

TABLE OF CONTENTS

SECTION 1 INVITATION FOR BID	1-1
1.1. Introduction	1-1
1.2. Obtaining the Contract Documents	1-1
1.3. Description of Work	1-1
1.4. Submittal Location and Deadline	1-2
1.5. Licenses	1-2
1.6. Bidding and Contract Information	1-3
1.7. Business Diversity Program	1-3
1.8. Federal Requirements	1-4
1.9. Reserved	1-4
1.10. Pre-Bid Meeting and Project Site Tour	1-4
1.11. Communication Protocol	1-4
1.12. Confidentiality	1-5
1.13. Reservations of Rights of VTA	1-5
SECTION 2 FOREWORD	2-1
2.1. Overview of Santa Clara Valley Transportation Authority	2-1
2.2. Equal Opportunity Employer	2-1
2.3. Description of the Contracting Process	2-1
2.3.1. General Process	2-1
2.3.2. Notice of Award	2-2
2.3.3. Bid Security	2-2
2.3.4. Executed Contract and Notice to Proceed	2-3
2.4. State and Federal Tax Forms	2-3
2.5. Definitions	2-3
SECTION 3 INSTRUCTIONS TO BIDDERS	3-1
3.1. Pre-Bid Meeting	3-1
3.2. Examination of the Contract Documents	3-1
3.3. Examination of Site and Existing Conditions	3-1
3.4. Addenda to Contract Documents	3-1
3.5. Prevailing Wage Requirements	3-2
3.6. Workers Compensation	3-2
3.7. Federal Requirements	3-3
3.8. Business Diversity	3-3
3.8.1. Goal	3-3
3.8.2. Business Diversity Policy and Requirements	3-3
3.9. Preparation of Bid	3-3
3.9.1. Submit Bid on Form Provided	3-3
3.9.2. Prices, Taxes and Applicable Fees in the Bid	3-4
3.9.3. Sealed Envelope	3-4
3.10. Bid Forms	3-4
3.10.1. Bid Form 1: Schedule of Quantities and Prices	3-4

Hamilton Station Stabilization
Contract C20046F

3.10.2.	Bid Form 2: Bid Security Form/ Bidder’s Bond.....	3-4
3.10.3.	Bid Form 3: Designation of Subcontractors	3-5
3.10.4.	Bid Form 4: Listing of DBE Contractor or Subcontractors	3-5
3.10.5.	Bid Form 5: Supplemental Contractor and Subcontractor Information	3-5
3.10.6.	Bid Forms 6 to 7 and 10	3-5
3.10.7.	Bid Forms 8 to 9	3-5
3.10.8.	Bid Forms 20 to 23	3-5
3.11.	Bids and Bid Opening	3-5
3.11.1.	Late Bids.....	3-6
3.11.2.	Withdrawal of Bid	3-6
3.11.3.	Conditional Bids	3-6
3.11.4.	Bidders Interested in More than One Bid	3-6
3.11.5.	Single Bid Response	3-6
3.12.	Award or Rejection of Bids.....	3-6
3.12.1.	Award Process.....	3-6
3.12.2.	Reserved	3-7
3.13.	Basis of Award.....	3-7
3.14.	Responsibility Hearing.....	3-7
3.15.	Bidder Review and Protest Procedures.....	3-7
3.15.1.	General Information	3-7
3.15.2.	Pre-Bid Opening Protests.....	3-7
3.15.3.	Post Bid Opening Protests	3-8
3.15.4.	Appeal	3-8
3.16.	Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions.....	3-8
SECTION 4 BID FORMS.....		4-1
Bid Form 1	Bid Form, Schedule of Quantities and Prices, Contractor Information	4-1
Bid Form 2	Bidder’s Bond	4-1
Bid Form 3	Designation of Subcontractors.....	4-1
Bid Form 4	Listing of DBE Contractor or Subcontractors	4-1
Bid Form 5	Supplemental Contractor and Subcontractor Information	4-1
Bid Form 6	Litigation Disclosure	4-1
Bid Form 7	Certificate of Bidder – Occupational Safety and Health	4-1
Bid Form 8	Non-Collusion Declaration	4-1
Bid Form 9	Public Contract Code Statements	4-1
Bid Form 10	References and Previous Experiences.....	4-1
Bid Form 20	Debarment and Suspension Certification	4-1
Bid Form 21	Certification of Restrictions on Lobbying	4-1
Bid Form 22	Buy America Certification	4-1
Bid Form 23	Equal Employment Opportunity Certification.....	4-1
SECTION 5 CONTRACT FORMS		5-1
Contract Form 1	Construction Agreement	5-1
Contract Form 2	Performance Bond	5-1
Contract Form 3	Payment Bond	5-1
Contract Form 4	Listing of Subcontractors, Suppliers, and Subconsultants	5-1
Contract Form 5	Designation of Authorized Representative.....	5-1
SECTION 6 SPECIAL CONDITIONS		6-1

Hamilton Station Stabilization
Contract C20046F

6.1.	Indemnity and Defense of Claims	6-1
6.1.1.	Indemnify and Hold Harmless.....	6-1
6.1.2.	Limitation on Indemnity.....	6-1
6.1.3.	Duty to Defend.....	6-1
6.1.4.	Survive Expiration or Termination	6-1
6.2.	Insurance.....	6-2
6.3.	Contract Bonds and Surety Requirements	6-2
6.3.1.	Payment Bond.....	6-2
6.3.2.	Performance Bond	6-2
6.3.3.	Surety Requirements	6-2
6.4.	Time for Performance	6-3
6.5.	Liquidated Damages.....	6-3
6.6.	Contract Data Requirements	6-3
6.6.1.	Contract Data Requirements	6-3
6.6.2.	Submittal.....	6-4
6.7.	Permits, Fees and Inspections.....	6-6
6.8.	Payment of Fines and Fees	6-6
6.9.	VTA Furnished Materials	6-6
6.10.	Delivery, Unloading and Storage.....	6-7
6.11.	Work Sequence and Constraints.....	6-7
6.11.1.	Use of Rail Mounted Equipment.....	6-7
6.11.2.	Specific Construction Requirements	6-8
6.12.	Reserved	6-9
6.13.	Sound Control Requirements.....	6-9
6.14.	Safety Precautions, Programs, and First Aid Requirements.....	6-9
6.14.1.	Safety Supervision.....	6-9
6.14.2.	Hazardous Substances	6-10
6.14.3.	Safety Data Sheets and Hazardous Substances	6-10
6.14.4.	Hazardous Substances Controls and Storage.....	6-11
6.14.5.	Written Safety Precautions	6-11
6.14.6.	Protection of Work and Property; Responsibility for Loss.....	6-12
6.14.7.	VTA Patrols.....	6-12
6.14.8.	Notice in Writing Before Breaking Ground	6-12
6.14.9.	Safeguards for Safety and Protection	6-12
6.14.10.	Job Safety Compliance	6-12
6.14.11.	Damage to the Work.....	6-13
6.14.12.	Dangerous Conditions.....	6-13
6.14.13.	Emergencies.....	6-13
6.15.	Contractor Safety and Light Rail Transit Operations.....	6-14
6.15.1.	Definition of Terms	6-14
6.15.2.	Use of Electronic Devices.....	6-15
6.15.3.	Restricted Access Permit.....	6-16
6.15.4.	Site Specific Work Plan	6-16
6.15.5.	Required Safety Training Records and Reports	6-17
6.15.6.	General Contractor Safety Training Requirements.....	6-17
6.15.7.	Roadway Worker Protection Compliance Inspection	6-18
6.15.8.	Restricted Access Work Rules	6-18
6.15.9.	Track Allocation Procedures	6-18
6.15.10.	Lockout/Tagout/Blockout Procedures	6-19
6.15.11.	On-Track Safety.....	6-21

Hamilton Station Stabilization
Contract C20046F

6.15.12.	Restricted Access Permit Fees	6-21
6.16.	Access and Working Hours.....	6-22
6.17.	Contractor Cooperation and Coordination	6-23
6.18.	Substantial Completion and Acceptance	6-23
6.18.1.	Substantial Completion.....	6-23
6.18.2.	Punch List Items	6-24
6.18.3.	Final Acceptance	6-24
6.19.	Final Pay Quantities	6-25
6.20.	Project Close-Out Requirements – Record Drawings.....	6-25
6.21.	Progress Schedule	6-25
6.21.1.	General Requirements	6-25
6.21.2.	Reserved	6-26
6.21.3.	Schedule Float.....	6-26
6.21.4.	Reserved	6-27
6.21.5.	Baseline CPM Schedule	6-27
6.21.6.	Schedule Update	6-28
6.21.7.	Three-Week Look-Ahead Schedule.....	6-29
6.21.8.	Schedule Revisions.....	6-29
6.21.9.	Recovery Schedule	6-30
6.21.10.	Time Impact Evaluation for Change Orders and Delays	6-30
6.21.11.	Time Extensions	6-30
6.21.12.	Adverse Weather Delays.....	6-31
6.21.13.	Payment Provisions.....	6-32
6.22.	References to Days.....	6-32
6.23.	Reserved	6-33
6.24.	Value Engineering Change Proposal	6-33
6.24.1.	Basis for Value Engineering Change Proposal.....	6-33
6.24.2.	Content of VECP.....	6-33
6.24.3.	Acceptance of VECP	6-34
6.24.4.	VECP Contract Price Adjustment	6-34
6.24.5.	Inclusion in Subcontracts	6-34
6.24.6.	Identical VECP	6-35
6.24.7.	Restrictions	6-35
6.25.	Reserved	6-35
6.26.	Quality Assurance and Quality Control Requirements	6-35
6.27.	Environmental Coordination and Cooperation	6-35
6.28.	Reserved	6-35
6.29.	Reserved	6-35
6.30.	Reserved	6-35
6.31.	Reserved	6-35

SECTION 7 GENERAL CONDITIONS7-1

7.1.	Applicable Law and Jurisdiction	7-1
7.2.	Compliance with Laws and Regulations.....	7-1
7.3.	Contractor Licensing Requirements.....	7-1
7.4.	Independent Contractor	7-1
7.5.	Permits, Licenses, Fees and Notices.....	7-2
7.6.	Nondiscrimination.....	7-2
7.7.	Prohibited Interests	7-2
7.7.1.	Solicitation	7-2

Hamilton Station Stabilization
Contract C20046F

7.7.2.	Interest of Public Officials	7-3
7.7.3.	Interests of Contractor.....	7-3
7.8.	Labor Provisions	7-3
7.8.1.	Register with DIR.....	7-3
7.8.2.	Safety	7-3
7.8.3.	Overtime Requirements	7-3
7.8.4.	Prevailing Wage Rates	7-3
7.8.5.	Liability for Unpaid Wages	7-4
7.8.6.	Withholding for Unpaid Wages and Liquidated Damages	7-4
7.8.7.	Travel and Subsistence Payments.....	7-4
7.8.8.	Retention of Labor Records	7-4
7.8.9.	Employment of Apprentices	7-5
7.8.10.	Subcontracts	7-5
7.9.	Hazardous Materials or Unusual Conditions.....	7-5
7.10.	Reserved	7-6
7.11.	Reserved	7-6
7.12.	Patent Rights	7-6
7.13.	Intellectual Property, Copyright and Patent Infringement	7-6
7.14.	Rights in Technical Data	7-6
7.15.	Ownership of Work and Material	7-7
7.16.	Title and Risk of Loss	7-7
7.17.	Assignment and Delegation	7-7
7.18.	Subcontracts	7-7
7.19.	Waiver and Non-waiver	7-8
7.20.	Antitrust Claims.....	7-8
7.21.	Stop Notices	7-8
7.22.	Reserved	7-8
7.23.	Reserved	7-8
7.24.	Authorized Representatives.....	7-8
7.25.	Notices and Communications	7-9
7.25.1.	Notices	7-9
7.25.2.	Drawing/Plan Clarification	7-9
7.25.3.	Requests for Information (RFIs)	7-10
7.26.	Pre-Construction Meeting.....	7-10
7.27.	Project Meetings	7-11
7.28.	Publicity Releases.....	7-11
7.29.	Notice to Proceed	7-11
7.30.	Time of Completion.....	7-11
7.31.	Progress Schedule	7-12
7.32.	Excusable Delays and Extensions of Time	7-12
7.33.	Failure to Complete the Work on Time.....	7-12
7.34.	Contractor’s Work Area	7-12
7.35.	Temporary Construction Facilities and Utilities	7-13
7.36.	Character of Workers.....	7-13
7.37.	Working Environment	7-13
7.38.	Public Convenience and Safety	7-13
7.39.	Cooperation/Coordination and Work by Others	7-14
7.40.	Security	7-14
7.41.	Product Options, Supplier Approval and Substitutions	7-14
7.42.	Source of Materials	7-14

Hamilton Station Stabilization
Contract C20046F

7.43.	Submittal of Shop Drawings, Product Data and Samples	7-14
7.44.	Survey Requirements	7-16
7.44.1.	Lines and Grades.....	7-16
7.44.2.	Monument Preservation.....	7-16
7.45.	Protection and Restoration of Property.....	7-17
7.46.	Utility Paint Markings.....	7-18
7.47.	Reserved	7-18
7.48.	Inspection.....	7-18
7.49.	Certificates of Compliance and Testing.....	7-19
7.49.1.	Certificates of Compliance	7-19
7.49.2.	Testing.....	7-19
7.49.3.	Furnish without Charge.....	7-19
7.50.	Removal of Rejected or Unauthorized Work	7-19
7.51.	Disposal of Materials.....	7-20
7.52.	Protection of Completed Portions of Work	7-20
7.53.	Clean-up	7-20
7.54.	Redlined Construction Drawings.....	7-20
7.55.	Final Inspection and Acceptance of All or a Portion of the Work	7-20
7.55.1.	Final Inspection and Acceptance of all the Work.....	7-20
7.55.2.	Final Inspection and Acceptance of a Portion of the Work	7-21
7.56.	Compensation	7-22
7.57.	Increased or Decreased Quantities and Quantity Variation	7-22
7.58.	Certified Payrolls	7-23
7.58.1.	Submit Certified Copies	7-23
7.58.2.	Form of Certified Copies	7-24
7.59.	Progress Payment	7-24
7.59.1.	Schedule of Values.....	7-24
7.59.2.	Progress Payment Processing	7-25
7.59.3.	Full Compensation	7-25
7.59.4.	Materials on Hand	7-26
7.59.5.	Retention	7-26
7.59.6.	Special Withholding	7-26
7.59.7.	Substitution of Securities.....	7-27
7.60.	Force Account Payment	7-30
7.60.1.	Work Performed by Contractor	7-31
7.60.2.	Labor	7-31
7.60.3.	Materials.....	7-31
7.60.4.	Equipment Rental	7-32
7.60.5.	Equipment at the Worksite.....	7-33
7.60.6.	Equipment Not at the Worksite.....	7-33
7.60.7.	Work Performed by Special Forces or Other Special Services	7-34
7.60.8.	Owner-Operated Equipment	7-35
7.61.	Prompt Payment	7-35
7.61.1.	Prompt Payment to Contractor	7-35
7.61.2.	Payment to Subcontractors	7-36
7.62.	Final Payment.....	7-36
7.63.	Project Records	7-37
7.64.	Reserved	7-37
7.65.	Change Requests and Change Notices.....	7-37
7.65.1.	Change Request	7-37

Hamilton Station Stabilization
Contract C20046F

7.65.2.	Change Notices	7-38
7.66.	Change Order	7-38
7.67.	Differing Site Conditions	7-39
7.67.1.	Soil Boring or Other Data	7-39
7.67.2.	Notice of Differing Conditions	7-39
7.68.	Claims and Claim Resolution	7-39
7.68.1.	Claim Defined.....	7-39
7.68.2.	Claim Requirements.....	7-39
7.68.3.	Claim Review.....	7-40
7.68.4.	Payment of Undisputed Portion	7-41
7.68.5.	Meet and Confer.....	7-41
7.68.6.	Inaction Deemed Rejection.....	7-42
7.68.7.	Subcontractor Claims.....	7-42
7.68.8.	Waivers of Rights under Public Contract Code Section 9204	7-42
7.68.9.	Procedures for Civil Actions	7-42
7.69.	Suspension of Work	7-43
7.70.	Termination for Convenience or in the Public Interest.....	7-44
7.71.	Termination for Default	7-44
7.71.1.	Events or Conditions	7-44
7.71.2.	Notice and Procedures.....	7-46
7.72.	Contractor’s Duties Upon Termination	7-47
7.73.	Warranty	7-47
7.74.	Warranty Work	7-47
7.75.	Warranty on Repaired or Replaced Parts	7-48
7.76.	Systematic Failures	7-48
SECTION 8 TECHNICAL SPECIFICATIONS		8-1
SECTION 9 CONTRACT DRAWINGS / PLANS.....		9-1
APPENDICES		1
Appendix A	Insurance Requirements	1
Appendix B	Contract Data Requirements	1
Appendix C	Business Diversity Policy and Requirements.....	1
Appendix D	Federal Requirements.....	1
Appendix E	Policy on the Use of Personal Electronic Devices.....	1
Appendix F	VTA Restricted Access	1
Appendix G	Environmental Coordination and Cooperation.....	1
Appendix H	Federal Wage Determination.....	1
Appendix I	Reserved.....	1
Appendix J	Reserved.....	1
Appendix K	VTA Substitutions for Caltrans Specs	1
Appendix L	Reserved.....	1
Appendix M	Quality Assurance and Quality Control Requirements	1
Appendix N	Reserved.....	1
Appendix O	Reserved.....	1
Appendix P	Procedure on Reflective Safety Vests	1
Appendix Q	Light Rail System Safety Program Plan.....	1

Hamilton Station Stabilization
Contract C20046F

SECTION 1 INVITATION FOR BID

1.1. Introduction

The Santa Clara Valley Transportation Authority (“VTA”) is requesting sealed written bids (“Bids”; “Bid”) from responsive and responsible qualified firms (“Bidders”) for the project titled below (“Project”):

**Hamilton Station Stabilization
Contract C20046F**

1.2. Obtaining the Contract Documents

Contract documents (herein referred to as “Contract Documents”) specifying the requirements of the work to be performed (“Work”), the terms of the contract (“Contract”) between VTA and the successful Bidder, and the details of the bidding procedure can be found at VTA’s website <https://www.vta.org/solicitations>. Click on the name of the solicitation that you are interested in.

To download documents for a solicitation, click "**Register or Log In to Download**" if you are not already logged in, and once you are registered and logged in, click "**Become a Plan Holder**" in order to download the documents. There is no charge for downloading these documents.

Register as a vendor and sign up for notifications for your North American Industry Classification System (“NAICS”) business codes at <https://www.vta.org/user/register?type=vendor>. By registering as a VTA vendor, Bidder will automatically receive notifications by email of upcoming VTA bidding opportunities.

It is highly recommended that prospective Bidders acquire the Contract Documents directly from VTA’s website in order to bid on this project and be assured that their Bids include all addenda. Bids that do not acknowledge receipt of addenda may be considered nonresponsive.

1.3. Description of Work

For purposes of this Contract, Work consists of furnishing all labor, materials, tools, equipment, services, supervision, and incidentals necessary to to perform the following scope of work for the Hamilton Stabilization Project:

1. Retaining Wall Repairs:
 - Install tieback assemblies and concrete walers to realign and brace existing mechanically stabilized earth (MSE) wall panels.
 - Realign existing MSE wall panels
 - Grout voids behind MSE wall panels
 - Adjust existing guardrail panels at MSE wall coping.
 - Cast polyester concrete at top of MSE wall coping.
 - Repair MSE wall panel spalls and panel joints

2. Track Realignment
 - Shift, tamp, line, surface, and destress tracks:
 - At front of Platform and Refuge Area.

3. Platform Repairs:
 - Adjust platform edge to accommodate new track alignment.

Hamilton Station Stabilization
Contract C20046F

- Adjust platform elevation to accommodate new track profile.
- Reconstruct station facilities as required for adjusting the platform.
- Adjust station facilities to finished grade as required for adjusting the platform.

The Work will be conducted within an operating rail corridor. This Work will be subject to restrictions to ensure safety and the continuing operations of the rail corridor and the light rail system.

The Engineer's Estimate for this Work ranges from \$415,500.00 to \$575,000.00. Refer to **Section 6.4 Time for Performance** for the time limit to complete all Work.

1.4. Submittal Location and Deadline

Bids must be submitted on ("Bid Opening") or before:

November 17, 2020 at 2:00 PM

Bids received after the date and time stated above will be rejected as nonresponsive. It is highly recommended that Bids be hand-delivered.

All Bids shall be enclosed in a sealed envelope bearing the Contract number, the title of the Project, the date and hour of the opening, and the name of the Bidder.

Bids will be received at the location set forth below:

Santa Clara Valley Transportation Authority
Procurement, Contracts and Materials Management
Attention: **Navie Kaur**
3331 North First Street, Building B
San José, California 95134

Bid will be publicly opened and read at the location set forth below:

Please meet at the lobby.

Santa Clara Valley Transportation Authority
Procurement, Contracts and Materials Management
Attention: **Navie Kaur**
3331 North First Street, Building B
San José, California 95134

Note: Due to COVID, only one representative is allowed per company. You must wear a mask and maintain a 6 feet distance from each other.

1.5. Licenses

The Bidder to whom the Contract will be awarded ("Contractor") must, at the time Contract Award, possess current licenses in the following classifications issued by the California Department of Consumer Affairs, Contractors State License Board:

License:

– Class A (General Engineering)

A Bidder may fulfill these license requirements either by itself or in conjunction with licenses held by subcontractors of any tier. A combination of prime contractor and subcontractor licenses is acceptable only when (a) each such subcontractor's scope of work is identified in Bid Form #3 (regardless of the subcontractor's tier or subcontract amount); and (b) each such subcontractor possesses the identified license at the time stated above.

Regardless of whether a subcontractor must be identified at the time of Bid, each subcontractor must also be properly licensed to perform its scope of work.

1.6. Bidding and Contract Information

Detailed instructions for the submittal of Bids are provided in **Section 3 Instructions to Bidders** and **Section 4 Bid Forms** of these Contract Documents. Items to especially note are listed in the table below:

Bid Forms to Submit	Refer to Section 4 Bid Forms for a list of required forms and certifications to submit at time of bid opening.
Bid Security	Each Bid must be accompanied by a certified check, a cashier's check or a bidder's bond in the sum of not less than 5% of the Total Bid Price. Refer to Section 3.10.2 Bid Security Form/ Bidder's Bond .
Prevailing Wages	This project is a "public work" as defined in Sections 1720 through 1720.6 of the California Labor Code. This Contract is subject to the prevailing wages as described in Section 3.5 Prevailing Wage Requirements .
Department of Industrial Relations Registration	Contractor and all subcontractors used for the Contract shall be registered, pursuant to Section 1725.5 of the California Labor Code, at the time of Bid Opening. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations ("DIR"). Refer to Section 3.5 Prevailing Wage Requirements .
Pre-Qualification	Pre-Qualification is not required.
Contract Forms to Submit	Refer to Section 5 Contract Forms for a list of required forms and certifications to submit at time of award. These forms are for reference only and are not to be submitted with the Bid Forms.
Additional Information	This project is federally funded.

1.7. Business Diversity Program

VTA encourages the use of Business Diversity Programs Business Enterprise ("BDPBE") firms in all our contracting opportunities. Refer to **Section 3.8 Business Diversity** and **Appendix C Business Diversity Policy and Requirements** for additional information.

DBE With Goal

A **9.45%** participation goal for Disadvantaged Business Enterprise (“DBE”) has been established for this Contract. Refer to **Section 3.8 Business Diversity** and **Appendix C Business Diversity Policy and Requirements** for additional information.

1.8. Federal Requirements

Federal requirements shall apply to all Work performed on the contract by Contractor’s own organization and with the assistance of workers under Contractor’s immediate superintendence and to all Work performed on the contract by piecework, station work, or by subcontract. Refer to **Section 3.7 Federal Requirements** and **Appendix D Federal Requirements**.

1.9. Reserved

1.10. Pre-Bid Meeting and Project Site Tour

A Pre-Bid Meeting will be held at the following location, date and time:

On

October 20, 2020 , at **02:00 PM**

Please meet at the lobby.

Santa Clara Valley Transportation Authority
Procurement, Contracts and Materials Management
Attention: **Navie Kaur**
3331 North First Street, Building B
San José, California 95134

Note: Due to COVID, only one representative is allowed per company. You must wear a mask and maintain a 6 feet distance from each other.

A site tour will be held promptly following the pre-Bid meeting at:

Hamilton Station - Campbell, California

1.11. Communication Protocol

Please direct inquiries concerning the Contract Documents, bidding procedure and legal requirements to the designated Contract Administrator for this project:

Contract Administrator: Navie Kaur
Email: Navdeep.Kaur2@vta.org

The deadline for submitting inquiries will be 2 PM, five (5) working days before Bid Opening date.

Bidders may not communicate with VTA Directors, Officers, staff or consultants. All requests for clarification, objections to or questions about the structure, content or distribution of this Invitation for Bids (“IFB”), or other inquiries during the procurement process must be submitted via email to the Contract Administrator. Communicating with any VTA representative(s) about this IFB other than as specifically permitted herein is grounds for disqualification.

Questions and/or objections must be as specific as possible and must identify the name of the project and the IFB section number and title at issue. Any party submitting a question or objection must be as specific as possible in their description.

Bidders shall only rely on information contained in this IFB, and any subsequent written supplement issued by the VTA through VTA's bid process. Bidders shall not rely on any other written or oral statements of the VTA or its officers, directors, employees, or agents regarding the Work, including statements made during site tours or otherwise.

1.12. Confidentiality

All information submitted to VTA under this IFB process becomes the exclusive property of VTA but, if not otherwise a public record under the California Public Records Act (California Government Code Section 6250 et seq.), shall not be open to public inspection. VTA has a substantial interest in not disclosing submissions during the evaluation process. For this reason, VTA will not disclose any part of the Bids before issuance of the Notice of Recommended Award, after which time all submissions will be subject to public disclosure to the extent such information constitutes a public record under the California Public Records Act.

1.13. Reservations of Rights of VTA

VTA reserves, holds and may exercise, at its sole discretion, the following rights and conditions with regard to this IFB, and by responding to this IFB, Bidders acknowledge and consent to the following rights and conditions:

- VTA reserves the right to issue addenda to amend this IFB or any related forms or document, or any reference information provided to Bidders.
- VTA reserves the right to respond to inquiries after the deadline for submitting inquiries.
- VTA reserves the right to cancel the procurement, to reject any and all Bids, or to negotiate separately in any manner necessary to serve the best interests of VTA, in accordance with applicable law.
- VTA reserves the right to waive any informality or immaterial irregularity in any Bid and/or accept or reject any items of a Bid
- This IFB does not obligate VTA to procure or to contract for any services.
- VTA reserves the right to change or alter the schedule for any events associated with this IFB upon notice to all potential Bidders.
- VTA reserves the right to eliminate any Bidder who submits incomplete or inadequate responses or is not responsive to the requirements of this IFB.
- VTA reserves the right to interview any or all Bidder references and to clarify the information provided pursuant to this IFB.

By order of the Santa Clara Valley Transportation Authority, State of California.

Approved for posting:



Daren Gee, P.E.
Construction Contracts Administration Manager
VTA Procurement, Contracts and Materials Management

Date

Hamilton Station Stabilization
Contract C20046F

[This Page Intentionally Left Blank]

SECTION 2 FOREWORD

2.1. Overview of Santa Clara Valley Transportation Authority

Santa Clara County is comprised of 15 cities and has a total population of 1.6 million people. The Santa Clara Valley Transportation Authority provides transit services in this area, including approximately 326 square miles in the urbanized portion of Santa Clara County. VTA currently operates 75 bus routes and the Guadalupe, Tasman, Vasona and Capitol Corridor light rail transit (LRT) lines. It also funds inter-regional commuter rail and express bus service, paratransit services, and light rail shuttle bus services to enhance the core transit system.

Working under a 17-member Board of Directors, VTA has a \$420 million annual budget and its currently approved capital program is approximately \$2.3 billion. It owns a fleet of 495 buses and 99 rail cars as well as 4 historic trolleys. VTA employs approximately 2,100 people.

VTA offers 42.2 miles of light rail extending from the Silicon Valley industrial and residential areas of Milpitas, Mountain View, Sunnyvale and Santa Clara to residential areas in South and East San José. The Light Rail System has 61 stations and multi-modal connections with CalTrain at the Mountain View and Tamien Station. This light rail system is one of the longest to be built in the U.S. in 50 years.

2.2. Equal Opportunity Employer

VTA is an Equal Opportunity employer. Contractors shall comply with the Equal Opportunity requirements as set forth in these Contract Documents. In the performance of this Contract, Contractor and its subcontractors shall not unlawfully discriminate, harass or allow harassment, against any employee or applicant for employment because of sex, gender, gender identity, gender expression, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), genetic information, marital status, age (over 40), sexual orientation, or military and veteran status. In addition, Contractors and subcontractors shall not unlawfully deny any of their employees family care leave or discriminate against them on the basis of having to use family care leave.

VTA affirms that disadvantaged and small business enterprises will be afforded full opportunity to submit Bids. Refer to **Appendix C Business Diversity Policy and Requirements** for business diversity requirements.

2.3. Description of the Contracting Process

2.3.1. General Process

The period between issuance of the Invitation for Bid and issuance of a Notice to Proceed consists of the steps listed below:

Bid Process

- Invitation for Bid posted and Pre-Bid Meeting
- Bid opening and submittal of Bid Forms
- VTA determines successful Bidder and issues a Notice of Recommended Award

Award Process

- Upon VTA's approval of the award of the Contract, VTA issues Notice of Award and Successful Bidder provides Contract forms and documents to VTA (see **Section 2.3.2 Notice of Award**)
- VTA reviews submitted forms and approves Performance Bond, Payment Bond, Insurance Certificates, and other documents as requested by VTA

Contract Execution and Notice to Proceed

- Execution of Contract by VTA
- VTA issues a Notice to Proceed

2.3.2. Notice of Award

After Bids are opened at the time and place stipulated, the Contract will be awarded to the lowest responsive and responsible Bidder ("Successful Bidder"), based on the "Total Bid Price" (as defined in **Section 2.5 Definitions**) subject to VTA's right to reject any or all Bids. No Bidder may withdraw its Bid for the period of days stipulated on the Bid Form after the date set for the Bid Opening. The Bid shall be subject to acceptance by VTA during this period.

Promptly upon VTA's approval of the award of the Contract, the Contracts Office will issue a "Notice of Award" letter to the Successful Bidder. Included with the NOA (as defined in Section 2.5 Definitions) will be two (2) originals of the **Construction Agreement** and one (1) original **Performance Bond** and **Payment Bond**.

Within **six (6) working days** from the date of NOA, the Successful Bidder shall return the following documents:

Documents

For additional information, reference the following:

- | | |
|---|---|
| • Executed copies of the Contract | |
| • The Performance Bond | Section 6.3 |
| • The Payment Bond | Section 6.3 |
| • Listing of Subcontractors, Suppliers and Subconsultants | Section 4 |
| • Certificates of Insurance | Appendix A |
| • Tax Forms | Section 2.4 State and Federal Tax Forms |
| • Other documents as requested by VTA | |

Refer to **Section 3 Instructions to Bidders** and **Section 6 Special Conditions** for additional information about each of the requirements listed above.

2.3.3. Bid Security

- (a) **Forfeiture of Bid Security.** Failure of the Successful Bidder to whom the NOA was issued to sign the Construction Agreement and submit all of the documents required within **six (6) working days** will be just cause for the annulment of the award and forfeiture of Bidder's security.
- (b) **Return of Bid Security.** If the Bid is not accepted by VTA within the period of days stipulated on the Bid Form after the date set for Bid Opening, or if the Successful Bidder executes and

delivers to VTA the required documents, then any certified or cashier's check shall be returned to all Bidders.

2.3.4. Executed Contract and Notice to Proceed

- (a) After delivery by the Successful Bidder of two (2) signed original Construction Agreements and all required submissions as stipulated above, VTA will sign the Construction Agreements. No agreement between VTA and Contractor is in effect until VTA executes the Construction Agreements.
- (b) VTA will issue a Notice to Proceed promptly following execution of the Construction Agreement and Contractor's compliance with the requirements as set forth in Section 2.3 and contingent upon approval of other documents as stated in the follow up "Letter to Notice of Award" issued by VTA.

Contractor shall commence performance of the Work after receipt of the Notice to Proceed, and shall continuously and diligently prosecute the Work to completion on or before the time or times set forth in **Section 6 Special Conditions** herein. Regardless of the date of the Notice to Proceed, the first day charged shall be the 20th **calendar day** following the date of the NOA. Should the first charged day fall on a Friday or weekend or holiday, the following working day shall be the first day charged

Contractor shall neither enter upon nor occupy VTA property or commence any materials fabrication prior to receiving the Notice to Proceed. Any Work performed or expenses incurred by Contractor prior to Contractor's receipt of Notice to Proceed shall be entirely at Contractor's risk.

2.4. State and Federal Tax Forms

Federal tax form W-9 and California state tax forms, either FTB Form 587 or Form 590, are required to be submitted annually. If the Successful Bidder has submitted these forms within the last 12 months, please so indicate when returning the Contract forms and other documents for execution by VTA.

2.5. Definitions

Certain terms used in this IFB have the meaning set forth below.

"Bid Add Alternates" are additional items of Work that may be awarded as part of the Contract if the Bids come within the budget specified in the Contract.

"Bidder(s)" means the respondent submitting a Bid in response to the Invitation for Bid.

"Construction Agreement" or **"Maintenance Agreement"** has the meaning as specified in Contract Form 1.

"Contract Documents" means documents for this project that specify the requirements of the Work to be performed inclusive of addenda, the terms of the contract between VTA and the successful Bidder inclusive of addenda, and the details of the bidding procedure.

"Contracts Office" or **"PCMM Office"** refers to the Procurement, Contracts and Materials Management offices of VTA, located at 3331 N. First Street, Building B, in San José, CA

“Day”, “working day” and “holiday” have the meaning as specified in **Section 6.22 References to Days**.

“DIR” means California Department of Industrial Relations

“IFB” means Invitation for Bids

“NOA” means Notice of Award

“Pre-Qualification” means the review and scoring of qualifications of potential Bidders in which such factors as financial capability, reputation, and management are considered in order to develop a list of qualified firms who may then be allowed to submit a Bid.

“Successful Bidder” means the Bidder that has submitted the lowest responsible and responsive bid, including holding the appropriate licenses as required by the Invitation for Bids.

“Total Bid Price” is the sum of the Bidder’s Total Base Bid and all Bid Add Alternates (if applicable). In the case of multiple year contracts, the Total Bid Price represents the sum of the Bid amount for each year of the Contract.

“Total Contract Price” is the value of the awarded Contract, as determined by adding Contractor’s Total Base Bid and accepted Bid Add Alternates (if applicable). In the case of Multiple Year Contracts, the Total Contract Price represents the sum of the Bid amount for each year of the Contract.

“Track Zone” means an area within six (6) feet of the closer rail on both sides of the track.

“VTA” means Santa Clara Valley Transportation Authority

“Work” means the work to be performed as specified in these Contract Documents.

“Worksite” means the site(s) upon which the Work will be performed or an area to be occupied by the Work and all adjacent and other related areas occupied or used by Contractor or his subcontractors. For maintenance contracts, this includes storage areas, buildings, staging areas, and areas for the production, procurement, storage, and disposal of materials and related equipment. The use of the word “job site” or “site” in these Contract Documents is synonymous with “Worksite.”

SECTION 3 INSTRUCTIONS TO BIDDERS

3.1. Pre-Bid Meeting

A pre-Bid meeting will be held at the time and place set out in **Section 1.10 Pre-Bid Meeting and Project Site Tour**. The purpose of this meeting is to inform prospective Bidders and potential subcontractors of subcontracting and material supply opportunities and to receive comments and questions regarding the Work and the Contract Documents from attendees. Representatives of VTA will be present to discuss:

- Participation of minority, women, disabled veterans, LGBT owned businesses, small businesses and/or disadvantaged businesses.
- Equal Employment Opportunity requirements.
- Coordination of the Work.
- Community relations
- Other subjects as appropriate.

If participation goals are stipulated in this Contract, attendance of prospective Bidders at this meeting may be one consideration of the reasonable good-faith efforts made to obtain the specified participation goal. Refer to **Appendix C Business Diversity Policy and Requirements** for additional information.

3.2. Examination of the Contract Documents

Each Bidder shall carefully examine the Contract Documents and become thoroughly familiar with the terms and conditions contained therein prior to the Bid Opening date. The Bid submitted shall include a sum to cover the cost of all items necessary to perform the Work. No allowance of any kind will be made to any Bidder because of lack of such examination or knowledge. The submittal of a Bid is conclusive evidence that the Bidder has made such an examination.

3.3. Examination of Site and Existing Conditions

In addition to examination of the Contract Documents, each Bidder shall, prior to the Bid Opening, become fully informed regarding all existing and expected site conditions which might in any way affect the cost or the time of performance of the Work. Any failure of the Bidder to fully investigate the Worksite and inform itself of existing and anticipated site conditions does not relieve such Bidder from responsibility for estimating properly the cost or difficulty of performing the Work.

A tour may be conducted in order to familiarize Bidders with the Worksite. Refer to **Section 1.10 Pre-Bid Meeting and Project Site Tour**.

3.4. Addenda to Contract Documents

VTA reserves the right to make changes in the Contract Documents as it may deem appropriate up to the time set for Bid Opening. Any and all changes in the Contract Documents shall be made by one or more written addenda, which shall be issued by VTA to all prospective Bidders who have registered and downloaded the Contract Documents at VTA's website.

If such addenda require changes in quantities or might affect the prices bid, or both, the date set for Bid Opening may be postponed by such number of days as in the opinion of VTA shall enable Bidders to revise their Bids. In any case, Bid Opening will be at least **72 hours** after the issue date of the last addendum and that addendum shall include an announcement of the new date, if applicable, for the Bid Opening.

Failure to acknowledge receipt of all addenda may cause the Bid to be considered non-responsive to the Contract Documents. Bidder certifies that the Contract Documents and addenda thereto have been thoroughly read and that there are no misunderstandings as to the meaning, purpose, or intent of any provision in the Contract Documents as modified by those addenda.

3.5. Prevailing Wage Requirements

All Bidders bidding on this Work (and any listed subcontractors carrying out covered work) must be registered with the DIR as further set forth at Section 7.8 Labor Provisions. Listing of subcontractors is as follows:

- Bid Form 4 and Bid Form 5, in accordance with the instructions provided in those bid forms.
- All subcontractors of every tier, for any dollar amount, must be listed on Contract Form 4 "Listing of Subcontractors, Suppliers and Subconsultants" prior to issuance of the Notice to Proceed.
- Any subcontractors, for any dollar amount, added to the project after the Notice to Proceed requires notification to VTA.

Pursuant to appropriate sections of the Labor Code of the State of California, the Director of the DIR has ascertained the general prevailing rate of wages (which rate includes employer payments for health and welfare, vacation, pension, and similar purposes) applicable to the Work for straight time, overtime, Saturday, Sunday and holiday work. Contractor shall post a copy of the prevailing wage rates at the Worksite or material staging area.

Workers employed in the Work must be paid at the rates at least equal to the prevailing wage rates specified by VTA. If Contractor uses a craft or classification not shown on the prevailing wage determinations, Contractor may be required to pay the wage rate of that craft or classification most closely related to it as shown in the general determinations effective at the time of Contract award.

In the performance of the Work, Contractor and all subcontractors **carrying out covered work** shall be responsible for compliance with California Labor Code Sections 1776 (Payroll records, retention, inspection, noncompliance penalties, rules and regulations) and 1777.5 (Employment of registered apprentices, wages, standards, number, apprenticeable craft or trade, exemptions, contributions).

This Contract is also subject to federal requirements for payment of prevailing wages as determined by the Secretary of Labor. Federal wage rates are available at the Department of Labor website <https://www.wdol.gov/dba.aspx> and at the Contracts Office of VTA. The applicable Federal Wage Determination for this contract will be based on CA20200018 Modification 20. A copy of the Federal Wage Determination may also be found in **Appendix H Federal Wage Determination**. Where there are differences in the rates, the higher shall apply.

3.6. Workers Compensation

In addition to the bid forms described in this Section 3 Instructions to Bidders, by signing and submitting this Bid, the Bidder is providing the certification set out below.

Bidder hereby certifies that it is aware of the provisions of California Labor Code §3700, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and that Bidder will comply with such provisions before commencing the performance of the Work.

3.7. Federal Requirements

This project is subject to financial assistance grants from the Federal Transit Administration (FTA) CA-05-0274-00, CA-2018-007-00, CA-2020-007-00. Each prospective Bidder shall carefully examine **Appendix D Federal Requirements** and understand the Federal Contract Provisions. Contractor shall insert in each subcontract all of the stipulations contained in the Federal Contract Provisions and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made of the Contract Documents and become thoroughly familiar with the terms and conditions contained therein prior to the Bid Opening date. Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Federal Contract Provisions.

Refer to **Section 4 Bid Forms** for the bid forms required due to Federal Requirements.

3.8. Business Diversity

3.8.1. Goal

A participation goal for Disadvantaged Business Enterprises (“DBEs”) has been established for this Contract as detailed in Section 1.7 Business Diversity Program of the Invitation for Bid.

3.8.2. Business Diversity Policy and Requirements

Bidders must comply with VTA's Policy on Utilization of Disadvantaged Business Enterprises (DBEs) Policy and Requirements, as set out in Appendix C Business Diversity Policy and Requirements.

A Bidder who fails to achieve the DBE participation goal and who fails to demonstrate sufficient good-faith efforts to meet such goal shall be deemed “non-responsive” and therefore ineligible for award of the Contract.

Bid Form 4, Bid Form 5, and Good Faith Efforts (if the DBE goal is not achieved) must be submitted in accordance with Section 3.10 Bid Forms and Appendix C Business Diversity Policy and Requirements. If Bidder is also a DBE firm, then list the bidder/contractor name on the Bid Form 4 and Bid Form 5.

All DBE firms listed on Bid Form 4 must be certified by the California Unified Certification Program (CUCP) at the time of Bid to be counted toward the above-stated DBE Participation Goal.

It is the Bidder’s sole responsibility for verifying subcontractor certification as a DBE to VTA. Bidders may search a list of certified DBE firms at http://www.dot.ca.gov/hq/bep/find_certified.htm. The DBE application is available at <http://www.vta.org/osdb>.

The DBE Goal Achieved in the approved Bid Form 4 equates to a commitment from Contractor; Contractor must meet this commitment.

3.9. Preparation of Bid

The Bidder shall prepare its Bid in strict accordance with all of the requirements of the Contract Documents and any addenda thereto. In order to receive consideration, all Bids shall comply with the following instructions:

3.9.1. Submit Bid on Form Provided

Bids shall be submitted on the forms provided in these Contract Documents in signed original. Bids submitted in any other form may be considered nonresponsive and rejected.

Blank spaces in each Bid form shall be properly filled in by indelible means, and the phraseology thereof shall not be changed. Any conditions or limitations made to the items mentioned therein may be cause for rejection. Alterations by erasure or interlineation must be explained or noted in the Bid over the signature of the Bidder.

No modification of a Bid Form will be considered.

3.9.2. Prices, Taxes and Applicable Fees in the Bid

Bids shall include full compensation for furnishing all labor, material, tools, and equipment and doing all the Work complete in place in accordance with the requirements of the Contract. Bid prices shall include all applicable taxes, freight charges and other applicable fees of any kind.

Contractor shall be responsible for assessing any and all applicable taxes related to the purchase of or installation of materials used on a VTA project and shall, for purposes of determining transaction or use tax liability, use the Worksite as the place where "engaged in business".

3.9.3. Sealed Envelope

All Bids shall be enclosed in a sealed envelope bearing the Contract number, the title of the Project, the date and hour of the opening, and the name of the Bidder. Bids shall be addressed to the name and location as specified in **Section 1.4. Submittal Location and Deadline**. It is the sole responsibility of the Bidder to see that its Bid is received in a timely manner.

3.10. Bid Forms

Bids shall include the Bid Forms as outlined in the cover page of Section 4 Bid Forms. The sections that follow provide specific requirements for the Bid Forms to be submitted.

3.10.1. Bid Form 1: Schedule of Quantities and Prices

The Bidder must complete and submit **Bid Form 1** in its entirety as instructed in **Bid Form 1**.

The quantities given in the Schedule of Quantities and Prices for which unit prices are asked to be Bid are approximate only, being given as a basis for the comparison of Bids, and VTA does not, expressly or by implication, represent that the actual quantities required will correspond therewith, but reserves the right to increase or decrease or omit entirely the quantity of any class or portion of the Work, or materials required for all or any portion of the Work, as VTA may deem necessary or advisable.

On all Bid items for which Bids are to be received on a unit price basis, the unit price for all items must be shown, as well as the extended price (unit price multiplied by the number of units shown on **Bid Form 1**) for each Bid item. If there is a discrepancy between unit prices and extended price for any Bid item, the unit price multiplied by the number of units shall prevail. In the event of a discrepancy between the sum of the extended prices for all Bid items and the Total Bid Price, the sum of the extended prices of all items shall prevail. The sum of extended prices on all Bid items and the Total Bid Price must be calculated to two (2) decimal places.

3.10.2. Bid Form 2: Bid Security Form/ Bidder's Bond

At the Bid Opening, each Bid shall be accompanied by **Bid Form 2** and a certified or cashier's check, or a Bidder's Bond in the sum of not less than **5% of the Total Bid Price** (as defined in **Section 2.5 Definitions**

and as further represented below) and said checks or bond shall be made payable to the order of the Santa Clara Valley Transportation Authority.

3.10.3. Bid Form 3: Designation of Subcontractors

At the Bid Opening, each Bid shall be accompanied by **Bid Form 3**. If there are no subcontractors, Bidder shall write “No Subcontractors” on the form. If there are subcontractors, follow the instructions on **Bid Form 3**.

3.10.4. Bid Form 4: Listing of DBE Contractor or Subcontractors

At the Bid Opening, the Bidder must complete and submit **Bid Form 4** in its entirety as instructed in **Bid Form 4**.

3.10.5. Bid Form 5: Supplemental Contractor and Subcontractor Information

At the Bid Opening, each Bid shall be accompanied by **Bid Form 5**. Each Bidder must complete and submit **Bid Form 5** in its entirety as instructed in **Bid Form 5**.

If a participation goal was specified in **Section 3.8 Business Diversity**, Bidders are required to submit Good Faith Effort documentation if goal is not achieved. **Good Faith Efforts documentation is required at Bid Opening**. Refer to **Appendix C Business Diversity Policy and Requirements** regarding requirements for Good Faith Effort documentation.

3.10.6. Bid Forms 6 to 7 and 10

At the Bid Opening, each Bid shall be accompanied by the following Bid Forms:

- (a) Bid Form 6 – Litigation Disclosure
- (b) Bid Form 7 – Certificate of Bidder – Safety and Health
- (c) Bid Form 10 – References and Previous Experience: Bidder shall provide the requested information in Bid Form 10 for the last three completed projects of similar scope, size and dollar value.

3.10.7. Bid Forms 8 to 9

At the Bid Opening, each Bid shall be accompanied by the following Bid Forms:

- (a) Bid Form 8 – Non-Collusion Declaration
- (b) Bid Form 9 – Public Contract Code Statements

3.10.8. Bid Forms 20 to 23

At the Bid Opening, each Bid shall be accompanied by the following Bid Forms:

- (a) Bid Form 20 – Debarment and Suspension Certification
- (b) Bid Form 21 – Certification of Restrictions on Lobbying
- (c) Bid Form 22 – Buy America Certification
- (d) Bid Form 23 – Equal Employment Opportunity Certification

3.11. Bids and Bid Opening

Bids will be opened and publicly read aloud by the Contract Administrator at the Bid Opening. The following conditions may apply to the bids.

3.11.1. Late Bids

Bids received after the Bid Opening will not be considered. Late Bids will be returned unopened.

3.11.2. Withdrawal of Bid

Any Bidder may withdraw its Bid, either personally or by a written request by a duly authorized representative, at any time prior to the scheduled time for Bid Opening. However, no Bidder may withdraw its Bid for a period of **120 calendar days** after the Bid Opening. Bidder's attention is directed to the provisions of the Public Contract Code Sections 5100 to 5110 regarding relief of Bidders.

3.11.3. Conditional Bids

Conditional Bids, or those which take exception to the Contract Documents, will be considered non-responsive and will be rejected.

3.11.4. Bidders Interested in More than One Bid

No entity shall be allowed to make or file or be interested as a principal in more than one Bid for the same Work, unless alternate Bids are called for. However, a person, firm or corporation submitting a sub-bid to a Bidder, or who has quoted prices on materials to a Bidder, is not thereby disqualified from submitting a sub-bid or quoting prices to other Bidders or from being a principal Bidder for the same Work.

3.11.5. Single Bid Response

If only one Bid is received in response to the Invitation for Bid, a detailed cost proposal will be required of the single Bidder. A cost/price analysis and evaluation and/or audit will be performed of the cost proposal in order to determine if the price is fair and reasonable.

3.12. Award or Rejection of Bids

3.12.1. Award Process

Award of the Contract to the Successful Bidder will be made within **120 calendar days** after the Bid Opening ("Initial Execution").

If the first Bidder selected as a Successful Bidder refuses or fails to execute the Contract within the Initial Execution period, VTA may award the Contract to the second-ranked Successful Bidder selected as provided herein and such an award, if made, will be made within **30 calendar days** after VTA notifies the second-ranked Successful Bidder of the first-ranked Successful Bidder's failure to execute the Contract ("Secondary Execution").

If the second-ranked Successful Bidder refuses or fails to execute the Contract within the Secondary Execution period, VTA may award the Contract to the third-ranked Successful Bidder selected as above provided and such an award, if made, will be made within **30 additional calendar days**.

If necessary, the same procedure may be utilized by VTA for awarding the Contract to subsequent Successful Bidders. The periods of time specified above within which the award of Contract may be made will be subject to an extension for such further period as may be agreed in writing between VTA and the Bidder concerned. VTA reserves the right to reject any or all Bids and to waive any informality in the Bids or in the Bid process. Obvious cases of Bid imbalancing may be cause for rejection.

3.12.2. Reserved

3.13. Basis of Award

The criteria for determining the Successful Bidder will include the Bidder's responsiveness to the requirements of the Contract Documents, Bidder's responsibility, results of a pre-award Buy America audit, if required and price. Any Bidder may be required to furnish evidence satisfactory to VTA that it and its proposed subcontractors have sufficient means and experience in the type of work called for in the Contract Documents to assure completion of the Contract in a satisfactory manner.

3.14. Responsibility Hearing

Before being declared non-responsible, a Bidder shall be notified of the proposed determination of non-responsibility, served with a summary of the information upon which VTA is relying and provided with an opportunity to be heard in accordance with applicable law. At the responsibility hearing, the Bidder will be allowed to rebut adverse information and to present evidence that it has the necessary quality, fitness and capacity to perform the Work.

The Bidder must exercise its right to request a hearing within **5 calendar days** after receipt of such notice. Failure to submit a written request for a hearing within the time frame set forth in this Section, will be deemed a waiver of the right to such a hearing and the awarding authority may proceed to determine whether or not the award of the contract should be made to another Bidder or whether or not the Bidder is non-responsible for this and future contracts.

The determination by VTA that the Bidder is non-responsible shall be final and constitute exhaustion of the Bidder's administrative remedies.

3.15. Bidder Review and Protest Procedures

The following procedures must be used by Bidders seeking review of the Contract Documents or the contracting process:

3.15.1. General Information

A Bidder may discuss the Contract Documents with VTA. Such discussions do not, however, relieve Bidders from the responsibility of submitting written, documented requests as required by these procedures. Bidder requests and protests shall be addressed to the Contracts Office, Santa Clara Valley Transportation Authority, 3331 North First Street, San José, CA 95134-1927, Attention: Procurement, Contracts & Materials Manager, and clearly marked "Bid Protest" on the outside of the envelope. VTA will decide the merits of the request or protest and render a determination. The protest resolution record will be provided to the protesting Bidder upon request.

3.15.2. Pre-Bid Opening Protests

Prior to Bid Opening, a Bidder may submit to VTA protests regarding the procurement process or items in the Contract Documents. Any such protest shall be received by VTA, in writing, not fewer than **ten (10) working days** before the date of scheduled Bid Opening. Any protest shall be fully supported with technical data, test results, or other pertinent information as evidence that the protest should be upheld.

VTA will make a determination of the merits of each Bidder protest. That written determination will be mailed or otherwise furnished to all Bidders.

3.15.3. Post Bid Opening Protests

Protests based upon alleged improprieties in the procurement process that can only be apparent after Bid Opening or the closing date for receipt of additional post Bid Opening documentation, shall be filed no later than **five (5) working days** following the issuance of a Notice of Recommended Award. Protests shall contain a statement of the grounds for protests and supporting documentation. Final VTA decision on the protest will be mailed or otherwise furnished to both the Successful Bidder and protesting Bidder prior to award of the Contract.

3.15.4. Appeal

A Bidder may appeal VTA's determination to the FTA. FTA review of any protest will be limited to determining VTA's failure to have or follow its own written protest procedures or failure to review a complaint or protest.

All appeals submitted to the FTA must be filed and will be handled in accordance with FTA circular 4220.1F. Appeals must be in writing and received by the FTA regional office within **five (5) working days** of the date the protester knew or should have known of the alleged impropriety. A Bidder must, at the same time, inform VTA in writing that it is appealing to FTA VTA's determination. The Bidder must first exhaust all administrative remedies available to the Bidder at VTA level before submitting an appeal to FTA. Upon request of the FTA, VTA will furnish to FTA a copy of all previous correspondence and other documentation pertaining to the Bidder's appeal. In conducting its review, FTA will consider only the correspondence and documentation provided by VTA and the Bidder as well as any additional information obtained through specific requests to VTA, Bidder, or other third-party.

3.16. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions

In addition to the bid forms described in this Section 3 Instructions to Bidders, by signing and submitting this Bid, the Bidder is providing the certification set out below.

The certification in this section is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the Bidder knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, VTA may pursue available remedies, including suspension and/or debarment.

The Bidder must provide immediate written notice to VTA if at any time the Bidder learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.

The terms “covered transaction,” “debarred,” “suspended,” “ineligible,” “lower tier covered transaction,” “participant,” “person,” “primary covered transaction,” “principal,” “proposal,” and “voluntarily excluded,” as used in this section, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549 [49 CFR Part 29]. You may contact VTA for assistance in obtaining a copy of those regulations.

The Bidder agrees by submitting its Bid that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by VTA.

The Bidder further agrees by submitting this proposal that it will include this section titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Non-procurement Programs.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this section. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

A participant in a covered transaction knowingly enters into a lower tier transaction with a person who is proposed for debarment under CFR 48 part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, VTA may pursue available remedies, including suspension and/or debarment.

SECTION 4 BID FORMS

These forms are designed to contain essential information concerning the Bidder and the Bid, and must be completed such that they can be read. If any of the completed forms are illegible, VTA may, at its option, declare the entire Bid unresponsive.

Bid Form 1	Bid Form, Schedule of Quantities and Prices, Contractor Information
Bid Form 2	Bidder's Bond Note: Form must be acknowledged by a notary
Bid Form 3	Designation of Subcontractors
Bid Form 4	Listing of DBE Contractor or Subcontractors
Bid Form 5	Supplemental Contractor and Subcontractor Information
Bid Form 6	Litigation Disclosure
Bid Form 7	Certificate of Bidder – Occupational Safety and Health
Bid Form 8	Non-Collusion Declaration
Bid Form 9	Public Contract Code Statements
Bid Form 10	References and Previous Experiences
Bid Form 20	Debarment and Suspension Certification
Bid Form 21	Certification of Restrictions on Lobbying
Bid Form 22	Buy America Certification
Bid Form 23	Equal Employment Opportunity Certification

Hamilton Station Stabilization
Contract C20046F

[This Page Intentionally Left Blank]

BID FORM 1
BID FOR CONTRACT C20046F

This form must be submitted with the Bid.

FROM: _____
(BIDDER'S NAME)

TO: THE SANTA CLARA VALLEY TRANSPORTATION AUTHORITY
STATE OF CALIFORNIA

In compliance with your Invitation for Bid for this project, the undersigned Bidder, being thoroughly familiar with the terms and conditions of the Contract Documents, hereby proposes and agrees to perform fully the Work within the time stated and in strict accordance with the Contract Documents.

The Bidder hereby acknowledges receipt of the following addenda to the Contract Documents:

Addendum No. _____ Dated _____
Addendum No. _____ Dated _____
Addendum No. _____ Dated _____
Addendum No. _____ Dated _____
Addendum No. _____ Dated _____
Addendum No. _____ Dated _____

FAILURE TO ACKNOWLEDGE RECEIPT OF ALL ADDENDA MAY CAUSE THE BID TO BE CONSIDERED NON-RESPONSIVE. BIDDER CERTIFIES THAT IT HAS READ AND UNDERSTANDS THE CONTRACT DOCUMENTS AND ADDENDA AND THE MEANING, PURPOSE AND INTENT OF EVERY PROVISION THEREIN.

Bidder hereby incorporates by reference all provisions of the Contract Documents.

CONTINUED ON NEXT PAGE →

BID FORM 1 (continued)

Schedule of Quantities and Prices

The prices quoted below include all applicable taxes, fees, permits, delivery and other charges as required.

If the Contract includes cleanup, please note that there is no separate payment item for "Cleanup"; therefore Bidder shall consider and include this in the various items of Work on the Schedule of Quantities and Prices.

BIDDER'S NAME: _____

(F)	Bid Item	Reference	Description	Unit	Qty.	Unit Price	Total
GENERAL REQUIREMENTS AND MSE WALL RETROFIT							
	1	01 71 13	Mobilization (Maximum Bid \$75,000)	LS	1		\$
	2	SC 6.21	Progress Schedule (Minimum Bid \$6,000)	LS	1		\$
	3	Appendix M	QA Program (Maximum Bid \$10,000)	LS	1		\$
	4	01 55 26	Traffic Control & Platform Accessibility	LS	1		\$
	5	01 71 23	Field Engineering	LS	1		\$
	6	SC 6.27, Appendix G	ESCAPE Plan (Preparation, Implementation and Maintenance)	LS	1		\$
	7	31 23 16	Structural Excavation (Waler and Tieback Assembly)	CY	20		\$
	8	31 23 23	Structure Backfill (Waler and Tieback Assembly)	CY	16		\$
	9	03 30 00	Cast-in-place Structure Concrete (Retaining Wall)	CY	5		\$
	10	03 30 53	Polyester Concrete	CF	4		\$
	11	03 61 30	Backfill Grouting	CF	27		\$
	12	03 41 00	Precast Structural Concrete (Joint Cover)	EA	6		\$

Hamilton Station Stabilization
C20046F

(F)	Bid Item	Reference	Description	Unit	Qty.	Unit Price	Total
	13	03 20 00	Concrete Reinforcing (Retaining Wall)	LB	1200		\$
	14	31 32 36	Tieback Assembly	EA	6		\$
	15	03 35 00	Repair Spalls at Retaining Walls	LS	1		\$
TRACK TAMPING AND REALIGNMENT							
	16	34 11 20	Track Lining, Tamping and Raising	TF	248		\$
PLATFORM REPAIRS							
	17	33 05 10	Adjust utility box to grade	EA	12		\$
	18	02 10 10	Reconstruct sign post	EA	2		\$
	19	02 10 10	Reconstruct trash receptacle	EA	3		\$
	20	33 05 10	Adjust fire hydrant to grade	EA	2		\$
	21	33 05 10	Adjust water hose bib cover to grade	EA	4		\$
	22	33 05 10	Adjust cleanout box to grade	EA	1		\$
	23	02 10 10	Reconstruct Emergency Phone Stanchion	EA	1		\$
	24	02 10 10	Reconstruct Ticket Vending Machine	EA	2		\$
	25	02 10 10	Reconstruct Information Kiosk	EA	1		\$
	26	02 10 10	Reconstruct Shelter Bench	EA	2		\$
	27	02 10 10	Reconstruct Translink CID	EA	1		\$
	28	02 10 10	Reconstruct plastic bollards set	EA	1		\$
	29	02 41 19	Selective Structure Demolition (Platform)	LS	1		\$
	30	03 20 00	Concrete Reinforcing (Platform)	LB	4900		\$
	31	05 50 00	Metal Fabrication (Platform)	LB	1700		\$
	32	03 41 00	Cast-in-place Structure Concrete (Platform)	CY	36		\$

Hamilton Station Stabilization
C20046F

(F)	Bid Item	Reference	Description	Unit	Qty.	Unit Price	Total
TOTAL BID PRICE:						\$	

CONTINUED ON NEXT PAGE →

BID FORM 1 (continued)

Signature Page

A. ENTER FULL AND CORRECT NAME OF BIDDER:

Firm Name: _____

B. ENTER BUSINESS ADDRESS

Street Address: _____

City, State, ZIP: _____

Phone #: _____ Email: _____

C. CALIFORNIA CONTRACTOR'S LICENSE

Number: _____

Class: _____

Expires: _____

D. BIDDER INFORMATION

Is this firm at least 51% owned by minorities or women?	<input type="checkbox"/> Yes <input type="checkbox"/> No (check one)
If yes, check the following primary ownership group:	<input type="checkbox"/> Asian Pacific <input type="checkbox"/> Asian Indian <input type="checkbox"/> Native American
	<input type="checkbox"/> Black <input type="checkbox"/> Hispanic <input type="checkbox"/> Caucasian <input type="checkbox"/> Other _____
Check gender of owner(s):	<input type="checkbox"/> Male <input type="checkbox"/> Female

E. LIST PRINCIPALS

The names of all persons as principals interested in the foregoing bid are as follows:
(IMPORTANT NOTICE: If Bidder or other interested person is a corporation, give legal name of corporation, and names of the President and Secretary thereof; if a partnership, give name of the firm, also names of all individual partners composing firm; if Bidder or other interested person is an individual, give first and last names in full. If a Bidder is a joint venture, supply the above information for each joint venture partner.) Attach additional pages if needed.

F. SIGN AND DATE

The person signing this Bid Form for the Bidder certifies that he or she is authorized by the Bidder to do so and that the Bidder is bound contractually by that signature.

Signature: _____

Name (print): _____

Title: _____

Date: _____

Hamilton Station Stabilization
C20046F

(This page is intentionally left blank)

BID FORM 2 BIDDER'S BOND

KNOW ALL PEOPLE BY THESE PRESENTS: That

WHEREAS the undersigned, _____
as Principal and _____

as Surety, are held and firmly bound unto the Santa Clara Valley Transportation Authority, a political subdivision of the State of California (hereinafter called "VTA") in the penal sum of **5%** of the **Total Bid Price** (as defined in **Section 2.5 Definitions**) of the Principal above named, submitted by said Principal to VTA for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that a bid to VTA for performance of that certain construction described as

HAMILTON STATION STABILIZATION C20046F

("Bid") has been submitted by Principal to VTA.

NOW THEREFORE, if the aforesaid Principal shall not withdraw said Bid within **120 calendar days** after said opening, and shall within the period specified therefore, or if no period be specified, within **six (6) working days** after the prescribed forms are presented to Principal for signature, enter into a written contract with VTA in the prescribed form in accordance with the Bid as accepted ("Contract"), submit the required insurance certificates and file two bonds with VTA; **a Performance Bond in the amount of 100% of the Total Contract Price** to guarantee faithful performance of the Work under the Contract and **a Payment Bond in the amount of 100% of the Total Contract Price** to guarantee payment for labor and materials, as required by law, or in the event of the withdrawal of said Bid within the period specified or the failure to enter into such Contract and give such bonds and insurance within the time specified, if the Principal shall pay VTA the difference between the amount specified in said Bid and the amount for which VTA may procure the required work, if the latter amount be in excess of the former, together with all costs incurred by VTA in again calling for bids, should that become necessary, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract on the call for Bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract or the call for bids, or to the work, or to the specifications.

In the event suit is brought upon this bond by VTA and judgment is recovered, the Surety shall pay all costs incurred by VTA in such suit, including a reasonable attorney's fee to be fixed by the court in accordance with applicable statutory law.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____ day of _____, 20_____.

PRINCIPAL

SURETY

(Company)

(Company)

(Signature)

(Signature)

(Name – Please Print)

(Name – Please Print)

(Title)

(Title)

NOTE: Signatures of those executing for Surety must be acknowledged by a Notary.

NOTE TO SURETY COMPANY:

The following form of acknowledgement should be used. If any other form of acknowledgement is used, there must be submitted a certified copy of unrevoked resolution of authority for the attorney-in-fact.

SURETY COMPANY ATTORNEY-IN-FACT

State of California)
County of _____)

On _____, before me, the undersigned, a Notary Public in and for the State, personally appeared _____, known

to me to be the duly authorized attorney-in-fact of the corporate Surety named in the within instrument, known to me to be authorized to execute that instrument on behalf of said corporation, known to me to be the person whose name is subscribed to such instrument as the attorney-in-fact of said corporation, and acknowledged to me that he (she) subscribed the name of said corporation thereto as Surety, and his (her) own name as attorney-in-fact and that said corporation executed the same.

(SEAL)

WITNESS MY HAND AND OFFICIAL SEAL:

Notary Public for the State of California

Acknowledgement by attorney-in-fact must be attached.
Corporate seals of Principal and Surety must be attached.

BID FORM 3 DESIGNATION OF SUBCONTRACTORS

IMPORTANT INFORMATION

Bidder shall completely fill in the form below for each proposed subcontract in excess of one-half of 1 percent of Bidder's Total Bid Price, or in Bids for the construction of streets, highways, including bridges, in excess of one-half of 1 percent of the Bidder's Total Bid Price or \$10,000, whichever is greater, in compliance with the Public Contract Code of the State of California, Sections 4100-4114.

Additionally, Bidder must list below all subcontractors (regardless of the subcontractor's tier or subcontract amount) needed to show compliance to **Section 1.5 Licenses**.

A. ENTER PRIME BIDDER INFORMATION

1. Bidder Name: _____
2. Total Amount to be Subcontracted: \$ _____
3. Total Percentage to be Subcontracted: _____%

B. ENTER NAMES OF SUBCONTRACTORS OR LOWER-TIER SUBCONTRACTORS AS REQUIRED ABOVE

SUBCONTRACTOR NAME	SUBCONTRACTOR'S ADDRESS	CONTRACTOR'S STATE LICENSE NUMBER	CONTRACTOR'S DIR REGISTRATION NUMBER	BID ITEM(S) & DESCRIPTION OF WORK
_____ _____ _____	_____ _____ _____	_____ _____	_____ _____	_____ _____ _____
_____ _____ _____	_____ _____ _____	_____ _____	_____ _____	_____ _____ _____
_____ _____ _____	_____ _____ _____	_____ _____	_____ _____	_____ _____ _____
_____ _____ _____	_____ _____ _____	_____ _____	_____ _____	_____ _____ _____

Hamilton Station Stabilization
C20046F

SUBCONTRACTOR NAME	SUBCONTRACTOR'S ADDRESS	CONTRACTOR'S STATE LICENSE NUMBER	CONTRACTOR'S DIR REGISTRATION NUMBER	BID ITEM(S) & DESCRIPTION OF WORK
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

BID FORM 4 LISTING OF SBE/DBE CONTRACTOR OR SUBCONTRACTORS

This form must be submitted with the Bid. Refer to instructions on Page 2 of this form when filling out this form.

A. ENTER PRIME BIDDER INFORMATION

- | | |
|----------------------------|----------------------------|
| 1. Bidder Name: _____ | 6. Email: _____ |
| 2. Street Address: _____ | 7. Preparer's Name: _____ |
| 3. City, State, ZIP: _____ | 8. Preparer's Title: _____ |
| 4. Phone #: _____ | 9. Signature: _____ |
| 5. Fax #: _____ | 10. Date: _____ |

B. LIST SBE/DBE CONTRACTOR AND SUBCONTRACTORS:

ENTERPRISE NAME (Column1)	ENTERPRISE NAICS CODE (Column2)	SBE/DBE (Column3)	CERTIFICATION NUMBER (Column4)	SUBCONTRACT /PO \$ AMOUNT (Column5)
_____ _____	____-____-____ ____-____-____ ____-____-____	<input type="checkbox"/> SBE <input type="checkbox"/> DBE	_____	\$ _____
_____ _____	____-____-____ ____-____-____ ____-____-____	<input type="checkbox"/> SBE <input type="checkbox"/> DBE	_____	\$ _____
_____ _____	____-____-____ ____-____-____ ____-____-____	<input type="checkbox"/> SBE <input type="checkbox"/> DBE	_____	\$ _____
_____ _____	____-____-____ ____-____-____ ____-____-____	<input type="checkbox"/> SBE <input type="checkbox"/> DBE	_____	\$ _____
_____ _____	____-____-____ ____-____-____ ____-____-____	<input type="checkbox"/> SBE <input type="checkbox"/> DBE	_____	\$ _____

11. Bidder has , has not (check one box) met SBE/DBE Participation Goal.

C. SUBMISSION OF GOOD FAITH EFFORT (GFE) DOCUMENTATION:

GFE documentation is required if Bidder's Goal Achieved is less than Participation Goal. Refer to the **Section 13.7 Good Faith Effort for documentation** to provide.

FOR VTA USE ONLY – BIDDER SHOULD NOT COMPLETE THIS SECTION

VTA OBDP certifies that all Business Enterprise certifications are valid and information on this form is complete and accurate.

Signature: _____
Printed Name/Title: _____
Phone #: _____

Date Signed: _____

INSTRUCTIONS FOR BID FORM 4

Refer to these instructions when filling out Bid Form 4 or the Bid may be rejected.

IMPORTANT: Identify all SBE/DBE firms being claimed for credit, regardless of tier. The preparer indicated in Part A is providing written confirmation of each listed SBE/DBE.

PART A: ENTER CONTRACTOR INFORMATION

- Line 1: Name of Bidder.
Line 2 and 3: Address of Bidder.
Line 4 and 5: Phone and Fax numbers of Bidder.
Line 6: Email of Bidder.
Line 7, 8 and 9: Printed name, title and signature of Bidder's Authorized Representative.
Line 10: Date when the Form is signed

PART B: LIST CONTRACTOR AND SUBCONTRACTORS

- Column 1: Enter name and address of the certified SBE/DBE subcontractor, or enter Bidder's name if Bidder is an SBE/DBE.
- Columns 2: Enter subcontractor/vender North America Industry Classification System ("NAICS") code(s). Ref. <https://www.census.gov/eos/www/naics/>.
- Columns 3: Check one of the choices offered. The firm must be certified through an approved certifying agency.
- Columns 4: Enter SBE (or BDE) certification number. An SBE/DBE must, at the time of Bid, be certified by VTA's Office of Business Diversity Program (OBDP) or SBEs/DBEs certified with the California Unified Certification Program (CUCP), or accepted by OBDP
- Column 5: Enter SBE/DBE subcontract or purchase order amount of the work to be performed or service to be provided. See **Appendix C Business Diversity Policy and Requirements** to determine how to count the participation credit amount of SBE/DBE firms. A summary of that information is provided below:

CREDIT FOR SBE/DBE VENDOR of materials or supplies is **limited to 60%** of its expenditures for materials and supplies required under this Contract and obtained from an SBE/DBE regular dealer. Credit for SBE/DBE manufacturers is given at 100% toward the SBE/DBE Goal Achieved only where the SBE/DBE vendor manufactures or substantially alters the material prior to resale.

CREDIT FOR SBE/DBE BROKERS (Distributor or Representative) is limited to the fees and commissions of the amount paid. All other firms receive 100% credit, less work subcontracted by the SBE/DBE to non-SBE/non-DBE firms, towards the SBE/DBE Goal Achieved.

CREDIT FOR SBE/DBE TRUCKING FIRMS is limited to amount performed by the SBE/DBE own trucks and drivers and by certified SBE/DBE trucking subhaulers. An SBE/DBE trucking firm must itself own and operate at least one fully licensed, insured and operational truck used on the Contract.

Formula to calculate Goal Achieved:

$$\text{SBE/DBE Goal Achieved} = \frac{\text{Sum [SBE/DBE Credit Amount]}}{\text{Total Bid Price}} \times 100$$

- Line 11: Calculate the SBE(or DBE) Goal Achieved as per above formula, and check whether Bidder's has met SBE/DBE Participation Goal. This percentage must equal or exceed the SBE or (DBE) Participation Goal or else Bidder must demonstrate Good Faith Efforts to achieve the goal. VTA will utilize the values provided herein to calculate Bidder's SBE/DBE Goal Achieved. Such values must be consistent with the values found elsewhere in the Bid Documents, otherwise **Bidder may be considered nonresponsive**. The Successful Bidder's SBE/DBE Goal Achieved becomes the Contractor's committed SBE/DBE goal.

BID FORM 5

SUPPLEMENTAL CONTRACTOR and SUBCONTRACTOR INFORMATION

1. INSTRUCTION TO CONTRACTOR: This form must be filled out by the Contractor and their subcontractors. Contractors, please copy this form distribute to all your subcontractors. Contractor must complete and sign all the forms, including subcontractor forms in Section D below and submit the information to the VTA Contract Administrator for this contract.

A. ENTER CONTRACTOR/SUBCONTRACTOR INFORMATION

1. Firm Name: _____
2. Street Address: _____
3. City, State, ZIP: _____
4. Phone #: () _____ 5. Email: _____

B. FIRM DEMOGRAPHICS

6. Check all that apply:
- DBE SBE Non-SBE/Non-DBE MWBE DVBE LGBTBE
-
7. Ethnicity Asian Subcontinent Asian Native American Black
 Hispanic Caucasian Other _____
-
8. Age of Firm: _____ 9. Gender Male Female
-
10. Firm Annual Gross Receipts Below \$500K \$500K to \$1M \$1M to \$4M
(indicate bracket of income): \$4M to \$6M \$6M to \$13M Above \$13M

C. FORM COMPLETED BY:

11. Form Completed by
(print name and sign) _____
12. Date Signed _____

D. TO BE COMPLETED BY CONTRACTOR

13. CONTRACTOR: _____
14. If firm listed in section A is a subcontractor, was subcontractor selected for a subcontract or purchase for this Contract? Yes No
15. If yes, enter the dollar value of this subcontract or purchase: \$ _____

INSTRUCTIONS FOR BID FORM 5

This form is for data collection purposes, required by federal regulation 49 CFR 26.11.

ENTER CONTRACTOR/SUBCONTRACTOR INFORMATION:

Contractor will fill out Parts A -D.

Contractor needs to make copies for their subcontractors. Subcontractors will fill out Parts A – C and return to this contractor. Contractor will fill out Part D on the subcontractor’s form and submit to VTA.

PART A: ENTER CONTRACTOR/ SUBCONTRACTOR INFORMATION

Line 1 to Line 5: Enter contractor/subcontractor name, address, phone number, and email.

PART B: FIRM DEMOGRAPHICS

- Line 6: Check all that apply. Make sure that firm is certified by an approved agency: California Unified Certification Program, VTA for SBE only (Small Business Enterprise), or DGS (Department of General Services)
- Line 7: Enter firm owner’s ethnicity
- Line 8: # of years firm has been in business
- Line 9: Select firm owner’s gender
- Line 10: Select firm’s annual gross receipts bracket.

PART C: FORM COMPLETED BY:

- Line 11: Print and sign the name of the person filling out this form
- Line 12: Enter date signed.

PART D: TO BE COMPLETED BY CONTRACTOR

- Line 13: Enter contractor’s name
- Line 14: If firm is a subcontractor that will be used on the contract, select Yes, otherwise select No
- Line 15: If firm is being used on the contract, enter subcontract value

**BID FORM 6
LITIGATION DISCLOSURE**

Bidder shall list and describe in detail all pending litigation, any litigation that has been closed in the past five years, and any pending investigations by the California Department of Industrial Relations in which Bidder's firm is or has been a party.

Include the following information:

- If your firm, or any of its owners or officers been convicted of a crime involving the awarding of a contract of a government construction project, or the bidding or performance of a government contract.
- If your firm or any of its owners, officers or partners ever been found liable in a civil suit or found guilty in a criminal action for making any false claim or material misrepresentation to any public agency or entity.
- If your firm or any of its owners, officers or partners ever been convicted of a crime involving any federal, state, or local law related to construction.
- If your firm or any of its owners, officers or partners ever been convicted of a federal or state crime of fraud, theft, or any other act of dishonesty.

Pending Litigation

Litigation settled in the last five years

Pending DIR Investigations

(Use additional sheets if necessary)

SIGN AND DATE

The person signing this Bid Form 6 for the Bidder certifies that he or she is authorized by the Bidder to do so and that the Bidder is bound contractually by that signature.

Signature: _____

Name (print): _____

Title: _____

Hamilton Station Stabilization
C20046F

Date: _____

[This Page Intentionally Left Blank]

BID FORM 7
CERTIFICATE OF BIDDER OCCUPATIONAL SAFETY AND HEALTH (OSH)

Bidder certifies the following:

1. Bidder does not have serious and willful violations of Part 1 (commencing with Section 6300) of Division 5 of the Labor Code, during the past five-year period
- *or* -
Bidder is taking appropriate corrective action to prevent further violations of Part 1 of Division 5 of the Labor Code.
2. Bidder's workers' compensation experience modification ("ex-mod") factor is below 1.25
- *or* -
Bidder's ex-mod factor is 1.25 to 1.75 and Bidder is taking all appropriate action to reduce employee workplace injuries, illnesses and workers' compensation losses.
3. Bidder has an injury prevention program instituted pursuant to Section 3201.5 or 6401.7 of the Labor Code.

SIGN AND DATE

The person signing this Bid Form 7 for the Bidder certifies that he or she is authorized by the Bidder to do so and that the Bidder is bound contractually by that signature.

Signature: _____

Name (print): _____

Title: _____

Date: _____

[This Page Intentionally Left Blank]

**BID FORM 8
NON-COLLUSION DECLARATION**

State of California)
)
County of _____) ss.

The undersigned declares:

I am the _____ of _____, the party making the
foregoing Bid. (TITLE) (COMPANY)

The Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The Bid is genuine and not collusive or sham. The Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The Bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid price of the Bidder or any other bidder, or to fix any overhead, profit, or cost element of the Bid price, or of that of any other bidder. All statements contained in the Bid are true. The Bidder has not, directly or indirectly, submitted his or her Bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a Bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the Bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and

correct and that this declaration is executed on this _____ day of _____, 20__

at _____,
(CITY) (STATE)

SIGN AND DATE

Signature of Declarant: _____

Name (print): _____

[This Page Intentionally Left Blank]

BID FORM 09
PUBLIC CONTRACT CODE STATEMENTS

There are three parts to this Bid Form. Complete the information in each part and sign the last page of this Bid Form.

A. Public Contract Code Section 10285.1 Statement

In accordance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the Bidder hereby declares under penalty of perjury under the laws of the State of California that the Bidder

has has not

been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "Bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The Bidder must place a check mark after "has" or "has not" in one of the blank spaces provided.

The above Statement is part of the Bid. Signing this Bid Form on the signature portion thereof shall also constitute signature of this Statement. Proposers are cautioned that making a false certification may subject the certifier to criminal prosecution.

B. Public Contract Code Section 10162 Questionnaire

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes No

Note: Bidder must place a check mark after "Yes" or "No".

If the answer is Yes, explain the circumstances in the following space:

C. Public Contract Code 10232 Statement

In accordance with Public Contract Code Section 10232, Bidder, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against Bidder within the immediately preceding two-year period because of Bidder's failure to comply with an order of a federal court which orders Bidder to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid. Signing this Bid Form on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Contractors are cautioned that making a false certification may subject the certifier to criminal prosecution.

By my signature on this Bid Form, I certify, under penalty of perjury under the laws of the State of California, that the foregoing questionnaire and statements of the Public Contract Code Sections 10285.1, 10162, AND 10232 are true and correct.

SIGN AND DATE

Signature: _____
Name (print): _____
Title: _____
Date: _____

BID FORM 10
REFERENCES AND PREVIOUS EXPERIENCES

A. ENTER PROJECT AND BIDDER INFORMATION

Contract Name Hamilton Station Stabilization
Contract Number C20046F
Bidder Name _____

B. PROJECT EXPERIENCE

IMPORTANT INFORMATION

Each Bidder must have the following minimum experience:

1. Contractor must have minimum 5 years of experience with an emphasis on civil and/or track work
2. Contractor must have previous experience with a governmental agency.

A Bidder can demonstrate this experience through either its subcontractor, key personnel or the entity as a whole.

Does Bidder meet the experience requirements indicated ABOVE?

Yes No (please check one)

NOTE: A "No" response will render the **Bid non-responsive**.

CONTINUED ON NEXT PAGE →

BID FORM 10 (continued)
REFERENCES AND PREVIOUS EXPERIENCES

C. ENTER REFERENCE INFORMATION

Bidder shall completely fill in this form **three completed projects** of experiences detailed above. "Owner" refers to the public or private agency for which services were provided. Use additional sheets, if necessary.

REFERENCE 1

Owner Agency/Firm Name _____

Address _____ Phone Number _____

Contact Name for Owner _____ Email for Contact _____

Dollar Value of Project \$ _____ Date Started _____ Date Completed _____

Detailed Scope of Work _____

REFERENCE 2

Owner Agency/Firm Name _____

Address _____ Phone Number _____

Contact Name for Owner _____ Email for Contact _____

Dollar Value of Project \$ _____ Date Started _____ Date Completed _____

Detailed Scope of Work _____

CONTINUED ON NEXT PAGE →

BID FORM 10 (continued)
REFERENCES AND PREVIOUS EXPERIENCES

REFERENCE 3

Owner Agency/Firm
Name _____

Address _____ Phone
Number _____

Contact Name for Owner _____ Email for Contact _____

Dollar Value of Project \$ _____ Date
Started _____ Date Completed _____

Detailed Scope of Work _____

[This Page Intentionally Left Blank]

BID FORM 20
DEBARMENT AND SUSPENSION CERTIFICATION

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

Bidder, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, manager:

- is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal agency;
- has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal agency within the past 3 years;
- does not have a proposed debarment pending; and
- has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Notes: Providing false information may result in criminal prosecution or administrative sanctions.

The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

By my signature on this Bid Form, I certify, under penalty of perjury under the laws of the State of California and the United States of America, that the Title 49 Code of Federal Regulations, Part 29 Debarment and Suspension Certification is true and correct.

BY:

Signature: _____
Name (print): _____
Title: _____
Date: _____

[This Page Intentionally Left Blank]

BID FORM 21
CERTIFICATION OF RESTRICTIONS ON LOBBYING

Bidder hereby certifies as follows:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of Bidder, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, Bidder shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. Bidder shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification was a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Bidder certifies or affirms the truthfulness and accuracy of each statement of certification and disclosure, if any. In addition Bidder understands and agrees that the provisions of 31 USC 3801, et seq., apply to this certification and disclosure, if any.

SIGN AND DATE

Bidder: _____

BY:

Signature: _____

Name (print): _____

Title: _____

Date: _____

[This Page Intentionally Left Blank]

BID FORM 22
BUY AMERICA CERTIFICATION
(Steel, Iron or Manufactured Products)

The Bidder must check the appropriate box below and sign this certificate.

Certificate of Compliance with Section 49 USC 5323(j)(1)

PLEASE CHECK ONLY ONE BOX.

- The Bidder hereby certifies that it will meet the requirements of 49 USC 5323(j)(1) and the applicable regulations in 49 CFR part 661.5.
- The Bidder hereby certifies that it cannot comply with the requirements of 49 USC 5323(j)(1) and 49 CFR 661.5, but it may qualify for an exception pursuant to 49 USC 5323(j)(2)(A), 5323(j)(2)(B) or 5323(j)(2)(C) and 49 CFR 661.7.

NOTE: If Bidder checks only the second alternative, VTA may deem the Bid non-responsive. If Bidder checks both alternatives, VTA must deem the Bid non-responsive.

SIGN AND DATE

Bidder: _____

BY:

Signature: _____

Name (print): _____

Title: _____

Date: _____

[This Page Intentionally Left Blank]

BID FORM 23
EQUAL EMPLOYMENT OPPORTUNITY (EEO) CERTIFICATION

(BIDDER'S EXECUTION ON THE SIGNATURE PORTION OF THIS BID SHALL ALSO CONSTITUTE AN ENDORSEMENT AND EXECUTION OF THOSE CERTIFICATIONS WHICH ARE A PART OF THIS BID)

Bidder, The proposed subcontractor (check one box) , hereby certifies that it has , has not (check one box) participated in a previous contract or subcontract subject to the equal opportunity clauses, as required by Executive Orders 10925, 11114, or 11246, and that, where required, it has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Note: The Bidder/proposed subcontractor must place a check mark after "has" or "has not" in one of the blank spaces provided.

About this certification:

The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7 (b)(1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally, only contracts or subcontracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

SIGN AND DATE

Bidder/
Proposed Subcontractor: _____

BY:

Signature: _____
Name (print): _____
Title: _____
Date: _____

[This Page Intentionally Left Blank]

SECTION 5 CONTRACT FORMS

It is not necessary to complete these Contract Forms to bid on this project. The Successful Bidder will be required to execute all the following Contract Forms if the Contract is awarded:

- | | |
|------------------------|---|
| Contract Form 1 | Construction Agreement
Note: Form must be acknowledged by a notary |
| Contract Form 2 | Performance Bond
Note: Form must be acknowledged by a notary |
| Contract Form 3 | Payment Bond
Note: Form must be acknowledged by a notary |
| Contract Form 4 | Listing of Subcontractors, Suppliers, and Subconsultants |
| Contract Form 5 | Designation of Authorized Representative. |

These Contract Forms will be returned to:

Santa Clara Valley Transportation Authority
Procurement, Contracts and Materials Management
Attention: **Navie Kaur**
3331 North First Street, Building B
San José, California 95134

Hamilton Station Stabilization
Contract C20046F

[This Page Intentionally Left Blank]

CONTRACT FORM 1 CONSTRUCTION AGREEMENT

This Construction Agreement (“Agreement”) is entered into between the Santa Clara Valley Transportation Authority (“VTA”) and

INSERT SUCCESSFUL BIDDER’S COMPANY NAME

(“Contractor”) as of the date set out below. VTA and Contractor agree as follows:

- 1. Scope of Work.** Contractor shall perform the Work as described in

**Hamilton Station Stabilization
C20046F**

in a satisfactory and workmanlike manner and in accordance with the provisions of the Contract Documents.

- 2. Compensation.** Full compensation to Contractor for the complete and satisfactory performance of the Work under the Contract and all provisions of the Contract Documents, and for Contractor’s payment of all obligations incurred to others in performance of the Work, is the Total Contract Price (as defined in Contract **Section 2.5 Definitions**) of **\$ INSERT TOTAL CONTRACT PRICE**, as this amount may be adjusted in accordance with other provisions of the Contract. All costs for Work shown or indicated in the Contract Documents, even if not specifically provided for by a Bid item in the Schedule of Quantities and Prices shall be included in the Total Contract Price per Contract **Section 7.59 Progress Payments**.
- 3. Contract Documents – Order of Precedence.** The following sections of the Contract Documents are incorporated by reference into this Construction Agreement:

Appendix C	Business Diversity Policy and Requirements
Appendix D	Federal Requirements
Section 5.0	Contract Forms
Section 4.0	Bid Forms
Section 1.0 –3.0	Invitation for Bid, Foreword, and Instructions to Bidders including Appendices referenced therein
Section 6.0	Special Conditions, including Appendices referenced therein
Section 7.0	General Conditions including Appendices referenced therein
Section 8.0	Technical Specifications
Section 9.0	Contract Drawings and Plans

These documents are essential parts of the Contract between the parties and are intended to be complementary and to describe and provide for the entirety of the Work. In the event of conflict among the documents, precedence shall be given in the order listed above. In the event of any discrepancy between any drawing and the dimensions written thereon, the dimensions shall be taken as correct. Detail drawings shall prevail over general drawings.

- 4. Quality of Work.** Where the plans and specifications describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be provided.

- 5. Time for Performance.** Contractor shall commence the Work immediately upon issuance by VTA of a Notice to Proceed and shall complete all of the Work by the dates specified in Contract **Section 6.4 Time for Performance**. The issuance of a Notice to Proceed is contingent upon Contractor's submittal of proper insurance certificates, performance bond, payment bond, Listing of Subcontractors, Suppliers and Subconsultants, Federal and State Tax Forms, Erosion and Sediment Control Action Plan Element (ESCAPE) and executed Construction Agreement no later than **six (6) working days** following the date of VTA's Notice of Award. The first chargeable day under the Contract is set out in Contract **Section 6.4 Time for Performance**.
- 6. Entire Contract.** The Contract constitutes the entire agreement between VTA and Contractor respecting the subject matter hereof. All other agreements, understandings and communications between the parties hereto are deemed to be merged into and superseded by the provisions of the Contract. No modification or change to the Contract shall have any force or effect unless it is in writing and expressly referred to as being a change order to the Contract. If any provision of the Contract is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will continue in full force without being impaired or invalidated in any way.
- 7. Responsible Conduct.** Contractor shall at all times deal in good faith and truthfully with VTA. Contractor shall submit documentation to VTA, including reports, claims, requests for change orders, equitable adjustment, Contract modifications or requests of any kind seeking increased compensation or decreases of an obligation on the Contract only in good faith and upon an honest evaluation of the underlying circumstances and an honest calculation of any amount being sought. A violation of this standard of conduct will subject Contractor to being deemed "non-responsible" pursuant to SCVTA Administrative Code, Chapter 9, Article III and potentially ineligible for future contracts with VTA, regardless of whether VTA relied on or responded to the submission.

IN WITNESS WHEREOF two identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by VTA and Contractor respectively, on the dates set out below.

INSERT NAME OF CONTRACTOR

By: _____
Title: _____
Date: _____
Contractor's License No.: _____
Class: _____
Expiration Date: _____

**SANTA CLARA VALLEY
TRANSPORTATION AUTHORITY**

By: _____
John Wesley White
Chief Procurement Officer
By: _____
Nuria I. Fernandez
General Manager / CEO
Date: _____
Approved as to Form:
By: _____
Legal Counsel

CONTRACT FORM 2 PERFORMANCE BOND FOR PUBLIC WORKS

KNOW ALL PEOPLE BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Transportation Authority (“VTA”) has awarded to

INSERT SUCCESSFUL BIDDER’S COMPANY NAME

(“Principal”) a contract described as:

**Hamilton Station Stabilization
C20046F**

and all of the Contract Documents attached to or forming a part of said contract (herein collectively referred to as the “Contract”) are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of said Contract to furnish a bond executed by an admitted surety insurer for the faithful performance of said Contract;

NOW THEREFORE, we, the Principal and

INSERT SURETY COMPANY

as Surety, are held and firmly bound VTA in the penal sum of **\$ INSERT TOTAL CONTRACT PRICE (In the case of yearly-based contracts, INSERT BASE YEAR PRICE)**, in lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the above-bound Principal, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract and any alteration thereof made as therein provided, on their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify, defend and save harmless VTA, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said Surety for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any change, extension of time, alteration or additions to the terms of the Contract or to the Work or to the specifications.

In the event suit is brought upon this bond by VTA and judgment is recovered, Surety shall pay all costs incurred by VTA in such suit, including reasonable attorneys’ fees, court costs, expert witness fees and investigation expenses.

IN WITNESS WHEREOF this instrument, has been duly executed by Principal and Surety under their several seals on this _____ day of _____, 20____, the names and corporate seals of the corporate parties being hereto affixed and those presents duly signed by their undersigned representatives, pursuant to authority of their governing bodies.

PRINCIPAL

SURETY

INSERT SUCCESSFUL BIDDER'S COMPANY NAME

INSERT SURETY COMPANY

(Company)

(Company)

(Signature)

(Signature)

(Name – Please Print)

(Name – Please Print)

(Title)

(Title)

CORPORATE SEAL

CORPORATE SEAL

NOTE: Attach the following:

- 1) a copy of authorization for signatory for Principal, and
- 2) original or certified copy of unrevoked appointment, power of attorney, bylaws or other instrument entitling or authorizing person executing bond on behalf of surety to do so.

**CONTRACT FORM 3
PAYMENT BOND FOR PUBLIC WORKS**

KNOW ALL PEOPLE BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Transportation Authority (“VTA”) has awarded to

INSERT SUCCESSFUL BIDDER’S COMPANY NAME

(“Principal”) a Construction Agreement (“Contract”) for the furnishing of all materials, labor, services and transportation necessary, convenient and proper to the performance of

**Hamilton Station Stabilization
C20046F**

and

WHEREAS, said Principal is required by the California Civil Code Section 9550 to furnish a bond executed by an admitted surety insurer in connection with said Contract;

NOW THEREFORE, we, the Principal and

INSERT SURETY COMPANY

as Surety, are held and firmly bound unto VTA, in the penal sum of **\$ INSERT TOTAL CONTRACT PRICE (In the case of yearly-based contracts, \$INSERT BASE OR OPTION YEAR BID PRICE (as applicable))**, in lawful money of the United States of America for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that if said Principal, its subcontractors, heirs, executors, administrators, successors, or assigns, shall fail to pay any of the persons named in Section 9100 of the California Civil Code, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under this Contract by any such claimant, the Surety will pay for the same, in an amount not exceeding the sum hereinabove specified, and also, in case suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court.

This bond shall inure to the benefit of any of the persons named in Section 9100 of the California Civil Code, so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement hereinabove described or pertaining to or relating to the furnishing of

labor, materials, or equipment therefor, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement hereinabove described, nor by any rescission or attempted rescission of any such Contract or agreement or the bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between VTA and original Contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 8400 or 8402 of the California Civil Code, and has not been paid the full amount of its claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

If VTA brings suit upon this bond and judgment is recovered, the Surety shall pay all litigation expenses incurred by VTA in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

IN WITNESS WHEREOF this instrument has been duly executed by Principal and Surety under their several seals on this _____ day of _____, 20____, the names and corporate seals of the corporate parties being hereto affixed and those presents duly signed by their undersigned representatives, pursuant to authority of their governing bodies.

PRINCIPAL

INSERT SUCCESSFUL BIDDER'S COMPANY NAME

(Company)

(Signature)

(Name – Please Print)

(Title)

CORPORATE SEAL

SURETY

INSERT SURETY COMPANY

(Company)

(Signature)

(Name – Please Print)

(Title)

CORPORATE SEAL

NOTE: Attach the following:

- 1) a copy of authorization for signatory for Principal, and
- 2) original or certified copy of unrevoked appointment, power of attorney, bylaws or other instrument entitling or authorizing person executing bond on behalf of surety to do so.

CONTRACT FORM 4 LISTING OF SUBCONTRACTORS, SUPPLIERS, AND SUBCONSULTANTS

Contractor shall complete the form below for each subcontract for all subcontractors of all tiers, suppliers of materials, and subconsultants. Include all firms.

IMPORTANT INFORMATION

- The form is to be completed and submitted with the other Contract Forms
- All subcontractors are to be listed on this form and must be registered with the California Department of Industrial Relations (“DIR”) as further set forth at Section 7.8, Labor Provisions

A. ENTER PROJECT AND CONTRACTOR INFORMATION

Contractor Name: _____

Total Contract Price: \$ _____

Amount to be subcontracted: \$ _____

Percentage to be subcontracted: _____ %

B. ENTER NAMES OF SUBCONTRACTORS, SUPPLIERS, AND SUBCONSULTANTS

Name of Subcontractor, Supplier, Subconsultant	City and State	Bid Item or Portion of Work	Ethnicity (see code Below)	Email Address	DIR Registration Number	Estimated Dollar Amount of Subcontract

NOTE

1. For Ethnicity, enter one of the following codes: A=Asian, SA=Subcontinent Asian, B=Black, C=Caucasian, H=Hispanic, NA=Native American, O=Other.
2. DIR Registration is for SUBCONTRACTOR ONLY subcontractor only.
3. Copy and add additional pages if necessary

[This Page Intentionally Left Blank]

CONTRACT FORM 5
DESIGNATION OF AUTHORIZED REPRESENTATIVE

In accordance with Sections 7.24, Authorized Representatives and 7.25, Notices and Communications, Contractor hereby designates as its Authorized Representative the person listed below. Contractor's Authorized Representative shall have full authority to act on Contractor's behalf in all matters within the scope of this Contract.

Name of Authorized Representative: _____

Business Address: _____

Business Phone: _____

Business Email: _____

24-Hour Emergency Phone: _____

Designated Alternate: _____

Alternate's 24-Hour Emergency Phone: _____

The person signing this Designation of Authorized Representative for the Bidder certifies that he or she is authorized by the Bidder to do so and that the Bidder shall be bound contractually by that signature.

Signature: _____

Name (print): _____

Title: _____

Date: _____

[This Page Intentionally Left Blank]

SECTION 6 SPECIAL CONDITIONS

6.1. Indemnity and Defense of Claims

6.1.1. Indemnify and Hold Harmless

Contractor must indemnify and hold harmless VTA, any public agencies within whose jurisdiction, on whose behalf, or on whose property the Work is being performed, any party VTA is contractually obligated to identify in this agreement Contract as an indemnitee, and each of their respective Board of Directors, Board of Directors, Councils, individual board members, VTA's board members, officers, agents, employees, and consultants (each, an "Indemnitee"; collectively, the "Indemnitees") from any claims, liabilities, losses, injuries, damages, expenses, fines, penalties, liens, stop notices, or fees and costs (including attorneys' and experts' fees and costs) arising out of, pertaining to, or caused by, or in any way relating to the Work, including the performance of this Contract or any subcontract hereunder, by Contractor and/or its agents, employees, or subcontractors, whether such claims, liabilities, losses, injuries, damages, expenses, fines, penalties, liens, stop notices, or fees and costs (including attorneys' and experts' fees and costs) are based upon a contract, or for personal injury, death or property damage or upon any other legal or equitable theory whatsoever.

6.1.2. Limitation on Indemnity

Notwithstanding any language in this Contract to the contrary, Contractor is not obliged to indemnify and/or hold harmless the Indemnitees from any claims, liabilities, losses, injuries, damages, expenses, fines, penalties, liens, stop notices, or fees and costs (including attorneys' and experts' fees and costs) arising from the sole or active negligence or willful misconduct of VTA or its agents, servants or independent contractors who are directly responsible to VTA, or from damages for defects in designs furnished by those persons.

6.1.3. Duty to Defend

Contractor agrees, at its own expense, and upon written request by VTA or any individual Indemnitee, to immediately defend any suit, action, claim, or demand brought against any Indemnitee founded upon, alleging, or implicating any claims, liabilities, losses, injuries, damages, expenses, fines, penalties, liens, stop notices, or fees and costs (including attorneys' and experts' fees and costs) covered by Contractor's indemnity obligation set forth in this **Section 6.1.1**, and regardless of whether Contractor and/or any of its agents, employees, or subcontractors, was, in fact, liable. In the event a court of competent jurisdiction determines that any suit, action, claim, or demand brought against any Indemnitee was caused by the sole or active negligence or willful misconduct by VTA or its agents, servants or independent contractors who are directly responsible to VTA, VTA shall promptly reimburse Contractor for costs of defending the Indemnitees in such action incurred by Contractor, but only in proportion to the sole or active negligence or willful misconduct of VTA or its agents, servants or independent contractors who are directly responsible to VTA.

6.1.4. Survive Expiration or Termination

The indemnity and defense of claims terms set forth in this Section 6.1 will survive the expiration or termination of the Contract and remain in full force and effect.

6.2. Insurance

Contractor's attention is directed to **Appendix A Insurance Requirements** of this Contract.

It is highly recommended that proposers confer with their insurance carriers or brokers in advance of bid submission to determine the availability of insurance certificates and endorsements prescribed in **Appendix A Insurance Requirements**.

6.3. Contract Bonds and Surety Requirements

Prior to execution of the Contract, Successful Bidder shall file with VTA on the forms provided herein, surety bonds in the amounts and for the purposes noted below, duly executed by an admitted surety insurer satisfactory to VTA; *provided, however*, that no bonds are required on Bids of \$25,000 or less. Successful Bidder shall pay all premiums and costs relating to required bonds, whether direct or incidental thereto. Each bond shall be signed by both Successful Bidder and surety.

6.3.1. Payment Bond

The Payment Bond shall be in an amount of **100%** of the Total Contract Price and shall inure to the benefit of persons performing labor or furnishing materials in connection with the Work. This bond shall be maintained in full force and effect until all Work under the Contract is completed and accepted by VTA, and until all claims for materials and labor have been paid. See the form of the Payment Bond in Section 5 Contract Forms.

6.3.2. Performance Bond

The Performance Bond shall be in an amount of **100%** of the Total Contract Price and shall insure the faithful performance by Contractor of all of the Work. It shall also insure the replacement of, or making acceptable, any defective materials or faulty workmanship. See the form of the Performance Bond in Section 5 Contract Forms.

6.3.3. Surety Requirements

Sureties for necessary bonds must:

- Be an admitted surety insurer.
- Have an AM Best's rating of no less than A VII.
- Comply with the provisions of Code of Civil Procedure Section 995.660.
- If Federal requirements apply (refer to **Section 1.8**), be a current Treasury Listed Surety (Federal Register).

Should any surety or sureties be deemed unsatisfactory at any time by VTA, notice will be given to Contractor to that effect, and Contractor shall forthwith substitute a new surety or sureties satisfactory to VTA; *provided, however*, that the time set out in the Notice of Award for submitting bonds will not be extended thereby. No further payment will be due or will be made under the Contract until the new sureties qualify and are accepted by VTA.

All alterations, time extensions, extra and additional Work, and other changes authorized by the specifications, or any part of the Contract, may be made without securing consent of the surety or sureties on the Contract bonds.

6.4. Time for Performance

The time limit for completion of all Work is **180 calendar days** commencing on the First Charged Day. First Charged Day is defined as the 20th day following the issuance of a NOA by VTA. Should the first charged day fall on a Friday or weekend or holiday, the following working day shall be the First Charged Day.

6.5. Liquidated Damages

Contractor agrees that its failure to complete the Work or any part thereof within the time periods or by the dates specified in the Contract, as such time periods or dates may be revised by change order, will result in damages being sustained by VTA. Since it is impractical and infeasible to determine the actual amount of such damage, it is further agreed that Contractor shall pay to VTA, as agreed, fixed and liquidated damages and not as a penalty, the amount specified hereunder for each day of delay or part thereof until such Work or part thereof is completed and accepted, and Contractor and its surety shall be liable for the amount thereof.

VTA may deduct the sum of liquidated damages from progress or final payment(s) due under this Contract.

The Work must be completed and accepted within the duration set out in **Section 6.4 Time for Performance**. Liquidated Damages will be assessed at **\$2000 per calendar day** thereafter for each and every day beyond the time specified in **Section 6.4 Time for Performance**, and **Section 6.11 Work Sequence and Constraints**.

Description	Liquidated Damages
Original Contract Completion	\$2,000 per calendar day beyond the Original Contract Completion Date

6.6. Contract Data Requirements

6.6.1. Contract Data Requirements

Contractor shall submit to VTA the items shown in **Table B-1 Contract Data List** (“Contract Data List”) and **Table B-2 Technical Submittals List** (“Technical Submittals List”) of **Appendix B Contract Data Requirements**. The Contract Data List and Technical Submittals List is intended to summarize the requirements for submittals as specified in the Contract Documents. If conflicts exist between the lists in **Appendix B** and the referenced paragraph, the referenced paragraph will take precedence.

VTA may withhold amounts from any payments otherwise due as it determines necessary for Contractor’s failure to provide submittals as required. This amount may be up to 10% of the payment or \$10,000.00,

whichever is greater for each item. Failure of Contractor to submit any item within 30 days of its due date may result in forfeiture of any or all of the withholding per **Section 7.59.6 Special Withholding**.

6.6.2. Submittal

Contractor shall submit to VTA the items shown on the Contract Data List and the Technical Submittals List in compliance with the times and the number of copies specified therein. Requirements and procedures for preparing and transmitting submittals must conform to the provisions of **Section 7.43 Submittal of Shop Drawings, Product Data and Samples** and this **Section 6.6**.

All submittals must be accompanied by a **Submittal Cover Letter** provided by VTA. Contractor shall:

- a. Submit drawings, schedules and samples as required in the Technical Submittals List;
- b. Coordinate preparation and processing of submittals with performance of construction activities;
- c. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity;
- d. Coordinate transmittal of different submittals for related parts of the Work so that processing will not be delayed because of the need to review submittals concurrently for coordination; and
- e. Submit any supporting data, such as manufacturer's literature and/or calculations, in the same manner and number as the drawings, schedules and samples required.

Given **Section 6.4 Time for Performance**, Contractor shall allow adequate time for an Initial Review or Concurrent Review (as defined below), whichever is applicable, including time for resubmittals.

- a. Initial Review: Contractor shall allow twenty (20) working days for initial review and appropriate action by VTA on each submittal. Contractor shall allow additional time if processing must be delayed to permit coordination with subsequent submittals. VTA will advise Contractor when a submittal being processed must be delayed for coordination.
- b. Concurrent Review: Where concurrent review of submittals by VTA and other parties is required, Contractor shall allow thirty (30) working days for initial review and appropriate action by VTA of each submittal.

The time period for review (whether Initial Review or Concurrent Review) will commence on the day of VTA's receipt of submittal. If the submittal is received by VTA after 3PM, time period for review will commence on the following working day.

VTA's acceptance of submittals will be general and shall not be construed as (i) permitting any deviation from Contract requirements, (ii) offering relief of responsibility for any errors or omissions, or (iii) approving any deviation from details furnished by VTA except as provided otherwise in **Section 8 Technical Specifications**. If submittals show variations from Contract requirements for any reason, such variations shall be described in the submittal cover letter.

If variations result in an adjustment to the Contract price or time for performance, the adjustment will be subject to approval by VTA. Failure to describe variations will not relieve Contractor from the responsibility of executing the Work according to the terms of the Contract, even though such submittals have been accepted by VTA.

Contractor shall submit documents such as certificates, reports and test results not shown in the Technical Submittals List, but specified in **Section 8 Technical Specifications**. Three (3) copies of each item are

required unless specified otherwise. Notice of completion of work to hold points specified in the encroachment permit must be provided ten (10) working days before estimated completion of that portion of the Work.

If VTA determines that substantial corrections are required, each submitted item will be marked AMEND AND RESUBMIT (A/R). The required corrections will be explained. In these instances, VTA will not be deemed to have accepted the submittal and it must be corrected and resubmitted. One copy will be returned for correction.

Resubmittals will be handled in the same manner as the initial submittal, and Initial Review and Concurrent Review period, whichever is applicable, will begin again. Contractor must direct specific attention to revisions other than those requested by VTA on previous submittals either by an accompanying letter or on the resubmitted drawings.

If accepted by VTA each submittal will be stamped NO EXCEPTIONS TAKEN (NET) and dated indicating acceptance.

Work included in submittals marked as MAKE CORRECTIONS NOTED (MCN) may be carried out provided that VTA's request has been properly addressed and resolved, and Contractor complies with all required corrections or modifications. Contractor shall make corrections to the resubmittals and resubmit to VTA within 5 working days. Working and shop drawings will be redlined by VTA and the Work will be carried out only using submittals that (i) are stamped either MAKE CORRECTIONS NOTED (MCN) or NO EXCEPTIONS TAKEN (NET), and (ii) which bear VTA's signature. No changes may be made thereon except by written direction from VTA.

Contractor is responsible for and will bear all cost of damages that may result from ordering material or from proceeding with Work before VTA acceptance.

Contractor shall submit six (6) legible copies of complete and detailed working and shop drawings as required for the performance of the Work, which must be suitable for electronic scanning. In addition, drawings must be prepared on a reproducible sheet measuring 22 inches by 34 inches unless approved otherwise. Each full size drawing sheet must have a blank area five inches by five inches minimum, located above the title block, for VTA's acceptance stamp. The title block must display the following:

- Contract Number and Name
- Number and Title of Drawing
- Date of Drawing or Revision
- Name of Firm originating Drawing
- Clear identification of contents
- Location of work
- Referenced Technical Specifications

Also, Contractor shall furnish detail drawings for any temporary work and the method of proposed construction for the safe and successful completion of such Work.

All submittals for electrical equipment shall conform to the provisions of the appropriate technical specifications of the Contract. All electrical materials shall be tagged in conformance with the provisions of **Section 7.49 Certificates of Compliance and Testing**, before delivery to the Worksite. VTA will reject untagged electrical materials.

Contractor shall furnish samples as specified and requested by VTA as soon as possible after the request. Unless indicated otherwise, no less than two (2) identical samples of each type required shall be submitted. Shipping charges shall be prepaid by Contractor. Products for which samples are requested shall not be used until accepted in writing by VTA. Each sample shall be labeled to indicate:

- Name of Project
- Contract Number
- Name of Contractor
- Name of subcontractor or supplier, if applicable
- Material or equipment represented
- Source
- Name of producer and brand, if any
- References to applicable plans and specifications
- Location of the Work

Contractor shall test samples as specified. Accepted samples not destroyed in testing may be retained by VTA. Samples not approved by VTA will be returned at Contractor's expense, if so requested at the time of submittal. Contractor shall mail a letter under separate cover submitting each shipment of samples detailing the information required in the preceding paragraph. Contractor shall enclose a copy of the letter with the shipment.

6.7. Permits, Fees and Inspections

Contractor shall obtain and pay all jurisdictional charges required for all necessary building, electrical, plumbing, mechanical or encroachment permits and will include the cost of the required permits in the Bid price.

Final Payment to Contractor will not be made until the terms and conditions of all permits have been satisfied including Fire Marshal approval for all fire sprinkler installations.

6.8. Payment of Fines and Fees

Contractor is responsible for the payment of all fines levied against VTA arising from or related to activities over which Contractor has responsibility under Contract Documents, or for Work which does not conform to the Contract Documents.

6.9. VTA Furnished Materials

Any materials to be furnished by VTA will be at locations designated herein or they will be delivered to the Worksite. Such VTA furnished materials shall be hauled to and properly stored at the place of use by Contractor at Contractor's expense including all necessary loading and unloading that may be involved. All costs of storing, handling, and installing VTA-furnished material shall be considered as included in the Contract price paid for the Bid item involving VTA-furnished material.

Contractor shall be held responsible for all materials furnished to Contractor, and shall pay all demurrage and storage charges. If any VTA-furnished materials are lost or damaged from any cause whatsoever after receipt by Contractor, Contractor shall be liable to VTA for the cost of replacing or repairing such VTA furnished material and the cost thereof may be deducted from any monies due or to become due Contractor.

In addition, VTA will furnish to Contractor, upon request, a maximum of ten (10) sets of conformed contract documents or bid documents including all addenda if conformed documents are not available. Contractor shall be responsible for making available to its subcontractors and suppliers all documents required to complete their Work. Upon Contractor's request, VTA will provide electronic copies of the conformed Contract Documents.

6.10. Delivery, Unloading and Storage

Contractor is completely responsible for all delivery, unloading and storage activities required for the completion of Work.

6.11. Work Sequence and Constraints

Contractor shall cooperate with and coordinate its Work with any private development work, utility relocation work or any other contractor that may be performing work in the immediate area of the Worksite.

Contractor is responsible for the coordination of all electric utility shutdowns required. Contractor shall give the applicable utility at least thirty (30) days' notice of the requirement for such a shutdown, unless a greater time period is specified in the Technical Specifications.

The Work will be performed on an active facility with ongoing 24-hours/day operations and maintenance activities. All Contract activities are subordinate to the ongoing function of these facilities. It is Contractor's responsibility to coordinate, phase, schedule and perform its Work without disruption to these activities.

Subject to the more specific timing provisions herein, Contractor must notify VTA and submit a work request at least **60 Calendar Days** prior to commencement of any field activity. A Site Specific Work Plan (See Section 6.15.4) must be submitted for review **45 Calendar Days** before requested shutdown date. Track Allocation approval will be required prior to any shutdown.

Shutdown requests may be denied as determined by VTA's operational needs.

6.11.1. Use of Rail Mounted Equipment

Where required to execute the Work, Contractor will provide and utilize road/rail-mounted work vehicles. The rail mounted equipment will not occupy the track except during the hours of work in which removal of power from contact wire is permitted as specified in Section 6.11. Rail mounted equipment (also referred to as high-rail vehicles) operations will be in accordance with VTA operating rules. Requirements will be as follows:

- (1) VTA's Operation Control Center (OCC) Controller will determine the specific track that will be occupied, based upon the location of the Work. The Work limits will be as defined in Restricted Access Permits issued by VTA.
- (2) The high-rail vehicle will be placed onto the rail at the location closest to the Worksite and approved by OCC.
- (3) All of Contractor's workers that will be on the right of way will attend a one-hour training session for the high-railing operations. The training session will be provided by VTA.
- (4) Use of high-rail equipment will be subject to obtaining a Restricted Access Permit as specified herein.

- (5) Should an unanticipated track blockage on the opposite track occur, Contractor will clear the track as directed by OCC.
- (6) Contractor will NOT move through any track switch without approval from both OCC and an on-site VTA Wayside Power & Signaling (WP&S) staff member.
- (7) Vehicle movements on the track will be approved by OCC, unless specific work area limits have been defined by OCC.
- (8) Contractor will provide qualified operators for Contractor's high-rail equipment. Contractor will allow a VTA representative to ride the high-rail vehicle at all times when the vehicle is on the operating system.

6.11.2. Specific Construction Requirements

- (1) Contractor will notify VTA and submit a Work request as follows:

- 30 calendar days prior to commencement of any work; and
- 60 calendar days prior to commencement of work that requires VTA support due to impacts to VTA operations.

No portion of work will be performed until after all materials required for that portion of work are readily available and located within 25 miles of the project sites.

All work will be coordinated such that no work is performed on days with scheduled events that will impact roadway and LRT traffic. A sample of various special events throughout the calendar year is included in **Appendix K**. Contractor will pay special attention to the following events:

- Events at SAP Center
- Events at Levi's Stadium
- Independence Day celebration on 4th of July
- San José Summer Jazz Fest in August
- Rock & Roll Half Marathon on First Sunday of October
- Silicon Valley Turkey Trot during Thanksgiving week
- San José Downtown construction moratorium during the winter holidays

- (2) Specific Traffic Control Requirements:

- Contractor must comply with all local jurisdictional permit requirements, including police support during construction activities at intersection.
- During commute hours (Monday to Friday 6:00 AM to 9:00 AM and 3:00 PM to 7:00 PM), Contractor must maintain in operation two lanes in each direction along the Hamilton Avenue corridor unless otherwise noted and approved by VTA and the City of Campbell.
- During non-commute hours, Contractor will be allowed to temporarily remove one lane in each direction for construction access and implementation.

- Approved detour plans are required for restricting specific traffic movements.
- Contractor must coordinate, schedule and perform Work in such a manner that allows pedestrian access at all times.
- VTA must be notified of any changes to traffic access (pedestrian, traffic, or private property) at least 10 working days prior to implementation of the change.
- Advanced signage with changeable message boards will be used at least 5 working days prior to implementation of the change to provide early notification to the public about upcoming traffic impacts and major traffic shifts.

Contractor must comply with the City of Campbell Lane Closure requirements. Contractor must submit lane closure request form ten(10) days prior to planned traffic control activity.

6.12. Reserved

6.13. Sound Control Requirements

Contractor must comply with all local sound control and noise level rules, regulations and ordinances that apply to any of the Work. If no maximum noise levels exist in local jurisdictions, the noise level from Contractor's operations, between the hours of 9:00 PM and 6: 00 AM, must not exceed 86 dbA at a distance of fifty (50) feet from the Work activity. Each internal combustion engine, used for any purpose on the job or related to the job, must be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine may be operated on the project without said muffler. Noise level requirements apply to all vehicles and equipment on the job or related to the job, including but not limited to trucks, transit mixers, or transit equipment regardless of whether Contractor owns the vehicle or equipment. The use of loud sound signals must be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

6.14. Safety Precautions, Programs, and First Aid Requirements

Contractor must, without separate charge to VTA, promptly and fully comply with, carry out, and enforce compliance with the safety and first aid requirements stated herein and prescribed by applicable laws, regulations, and officials or representatives charged with the authority to enforce such requirements. In addition to the requirements set forth herein, Contractor must take such other measures as may be necessary to ensure that (i) the Work is performed in a safe manner and (ii) the safety and health of employees and the people of surrounding local communities is safeguarded. Contractor must ensure that its employees and its subcontractors and suppliers of every tier comply with these provisions and that provisions equivalent to these requirements appear in all subcontracts and purchase orders.

6.14.1. Safety Supervision

Contractor must initiate, maintain, and supervise all safety precautions and programs in connection with the Work.

Contractor must:

- (1) Identify and assign a competent individual (e.g., a superintendent or foreperson) to work at the Worksite and be responsible for Worksite safety,

- (2) Submit, under the procedures in Section 6.6.2, a Site Specific Safety Plan (SSSP) prior to beginning the Work that addresses the scope of work to be performed and certifies that the designated safety representative has received competent person training in all aspects of the SSSP. If scope of Work changes during the course of the Contract, Contractor must update and resubmit the SSSP to VTA for approval before executing the Work.
- (3) Comply with all state, federal, and local regulations regarding safety, and
- (4) Submit, under the procedures in Section 6.6.2, a copy of its Injury Illness Prevention Program (IIPP) prior to beginning the Work.

Contractor must require the safety representative to set up, carry forward, and aggressively and effectively maintain the aforementioned safety program covering all phases of the Work. Contractor must (i) take all precautions and follow all procedures to ensure the safety of and (ii) provide all protection to prevent injury to, all persons involved in any way in the Work and all other persons within the vicinity of the Worksite, including, without limitation, the employees, agents, guests, visitors, invitees, and licensees of VTA who may be involved. This requirement applies continuously and is not limited to normal working hours.

6.14.2. Hazardous Substances

If Contractor encounters Worksite material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or other Hazardous Substance (as defined below) that has not been rendered harmless, Contractor must immediately stop Work in that affected area and report the condition through VTA's current Hazard Management Program (HMP). That portion of the Work in the affected area must not thereafter be resumed unless the asbestos, PCB, or other Hazardous Substance has (a) been removed, (b) determined to not be present, or (c) been rendered harmless, which fact(s) must first be documented in a written agreement between VTA and Contractor or in a final determination by an environmental consultant employed or retained by VTA.

Pursuant to **Section 7.9 Hazardous Materials or Unusual Conditions**, Contractor will not be required to perform, without consent, any portion of the Work relating to asbestos, PCB or other Hazardous Substances.

For purposes of the Contract Documents, "Hazardous Substance" has the meaning set forth in California Health and Safety Code, Chapter 6.6 (and all regulations enacted pursuant thereto) and also includes (to the extent not set forth in the Health and Safety Code) any additional substance or material that is determined by any federal, state, or local governmental authority to be capable of posing a risk of injury to health, safety, property, or the environment.

6.14.3. Safety Data Sheets and Hazardous Substances

Contractor must provide, and must require its subcontractors of every tier to provide, VTA with Safety Data Sheets for all materials to be incorporated into or used in the prosecution of the Work, including commonly used construction materials that contain any Hazardous Substance or mixture, including, without limitation, any chemical listed by the State of California as a chemical known to cause cancer or reproductive harm (as defined in California Health and Safety Code, Chapter 6.6, and all regulations pursuant thereto). The Safety Data Sheets must (i) contain all necessary and legally required information concerning such substances as asphalts, solvents, adhesives, epoxy resins, roofing sealant and bonding agents, mixtures or chemicals, and (ii) be in a format agreed to by VTA and as required by law.

6.14.4. Hazardous Substances Controls and Storage

Contractor must not permit any Hazardous Substances to be brought onto or stored at the Worksite or used in connection with the Work, except for specified materials and commonly used construction materials for which there is no reasonable substitute. All such materials must be handled, stored, and disposed of (i) in accordance with all applicable manufacturer guidelines, warnings, and recommendations and (ii) in full compliance with all applicable laws. All notices required to be given with respect to such materials must be given by Contractor.

Contractor must not intentionally release or dispose of any Hazardous Substance at the Worksite or into any soil, drains, surface or ground water, or air, nor may Contractor allow any subcontractor, supplier, or any other person for whose acts Contractor or any subcontractor, sub-subcontractor, or supplier may be liable, to do so.

Contractor's Hazardous Substances controls must conform to all applicable federal, state, and local rules and regulations. Contractor must store all liquid Hazardous Substances and waste in double walled containers in accordance with (i) all applicable federal, state, and local Hazardous Substances (sometimes also referred to as "hazardous materials") and (ii) any applicable permits; and (iii) any VTA-specific requirements. If volatile and/or noxious substances are being used in spaces that are not naturally ventilated, Contractor must provide adequate artificial ventilation.

6.14.5. Written Safety Precautions

Contractor must set forth in writing its safety precautions and programs in connection with the Work. These safety precautions and programs must meet or exceed any and all applicable laws, ordinances, rules, regulations, and orders of any public, quasi-public, or other authority relating to the safety of persons and their protection against injury. Such authorities include, but are not limited to the following:

- (1) Federal Occupational Safety and Health Act of 1970, as amended,
- (2) The California Occupational Safety and Health Act of 1973, as amended, and
- (3) The California Labor Code.

In the event of differing requirements among the relevant authorities, the more stringent requirement, as determined by VTA in its sole discretion, governs.

Contractor must ensure that all Work and all equipment, machinery, materials, tools, and like items incorporated or used in the Work comply with and conform to:

- (1) All applicable laws, ordinances, rules, regulations, and orders of any public, quasi-public, or other authority relating to the safety of persons and their protection against injury, specifically including, but in no event limited to, the above listed acts and associated standards and all rules and regulations now or hereafter in effect pursuant to said acts; and
- (2) Contractor must provide, or cause to be provided, to each worker on the Worksite the proper safety equipment for the duties performed by that worker and Contractor must not permit any worker who fails or refuses to use proper safety equipment to be present on the Worksite. VTA may, in its discretion, order Contractor to send a worker off the Worksite for the day or to discharge a worker for their failure to comply with applicable safety requirements.
- (3) VTA's Safety Vest Procedure, Document Number 600.009, which is included in the Contract Documents as **Appendix P VTA's Policy on Reflective Safety Vests**.

6.14.6. Protection of Work and Property; Responsibility for Loss

Contractor must, throughout the performance of the Work, (i) maintain adequate and continuous protection of all Work and temporary facilities against loss or damage from whatever cause, (ii) protect the property of VTA and third parties from loss or damage from whatever cause arising out of the performance of Work, and (iii) comply with the requirements of VTA and its insurance carriers and with all applicable laws, codes, rules, and regulations relating to the prevention of loss or damage to property as a result of fire or other hazards posed to:

- (1) Employees on the Worksite and other persons who may be affected by the Work;
- (2) The Work and materials and equipment to be incorporated into the Work (whether in storage on or off of the Worksite), which are under the care, custody, or control of Contractor and/or its subcontractors of any tier;
- (3) Other property at the Worksite or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

Solvents, oils, and any other substances that may be harmful to plant life must be disposed of in containers and removed from the Worksite. At completion of the Work, any contaminated soil must be removed and replaced with soil of equal quality prior to contamination by Contractor at no additional cost to VTA.

6.14.7. VTA Patrols

VTA may, in its discretion, make periodic patrols of the Worksite as a part of its normal security and safety program. For the avoidance of doubt, VTA's decision to perform a patrol does not in any way relieve Contractor from its responsibilities described herein, and VTA will not be deemed to assume any such responsibilities.

6.14.8. Notice in Writing Before Breaking Ground

Contractor must give notice in writing, at least forty-eight (48) hours before breaking ground, to all persons having interests on or near the Worksite, including public utility companies, owners of property having structures or improvements in proximity to the Worksite, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads, or otherwise who may be affected by Contractor's operation, so that they may remove any obstruction for which they are responsible and have a representative on the Worksite to see that their property is properly protected. Such notice does not relieve Contractor of responsibility for any damages, claims, and defense of all actions against VTA resulting from performance of such Work.

6.14.9. Safeguards for Safety and Protection

Contractor must erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent worksites and utilities.

6.14.10. Job Safety Compliance

Contractor must ensure job safety in compliance with the following standards:

- National Electrical Code

- All CPUC General Orders including but not limited to the most current versions of General Orders 143, 164, 172, and 175A
- Cal/OSHA Regulations (Title 8 of California Code of Regulations)
- Federal OSHA Standards (Title 29 of the Code of Federal Regulations)

6.14.11. Damage to the Work

Contractor must rebuild, repair, restore, and make good all losses of, and injuries or damages to, the Work performed or any portion thereof (specifically including VTA-supplied equipment or other items to be utilized in connection with, or incorporated in, the Work) before VTA's final acceptance of the Work. Such rebuilding, repair, or restoration will be at Contractor's sole cost and expense unless the associated loss, injury, or damage is caused by a hazard against which VTA is required to insure. Notwithstanding the preceding sentence, if the loss, injury, and/or damage would not have occurred but for the negligent act or omission of Contractor, its subcontractors of any tiers, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, Contractor will be solely responsible for the full cost and expense of the deductible due from VTA for the associated insurance claim; if any policy of insurance covering loss or damage to the Work is voided due to any act or omission of Contractor or any of its subcontractors of any tier, such rebuilding, repairing, and/or restoring will be at Contractor's sole cost and expense.

6.14.12. Dangerous Conditions

Contractor must designate the project superintendent, or such other qualified member of Contractor's organization at the Worksite, subject to approval by VTA, to be responsible for the prevention of injuries and illnesses.

If VTA or any public agency with jurisdiction over the Worksite notifies Contractor of any claimed dangerous condition at the Worksite that is within Contractor's care, custody, or control, Contractor must take immediate action to rectify the dangerous condition at no additional cost to VTA. Contractor is responsible for the payment of all fines levied against VTA for deficiencies relating to Contractor's supervision or conduct of the Work.

Contractor must not load or permit any part of the construction or Worksite to be loaded so as to endanger safety of persons or property.

Contractor must not permit open fires on the Worksite.

Contractor must not use or store explosives at the Worksite.

If Contractor's performance of Work results in any alteration or change to the Worksite or adjacent properties, and if such alteration or change is not required by these Contract Documents, Contractor must take all steps necessary to return all such alterations and/or changes on or about the Worksite and adjacent properties to the same conditions that existed prior to Contractor's starting performance under the Contract.

6.14.13. Emergencies

In the event that (i) an emergency affecting the safety of persons or property or (ii) a claimed violation of any Federal or State safety or health law or regulation, arises out of or in any way connected with the Work or its performance, Contractor must ensure that at least one of Contractor's employees with

authority is on duty during working hours, and act immediately to prevent threatened damage, injury or loss or to remedy said violation, whichever is applicable, failing which VTA may immediately take whatever action it deems necessary, including, but not limited to, suspending the Work as provided in **Section 7.69 Suspension of Work**. Contractor must also establish and maintain adequate First Aid facilities at locations close to work areas and mark such locations with signs of adequate size and composition. Contractor must also ensure that at least one of Contractor's employees qualified by a recognized authority to perform First Aid is on duty at all times while Work is being performed

VTA may offset any and all costs or expenses of whatever nature, including attorneys' fees, paid or incurred by VTA in taking such actions against any sums then or thereafter due to Contractor.

6.15. Contractor Safety and Light Rail Transit Operations

This Section includes requirements to control and reduce potential hazards of light rail traction power and moving trains in any environment where contractors and outside parties have access to right-of-way and/or facilities of VTA's LRT system. These requirements and procedures are designed to add an extra measure of safety for the public, passengers, and employees of VTA and VTA's contractors. These procedures do not supersede existing CPUC, Cal OSHA, Workers Compensation, or any other Federal, State, or local safety regulations.

These procedures apply to any person(s) working on or in any light rail restricted access area including electrical substations, overhead catenary system (OCS), signal or communications facilities, Operations Control Center (OCC), tracks, stations, and any area where moving trains or light rail traction power are present or may be affected.

Contractors are responsible for insuring that their employees, their subcontractors, and any lower tier contracted services working under their purview are fully informed and responsive to these safety requirements. Contractors or their employees found to be in violation of these safety procedures may be removed from the Worksite. Failure of Contractor to comply with these requirements will result in a Work stoppage issued by VTA until such compliance is satisfied. VTA reserves the right to assess penalties for repeated safety violations up to and including termination of the Contract.

6.15.1. Definition of Terms

In addition to all other defined terms set forth elsewhere in the Contract Documents, the following definitions apply to this Section 6.15:

Access: Permission, granted by VTA, to be on, in or near the LRT right-of-way or rail transit facilities of the VTA.

Contractor: Any company, each of its principals, subcontractors, employees and any lower tier services employees whether or not actually under contract with VTA who are working on or in the LRT right-of-way or rail transit facilities of VTA.

CPUC: California Public Utilities Commission

FRA: Federal Railroad Administration

Certification Card: VTA-issued certification card identifying successful completion of required Contractor safety training.

Lockout and Tagout Procedure: The objective of this procedure is to ensure that machines or equipment are isolated from all potentially hazardous energy, and locked out/tagged out or

blocked out before employees perform any servicing or maintenance activities where the unexpected energization, start -up or release of stored energy could cause injury.

Restricted Area (or Restricted Access Work Area): any area including electrical substations, OCS, signal or communications facilities, OCC, tracks, stations, and any area where moving trains or light rail traction power are present or may be affected.

Restricted Access Permit (or Permit): Paper form and permission granted by VTA to be on, in, or near the LRT right-of-way or rail transit facilities of VTA.

Right-of-Way: VTA property or facilities including track, OCS, and buildings used for light rail vehicle (LRV) train operations that contain traction power or signal and communications facilities and equipment.

Safety Training: Safety training required for Work that Contractor will perform on, in, or near the LRT right-of-way and/or rail transit facilities of VTA.

Job Briefing: Required safety briefing before Contractor performs any work on, in or near the LRT right-of-way and/or rail transit facilities of VTA.

SSWP or Work Plan: Site Specific Work Plan, which is a task and activity plan (which includes work activities, equipment, and safety procedures) and detailed schedule.

Traction Power System: A facility, including power feed and power distribution cabling, for delivery of commercial electrical power and delivery of that power to the LRT OCS.

Train: One or more LRVs, any on-track equipment, or a rail borne or hi-rail vehicle that is set on the track.

Track Allocation Meeting: Joint meeting of VTA and its contractor(s) to (i) determine track access, (ii) obtain power-down permission, and (iii) schedule coordination of work between contractors. Scheduled weekly or as deemed necessary by VTA.

6.15.2. Use of Electronic Devices

In compliance with CPUC requirements, the use of personal electronic devices is prohibited at all times when within the Track Zone. This includes, but is not limited to, scanners, cellular telephones, personal audio devices, or watches or headsets associated with those devices and any Personal Digital Assistant with the following exceptions:

- Two-way radio equipment.
- Photography equipment (but not cellular telephones) that is required for the Work to be performed or for inspection purposes and has been approved by VTA in writing.

Contractor's Safety Officer will be responsible for implementing these requirements and must be part of the required safety briefings. Any Contractor employee violating these rules will be immediately removed from the Worksite and permanently banned from the Work. The CPUC, on behalf of the FRA, may impose or levy fines and penalties against Contractor for violation of these requirements.

Contractor must further comply with all the requirements in VTA's "Use of Personal Electronic Devices by Bus and Light Rail Employees and Contractor Staff (AFSCME)" policy (Document Number OPS-PL-0001(c)), included in the Contract Documents as **Appendix E** and incorporated herein by this reference.

6.15.3. Restricted Access Permit

Whenever Contractor requires access to (i) enter on, cross over, or cross under the right-of-way, tracks, or OCS of VTA or (ii) enter into facilities including VTA yards, maintenance buildings, stations, substations, OCC, or signal and communications equipment or facilities, Contractor must submit a Restricted Access Permit application to VTA before accessing such locations. Contractor must also submit a Restricted Access Permit application to VTA before performing any Work within six (6) feet of the nearest rail of any track.

Unless specifically requested and approved by VTA, a Restricted Access Permit does not authorize any Work operations to be performed, or equipment to be used, on the tracks or within ten (10) feet of the OCS (the "Limited Approach Boundary"). A Restricted Access Permit also does not authorize any act which may interfere with the safe and timely operation of VTA's public rail transportation services.

A sample of VTA's **Restricted Access Permit Form** is included in the Contract Documents as **Appendix F**, including Restricted Access Work Rules on the reverse of the form. Contractor must submit an original copy of this Restricted Access Permit form for each day, week, or for each independent Work operation to be performed by Contractor, as determined by VTA. Contractor must submit to VTA a completed Restricted Access Permit form and any additional illustration or schedule details to support the request at least seven (7) days prior to the start of Work. A copy of the approved Restricted Access Permit must be maintained at each Worksite, and Contractor must ensure that all personnel at the Worksite have read and understand the Restricted Access Permit.

6.15.4. Site Specific Work Plan

If (i) any of the Work may impact (a) train operations or (b) the integrity or physical configuration of the LRV track, the traction power system, and/or the LRT signal and communications system; or (ii) if VTA determines that it is necessary for the safety of personnel and equipment, then Contractor must develop and submit to VTA for approval a SSWP.

The SSWP must (i) describe each of the activities or tasks to be performed and (ii) include a detailed schedule of the Work items that have a duration of one (1) hour or more, which indicates the hourly progress of each activity. The SSWP must include staffing, materials, and equipment that will be used to complete the relevant Work. The schedule must include a time for which all activities planned under the SSWP will be completed.

The SSWP must include a detailed description of the safety measures to be taken for the protection of personnel and equipment. Items planned for use in the performance of the relevant Work such as protective gear, marker and sign placement, Employees-In-Charge, Lookouts, specialized safety equipment, ventilation equipment, in-house safety programs, and additional safety supervision must be identified.

Where the Work adds, removes, or changes any element of the traction power system, the track structure, or the signal or communications system(s), the SSWP must (i) clearly identify the changed or fully restored condition of the OCS, track or signal and communications system and (ii) provide a detailed alternative plan to restore traction power and track and/or signal and communications system if the planned Work cannot be completed successfully.

Contractor must submit the SSWP to VTA either (i) at least fourteen (14) days prior to the date and time of the proposed start of Work or (ii) at least fourteen (14) days prior to the scheduled Track Allocation

Meeting, whichever is earlier. Contractor must not begin any of the relevant Work until VTA has reviewed and approved (or approved with changes noted) the SSWP and returned such to Contractor. VTA may request additional explanation, request changes, or require Contractor to revise and resubmit the SSWP. If the SSWP is not acceptable to VTA, Contractor must revise and resubmit the SSWP and obtain approval before proceeding with the Work.

Contractor's failure to complete its scheduled activities and restore the track way and traction power system within the allocated period (window) allowed above may adversely impact VTA's LRT operations. In the event that LRT service is delayed by Contractor's action or failure to act, Contractor will be liable for the actual expenses incurred by VTA, including but not limited to busing passengers, overtime wages for crew, Employee-In-Charge, Lookout, and cost of additional dispatching. VTA reserves the right to deduct the amount of such delay expenses from any payment owed to Contractor under the Contract.

6.15.5. Required Safety Training Records and Reports

Contractor must maintain and submit to VTA, no less frequently than on a monthly basis, a current list of all employees safety-trained by VTA and Contractor. The reported information must include a description of the successfully completed training including the expiration dates of the associated training certifications. Contractor must forward these Safety training records to (i) VTA's Resident Engineer, Resident Inspector, or designated Safety Coordinator, and (ii) the representative of VTA's Railroad Liability Insurance Program.

6.15.6. General Contractor Safety Training Requirements

Working on and around rail transit operations and traction power facilities includes a unique set of potential hazards. VTA has developed Safety Training based on the Work tasks to be performed by Contractor. To prepare all workers for these hazards, information provided in the Safety Training is meant to inform workers on all relevant existing CPUC, Cal OSHA, Workers' Compensation, federal, state, and local safety regulations related to the Work tasks to be performed. The goal of the Safety Training is to educate each Contractor employee on the unique hazards that may be encountered on any VTA rail project.

Contractor must require each and every employee, foreperson, superintendent, office personnel, and manager, any and all subcontractors, as well as any third tier services personnel who will enter, work on, or have the ability to foul (i) VTA's Track Zone, (ii) the Limited Approach Boundary, (iii) any substation, and/or (iv) any communications and signal facilities or equipment to attend Safety Training applicable to the Work that is to be performed.

Contractor Safety Training classes will be provided at a location and time to be established by VTA.

If at any time Contractor intends to bring new employees onto the Worksite, each such employee must first attend and successfully complete any required safety training classes. Contractor is responsible for scheduling their employees for any training with VTA's Resident Inspector. Additionally, Contractor is responsible for ensuring that all employee's required certifications are maintained and valid throughout performance of the Work. Contractor will pay training fees for each employee attending safety training.

Contractor employees who have successfully attended Safety Training classes will be provided with proof of successful completion of the training required for their Work tasks. This proof of successful completion of the required Safety Training must be presented along with a picture ID (e.g., a driver's license) if requested.

Contractor must monitor adherence to this requirement by their employees, subcontractors, and third tier service personnel. Contractor employees not in possession of the proper proof of training may be subject to being removed from the Worksite.

6.15.7. Roadway Worker Protection Compliance Inspection

Individual responsibility is the basis for and a necessary key to any safety program. VTA or its designated representative(s) may conduct compliance inspections as deemed reasonably necessary. The purpose of the compliance inspections is to ensure that each Contractor employee granted permission to work on the right-of-way is familiar with VTA's safety rules and understands the Work area and time limits and can identify Contractor and VTA-representatives in charge of safety at the Work location or the Employee In Charge when applicable. The compliance inspections may also include verification that an approved copy of the Restricted Access Permit is being maintained at the Worksite and that it has been read and understood by all personnel working at the Worksite.

6.15.8. Restricted Access Work Rules

This permit provides access for the physical presence on or in any light rail restricted access area including electrical substations, OCS, signal or communications facilities, OCC, tracks, stations, and any area where moving trains or light rail traction power are present or may be affected.

Unless specifically authorized in the Permit, the Restricted Access Permit does not authorize (i) Work within 6 feet of the nearest rail of any track, (ii) operations of any equipment on the track, or (iii) any access or equipment within 10 feet of any OCS, signal cabinet, or any traction power substation. Restricted Access Work Rules are provided as part of the Restricted Access Permit Form.

6.15.9. Track Allocation Procedures

Prior to occupying any light rail restricted access area including electrical substations, OCS, signal or communications facilities, OCC, tracks, stations, or any area where moving trains or light rail traction power are present or may be affected.

Contractor must submit a Restricted Access Permit Application to the Track Allocation Coordinator not later than 24 hours prior to the scheduled Track Allocation Meeting.

Contractor must provide a qualified representative to attend the Track Allocation Meeting. If a qualified representative fails to attend, the Restricted Access Permit application is subject to being disapproved.

Track Allocation procedures must be implemented as part of the Restricted Access Work Rules at the discretion of VTA in the interest of the safety of all personnel and equipment in and around the Worksite.

The Track Allocation Meeting is used to identify Work locations, types of Work activities, presence and protection against high voltage traction power and moving trains. Track allocation procedures work in concert with other safety procedures to ensure all Contractor and all VTA operations and safety personnel are fully informed concerning construction activities and mandated safety requirements.

As identified at the Track Allocation Meetings, the requirements herein are for VTA and for all contractors working on the Worksite beginning from the first date of the earlier occurrence of either of the following two events:

- (1) Electrical power is installed in any substation or any portion of the traction power system is capable of being energized, and/or

(2) VTA LRV, hi-rail, or on-track equipment is operated on any portion of the track.

Track Allocation Meetings must be held weekly and require the attendance of a representative of all contractors and their subcontractors managing their own track access permits. When required, VTA Resident Inspectors, a representative of VTA's Construction Manager, and/or the Project Principal Inspector and representatives of the Track Allocation and Operations Testing personnel will attend.

The weekly meeting will be conducted by the Track Allocation Coordinator, who will establish the weekly time and location for scheduled meetings and procedures for communicating between all parties involved. The meeting will begin with a roll call confirming that all parties have properly submitted requests and are in attendance at the meeting. Items to be discussed will include, but not be limited to: identification of track(s) and all affected areas, level of personnel protection required, previous conflicts or problems, status of traction power, planned testing by VTA and/or train movements, planned construction activities, and potential conflicts and their resolution.

Following the weekly meeting, the Track Allocation Coordinator must prepare a written Track Allocation Schedule for the following week. The Track Allocation Schedule must include all planned testing, the traction power status for the week, and any safety requirements. The Track Allocation Schedule and any accompanying approved and/or rejected Restricted Access Permits will be distributed to all parties prior to the end of the following day.

Contractor's responsibilities include the following:

- Contractor must confirm all of their scheduled Work is included on the Restricted Access Permit application. Contractor must identify days, times, tracks, access point(s), personnel requirements, and equipment to be used in the Work.
- Where any conflict may exist with other contractors at or near the Worksite, Contractor must coordinate a mutually agreeable resolution to allow the maximum productive track access for all parties.
- Contractor must ensure that all of its employees, as well as all of its subcontractors and its lower tier service personnel, are aware of any scheduled safety-critical items and that they actively respond to the safety requirements of the Restricted Access Permit and Track Allocation Schedule, if granted.
- If multiple contractors are scheduled to work in the same or overlapping work limits, the contractor identified by VTA as having primary access is responsible for all elements of coordination and access as between contractors, subcontractors, and third tier services. Where multiple independent contractors are granted authority to work within the same or overlapping work limits, VTA's Resident Inspector or OCC supervisor or Track Allocation Coordinator will designate and enforce rights of priority and access by various contractors.

VTA will not be responsible for conflicts or limitations in access to restricted work areas or facilities or for schedule impacts that result from approval of coordinated schedules affecting the same work locations, facilities, or use of limited VTA resources.

6.15.10. Lockout/Tagout/Blockout Procedures

Application of Lockout /Tagout/Blockout Procedures must be coordinated with VTA's resident inspector.

Lockout /Tagout/Blockout Procedures provide protection for personnel against the inadvertent release of hazardous energy. If removal of traction power is required by Contractor, in addition to the removal of traction power, the installation of VTA approved lockout devices including Power Removal tags approved by Cal-OSHA, the installation of grounds straps and applicable warning signs, markers must be installed. This procedure is required with an approved Restricted Access Permit for Work within the Limited Approach Boundary. This procedure may also be required through the Restricted Access Permit process for Work on elevated structures, within a tunnel, or when it is deemed necessary for the safety of personnel when performing Work that requires protection from hazardous energies.

The requirements identified herein are mandatory for VTA and for all contractors working on the Worksite beginning from the earlier occurrence of either of the following two events:

- (1) Electrical power is installed in any substation or any portion of the traction power system is capable of being energized; or
- (2) VTA LRV, hi-rail, or on-track equipment is operated on any portion of the track.

Prior to implementing Lockout/ Tagout/Blockout Procedures at any Work location, the VTA representative in charge of Worksite safety must identify and confirm the following with Contractor and with VTA's OCC:

- (1) All details as approved on the Restricted Access Permit, the Site-Specific Work Plan (if used), and the VTA Light Rail Power Removal Form, including work limits, locations of track, or OCS access and specific tracks and substations affected;
- (2) Scope of work, specific Contractor activities and equipment to be used must be only those specifically approved by VTA; and
- (3) Expected duration of Work and time for restoration of track and OCS to VTA Operations' Control.

The VTA OCC supervisor and Power employee on site must then secure all power, install required lockout devices, issue lockout tags, install required traction power system ground(s), and place markers, cones, and/or signs as required to secure the Work area.

Contractor's representative in charge of the Work at the Worksite may then proceed with approved Work Plan and activities only after obtaining specific approval and direction from the VTA Resident Inspector or their designee (OCC supervisor and Power employee.)

The VTA OCC supervisor or Power employee in charge at the Worksite may suspend or modify any aspect of the work plan, assignment of personnel, or use of equipment at any if it is determined necessary to ensure any aspect of Worksite safety. Contractor is required to promptly respond to such direction and alter Work operations, discontinue any Work activity or all Work activity as necessary to comply with Worksite safety directives.

At the completion of the relevant Work or prior to the expiration of work time granted at the Worksite, Contractor must restore all aspects of track, OCS, and/or signal and communications systems to full operation (including necessary testing) or to the condition identified in the approved work plan. All Contractor personnel, equipment, and materials must be removed from the trackway, OCS facilities, substation, or equipment room and returned to approved storage or marshaling area.

Contractor's representative in charge of the Work at the Worksite must notify the OCC supervisor and the Power employee in charge of (i) any conditions, facilities, or materials not in conformance with the

approved work plan and/or (ii) any condition that will or may affect (a) any aspect of safety of VTA's facilities, trains, personnel, or (b) public safety, prior to releasing their use and control of the Work. Contractor must not leave the Worksite unless and until VTA has inspected and accepted any changed condition or facility.

In the event that Contractor fails to (i) restore any VTA facility to the required condition for VTA operations or as identified in the approved work plan or (ii) release Contractor's access to track, OCS, or signal and communications facility, VTA's OCC supervisor and Power employee will make a sweep of the track, OCS, or other facilities and determine whether equipment and systems are safe to operate. VTA OCC will then direct the restoration of power, the Power employee will remove markers, cones, and/or signs, ground straps, and installed lockout devices and tags and then restore the track and OCS to service for VTA.

The permit will be canceled with an effective time, date, and OCC approval written on Contractor's permit, including an explanation of cause for restoration of track and power in the absence of Contractor.

Failure of Contractor to conform to the requirements of the approved Restricted Access Permit, the approved Site Specific Work Plan, or the safety directions provided by the VTA Resident Inspector or their designee (OCC supervisor or Power employee) in charge at the Worksite will result in a Work stoppage issued by VTA until these deviations of the Contract requirements are corrected and Contractor is in full compliance.

6.15.11. On-Track Safety

Contractor must provide On-Track Safety for each work group as required in the **Restricted Access Procedures and VTA's Roadway Worker Protection Program** and these specifications. A work group is one or more persons performing Work.

All Work performed within Track Zone will require On-Track Safety by means of taking the tracks Out-Of-Service or the establishing a Work Zone. Each Work Zone, at a minimum, must consist of an Employee-In-Charge and a designated Lookout to watch for approaching trains or on-track equipment. The designated Lookout will provide a train approaching warning to the workers such that they move to the predetermined place of safety. Workers must be in the place of safety fifteen (15) seconds prior to the train or on-track equipment's arrival travelling at maximum authorized speed for the area. Once the track is clear, the Employee-In-Charge must provide a "proceed" hand signal to the operator of the train or on-track equipment. Work that is not identified as a minor task is any activity that takes place within Track Zone or has the potential to foul Track Zone. Minor Tasks are limited to removing an item from Track Zone, inspecting a fixed location, aligning a track switch using a switch bar, taking photographs with a VTA approved camera, and placing or removing markers and signs.

A single Lookout may be assigned to multiple work groups only if the Lookout can view approaching trains and rail mounted vehicles and can notify all workers of the approaching trains and rail mounted equipment.

Contractor must furnish any required Employee-In-Charge and Lookouts for the Contract. Full compensation for On-Track Safety must be included in the Contract price for the items of Work requiring the use of an Employee-In-Charge and Lookout and no separate payment will be made therefor.

6.15.12. Restricted Access Permit Fees

VTA will deduct the following amounts charged to Contractor for the below mentioned services provided by VTA Operations staff:

- (1) Restricted Access Permit: \$3,050 per location, per year
- (2) General Contractor Safety Seminar (also known as Roadway Worker Protection Training): \$85 per class for each participant
- (3) Power Shutdown: \$1,300 each
- (4) Bus Bridging: \$177 per hour for each bus
- (5) Modified Bus and/or Light Rail Services:
 - a. Hourly cost for each additional Bus required for service (regular or bus bridge): \$177 per hour for each bus
 - b. Hourly cost for a one-car Train; \$537
 - c. Hourly cost for a Train with 2 cars; \$620
 - d. Hourly cost for a Train with 3 cars: \$703.
- (6) Background Security Checks for VTA Permittees. The permit applicant will be required to have their employees undergo a background security check through a process determined by VTA at the permittee's cost. VTA reserves the right to make changes at any time to all aspects of the background security check process, including, but not limited to all costs. As of the issuance of these Contract Documents, the cost to permit applicant is estimated to be \$100.00 per person.

Full compensation for Restricted Access Permit Fees must be included in the Contract price for items of Work requiring a Restricted Access Permit and no separate payment will be made therefor. Contractor must pay all Restricted Access Permit fees directly to the Track Allocation Coordinator.

6.16. Access and Working Hours

This facility is owned and operated by VTA seven (7) days per week. Contractor shall endeavor to minimize disruption to VTA personnel and will carefully schedule its Work operation with VTA's Resident Inspector.

For bidding purposes, Contractor should assume the following working hours as permissible for Contractor to work:

Except for work requiring single tracking or shutdown of LRT Operations, Contractor activity for work without impacts to VTA operations or requiring roadway lane closures will be permitted between the hours of 7:00 AM (0700) and 5:00 PM (1700) daily Monday through Friday.

Weekend hours of work require VTA approval and must be between 8:00 AM (0800) and 6:00 PM (1800) on Saturday, Sunday or a holiday.

Contractor may utilize non-revenue light rail service hours (between 1:00AM (0100) to 4:00AM (0400), to perform the work, compliant with any permit conditions of any applicable local jurisdiction.

For work that is impacting LRT operations, Contractor must assign multiple crews and work around the clock within the allowable windows provided by VTA. VTA will provide bus bridging for passengers at no cost to Contractor only during the work windows defined below:

The schedule constraints involving operational impacts have been established for this Contract as follows:

- **Completion of Waler Installation:** Waler installation will be allowed under one (1) weekend period between the hours of 1:00 AM (0100) Saturday and 11:59 PM (2359) Sunday night, or 11:59 PM (2359) Monday if done on a 3-day holiday weekend. A 60 day notice to VTA and a 45 day notification at Track Allocation is required for this work. No light rail train will pass through Hamilton Station.
- **Completion of Retaining Wall Repair:** Retaining wall repair will be allowed under one (1) weekend period between the hours of 1:00 AM (0100) Saturday and 11:59 PM (2359) Sunday night, or 11:59 PM (2359) Monday if done on a 3-day holiday weekend. A 60 day notice to VTA and a 45 day notification at Track Allocation is required for this work. No light rail train will pass through Hamilton Station.
- **Completion of Track Alignment and Tamping:** The track alignment and tamping work will be allowed under one (1) weekend period between the hours of 1:00 AM (0100) Saturday and 11:59 PM (2359) Sunday night, or 11:59 PM (2359) Monday if done on a 3-day holiday weekend. A 60 day notice to VTA and a 45 day notification at Track Allocation is required for this work. Platform edge and station grade will be adjusted as well. No light rail train will pass through Hamilton Station, except the test train.
- **Completion of platform work:** The platform work will be allowed under a seven (7) days single-tracking period from 12:00 AM (0000) Monday through 11:59 PM (2359) Sunday night. A 60 day notice to VTA and a 45 day notification at Track Allocation is required for this work. While Hamilton Station is closed for patrons access during this period, the platform work will be performed with light rail train passing through Hamilton Station.

Contractor will coordinate with VTA and any local jurisdiction, including the City of Campbell, to prepare, submit, and obtain approval of traffic control plans to allow for the safe loading and unloading of materials and equipment, the safety of workers, pedestrians and vehicular traffic. Traffic control permits must be approved and given to VTA prior to scheduling of the rail work through VTA.

6.17. Contractor Cooperation and Coordination

Contractor shall meet weekly with the Resident Inspector, Project Manager and affected subcontractors to review construction status problems, schedule, concerns, etc. and to resolve any outstanding issues. The date and time of this weekly meeting will be established by the Resident Inspector at the Pre-Construction Meeting.

6.18. Substantial Completion and Acceptance

In addition to the requirements outlined in **Section 7.55 Final Inspection and Acceptance of All or a Portion of the Work**, the following apply:

6.18.1. Substantial Completion

Substantial Completion shall be deemed to have occurred only when all of the following conditions have been satisfied:

- Contractor completes all Work except for punch list items, final cleanup and other items included in the requirements for Final Acceptance;

- Contractor has completed all electrical and system work to level of completion ready for integration and testing and permission to operate from PG&E;
- Contractor has ensured that all Work has been performed in accordance with the requirements of the Contract Documents;
- Contractor has ensured that the Project may be used without damage to the Project or any other property on or off the Worksite, and without injury to any person;
- Contractor shall have furnished to VTA for VTA's approval certificates that the Work is in conformance with all applicable design criteria, applicable codes and Governmental Rules;

6.18.2. Punch List Items

Contractor shall submit a proposed Punch List to VTA when Contractor believes the Project has been substantially completed in compliance with the Contract. The "Punch List" shall be a statement of repairs, corrections and adjustments to the Contract Work, and incomplete aspects of the Project which, in Contractor's opinion, can be completed with minimal interference to the occupancy, use and operation of the completed facility.

All Punch list items will be completed to the reasonable satisfaction of VTA

6.18.3. Final Acceptance

Contractor shall achieve Final Acceptance by meeting the following requirements, in addition to the requirements as outlined in **Section 7.55 Final Inspection and Acceptance of All or a Portion of the Work**:

- All requirements for Substantial Completion and Punch List Completion have been fully satisfied;
- All spare parts, if any, have been purchased and delivered to VTA free of liens;
- Contractor shall have delivered to VTA a certification representing that there are no outstanding claims of Contractor or claims, Liens or stop payment notices of any Subcontractor or laborer with respect to the Work, other than any previously submitted unresolved claims of Contractor and any claims, Liens or stop payment notices of a Subcontractor or laborer being contested by Contractor (in which event the certification shall include a list of all such matters with such detail as is requested by VTA and, with respect to all Subcontractor and laborer claims, Liens and stop payment notices, shall include a representation by Contractor that it is diligently and in good faith contesting such matters by appropriate legal proceedings which shall operate to prevent the enforcement or collection of the same). For purposes of such certificate, the term "claim" shall include all matters or facts which may give rise to a claim;
- VTA shall have received and accepted all Construction Documents, Record Documents and as-built schedule, test data and other deliverables required under the Contract Documents;
- All of Contractor's obligations under the Contract Documents (other than obligations which by their nature are required to be performed after Final Acceptance) shall have been satisfied in full or waived in writing by VTA; and
- Contractor shall have delivered to VTA a Notice of Completion for the Project in recordable form and meeting all statutory requirements.

6.19. Final Pay Quantities

When the estimated quantity for a specific portion of the Work is designated on the plans or in the Schedule of Quantities and Prices as a final pay quantity (F), the estimated quantity shall be the final quantity for which payments for the specific portion of the Work will be made, unless the dimensions of the portion of the Work shown on the plans are revised by VTA, or unless the portion of the Work is eliminated. If the dimensions of the specific portion of the Work are revised, and the revisions result in an increase or decrease in the estimated quantity of the portion of the Work, the final quantity for payment will be revised in the amount represented by the changes in the dimensions. If the specific portion of the Work is eliminated, the final pay quantity designated for the specific portion of the Work will be eliminated. In the event that the quantity of a final pay item shown on the Schedule of Quantities and Prices differs from a quantity that can be calculated from dimensions or lines shown on the Plans, the quantity shown on the Schedule of Quantities and Prices shall govern.

When portions of an item have been designated on the plans or in the Schedule of Quantities and Prices as final pay quantities, portions so designated will be measured and paid for in accordance with the provisions of **Section 7.59 Progress Payments**.

6.20. Project Close-Out Requirements – Record Drawings

During the project, Contractor shall keep a master set of drawings updated, noting any variation of the Work. Upon completion of the Work, Contractor shall produce a master “Record” set of plans by neatly transferring all such noted variations to blueprint copies of the same drawings, and shall deliver same to VTA for signed receipt, certification, and delivery to VTA.

Record Drawings shall include all shop drawings submittals indicated as NO EXCEPTIONS TAKEN (NET) and MAKE CORRECTION NOTED (MCN). Shop Drawings indicated as MAKE CORRECTION NOTED (MCN) shall be revised to reflect the required corrections or modifications.

In addition, project closeout will include marked specifications, drawings submitted as part of design reviews, design calculations, test procedures and results, subcontracts, purchase orders, employment records, shop drawings, change orders, daily logs and certificates of inspections, and other items pertinent to the installed and tested contract Work.

6.21. Progress Schedule

6.21.1. General Requirements

- (a) **Critical Path Method.** Scheduling of Work must be performed by Contractor in accordance with this Section 6.21 Progress Schedule.

Development of the schedule and project status reporting requirements must employ computerized Critical Path Method (CPM) scheduling.

- (b) **Primavera.** All Schedules must be prepared using the latest version of “Primavera” software.
- (c) **Incorporation of Contract Requirements.** All schedules prepared by Contractor shall meet the requirements for access, sequencing, construction staging, delivery of Contractor and VTA-furnished materials, Contract milestone and completion dates as specified in the Contract Documents.

- (d) **Contractor's Representation.** Submittal of the baseline CPM schedule ("Baseline") and subsequent schedule updates ("Updates") shall be Contractor's representation that the submitted schedule meets all of the requirements of the Contract and that Contractor plans to execute the Work in the sequence, durations, and methods indicated on the submitted Baseline and Updates.
- (e) **Submittal Format.** Unless otherwise specified in this Section 6.21 Progress Schedule, procedures for the submission, review and acceptance of all schedule submittals will be in accordance with Section 6.6 Contract Data Requirements. Contractor shall submit three (3) copies of each schedule submittal and an electronic copy of the exported schedule data file on compact disk or other acceptable electronic medium for all schedule submittals.
- Schedule submittals includes Baseline, monthly updates, schedule revisions, recovery schedules, Time Impact Evaluations, and mitigation plans
- (f) **Current Schedule.** Contractor shall develop the schedule and monitor the actual progress of the Work. The accepted Baseline, together with the most recent accepted Update constitute the "Current Schedule". The Current Schedule will be the basis for evaluating progress and time extension requests.
- (g) **Acceptance No Waiver.** Acceptance of Preliminary and Baseline schedules and updates by VTA does not constitute a waiver of any Contract requirement including the Contract completion and milestone dates. Neither schedule inaccuracies nor Contractor's failure to include in the schedule an element of the Work shall relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract requirements.
- (h) **Pay Item.** The Schedule pay item includes full compensation for all costs associated with schedule submittals and re-submittals and no additional compensation will be allowed therefor.
- (i) **Schedule Adjustments.** VTA reserves the right to require that Contractor modify, adjust, add to, or clarify any portion of the Current Schedule which may later be discovered to be insufficient or inaccurate for planning, monitoring, or prosecuting the Work. No additional compensation will be provided for such modifications, adjustments, additions, or clarifications.
- (j) **Reserved**

6.21.2. Reserved

6.21.3. Schedule Float

- (a) **Definition.** "Float" is the amount of time between the early and late start dates of an activity, or between the early and late finish dates of the activity in the CPM schedule. A Baseline with negative float will not be accepted.
- (b) **Ownership.** Neither VTA nor Contractor owns Float; the project owns Float. As such, Float is considered an expiring resource available to both parties.
- (c) **Early Completion.** If Contractor submits a schedule showing completion dates earlier than the dates specified in **Section 6.4 Time for Performance** and **Section 6.11 Work Sequence and Constraints**, VTA may, in its discretion, accept or reject the schedule. If the schedule showing early completion is accepted, VTA may, in its discretion, issue a change order

adjusting the Contract dates. However, if a change order is issued, no additional compensation will be provided to Contractor for such adjustment to the Contract. If VTA elects not to issue a change order adjusting the Contract dates, any additional time between the early and contract completion dates will be Float. Neither party will be liable to the other for impacts to early completion dates.

6.21.4. Reserved

6.21.5. Baseline CPM Schedule

- (a) **Submittal.** Contractor shall prepare and submit for acceptance by VTA, a detailed Baseline as further specified in **Section 6.51 Technical Submittals List**. The Baseline shall be an orderly and practical plan for completion of the Work in conformance with all Contract requirements. The date of the Baseline shall be the date of Notice of Award.
- (b) **Format and Content.** The Baseline must be comprehensive. It must include all activities necessary to clearly establish the critical path and to demonstrate complete and accurate planning and sequencing of the Contract and to permit monitoring and evaluation of progress and time impacts.

The Baseline must be time-scaled and comply with the following requirements:

- All activities in the schedule, with the exception of the first and last activities, shall have a minimum of one predecessor and a minimum of one successor.
- The Baseline must not show a duration longer than 15 days for any activity except submittals, approvals, fabrication and procurement, unless otherwise approved by VTA. An activity “duration” is the total number of actual working days required to perform that activity including the first day thereof.
- Include a Special Calendar for those activities susceptible to weather delays. The Special Calendar shall incorporate the number of working days that are anticipated will be lost due to adverse weather conditions in accordance with **Section 6.21.12 Adverse Weather Delays**.
- Identify procurement of substantial items of material and equipment and, include as separate activities the following: submittal, review, approval, order, delivery and inspection at the Worksite. The timing and duration for VTA review and approval of submittals and shop drawings will be as specified in Section 8.0 - Technical Specifications and the Technical Submittals List.
- Identify VTA-furnished materials and equipment, if any, as separate activities.
- Show dependencies (or relationships) between activities.
- Include Contractor testing, VTA testing, training of VTA personnel, delivery of spare parts, submittal of operating and maintenance manuals, developing and completing punch list items, and clean-up as separate activities.
- Show the interface with the work of other contractors and agencies, including utilities.
- Identify all activities to be performed by subcontractors by name of subcontractor.

- Identify all anticipated non-working days and holidays.
- (c) **Baseline Report.** Contractor must submit with the Baseline a report containing the following information: (i) A list of activities, showing the early, late and actual start and finish dates, duration, float, responsibility code and the predecessor and successor relationship, sorted by early start; (ii) A time-scaled network diagram that includes activities and their relationships; and (iii) A written narrative which describes the basis, assumptions, planned sequence of work operations, production rates, equipment, resources, constraints, and any other considerations used to develop the Baseline.
- (d) **Review and Resubmittal.** VTA shall review and provide comments on the Baseline within 14 days of receipt. Contractor shall revise and resubmit the Baseline to address all comments, concerns and modifications requested by VTA within 14 days of receipt of VTA comments. Contractor shall include with the Baseline re-submittal a line-by-line response to each VTA comment indicating how it has been addressed by Contractor.

6.21.6. Schedule Update

- (a) **Submittal.** Following acceptance of the Baseline, Contractor shall prepare and submit monthly schedule updates (“Updates”) to reflect actual progress, anticipated changes to planned activities, and corrections to out-of-sequence logic. Five (5) days before the end of each month VTA will meet with Contractor and its Scheduler to review the progress of activities and Contractor’s proposed logic revisions for that month. Updates shall be statused through the end of the month and shall be submitted within 7 calendar days following the end of the month
- (b) **Content.** Each Update shall show all work activities including those already completed. Completed activities shall incorporate "As-Built" information including when activities were actually started and completed, logic revisions, and activity re-sequencing. The Weather Delay Calendar shall be revised to include actual weather delay days that occurred during the reporting period.
- (c) **Update Report.** A report shall be submitted with the Update containing the following information: (i) A list of activities, showing the early, late and actual start and finish dates, duration, float, responsibility code and the predecessor and successor relationship, sorted by early start; (ii) A time-scaled network diagram that includes activities and their relationships, and (iii) A written narrative which includes:
- Status of major project components (percent complete, amount of time ahead or behind schedule) and an explanation of how the Project will be brought back on schedule if delays have occurred.
 - Progress made on critical activities.
 - An explanation for lack of progress on critical path activities that were planned to be performed during the previous month.
 - An explanation for any schedule changes, including changes to logic or to activity durations.

- List of critical activities scheduled to be performed in the next three (3) week period.
 - Status of major material and equipment procurement.
 - Any delays encountered during the month.
 - List of any working days lost due to weather and changes made to the weather delay calendar.
 - Any other information pertinent to status of the Contract. Contractor shall include additional status information requested by VTA at no additional cost.
- (d) **Acceptance.** VTA will, within 14 working days after receipt of the Update, either accept, accept with comments, or reject the submittal: (i) If accepted, no additional action by Contractor is required for that month; (ii) If accepted with comments, the requested revisions must be incorporated into the next Update. Failure to incorporate the requested revisions into the subsequent Update will be cause for rejection of the subsequent Update; or (iii) If rejected, within five calendar days, Contractor shall provide a separate line-by-line response to all comments and re-submit the Update incorporating the requested revisions. Only one (1) Update re-submittal per month will be reviewed by VTA. If an Update is not accepted, the amount of that month's schedule installment payment will be deducted from the Contract (see **Section 6.21.13 Payment Provisions**).
- (e) **Current Schedule.** The accepted Update shall become the Current Schedule.

6.21.7. Three-Week Look-Ahead Schedule

- (a) **Project Meetings.** At the weekly progress meeting (see **Section 7.27 Project Meetings**), Contractor will provide a time-scaled Three Week Look-Ahead Schedule ("Three Week Schedule"). The Three Week Schedule must show the actual progress for the previous week and planned activities for the upcoming three weeks.
- (b) **Primavera.** The Three Week Schedule will be prepared using "Primavera" software. Handwritten schedules shall not be accepted by VTA. VTA may request electronic transmittal of the Three Week Schedule by compact disk or other electronic medium acceptable to VTA, at least one day ahead of the weekly progress meeting.
- (c) **Consistency.** The activities in the Three Week Schedule shall be based upon and correlated by activity number to the Current Schedule. The actual progress data incorporated into the Update and the Current Schedule shall be consistent with the data previously shown in the Three Week Schedules. The format of the Three Week Look-Ahead Schedule shall be subject to review and acceptance by VTA.

6.21.8. Schedule Revisions

- (a) **Significant Changes.** If Contractor desires to make a change in the method or manner of construction that results in significant changes to the logic, sequence or duration of scheduled activities, Contractor shall submit a request for a schedule revision to VTA. Contractor must not revise the Current Schedule until the proposed revision has been accepted by VTA.
- (b) **Format of Request.** To request a revision to the Current Schedule, Contractor shall provide VTA with a written narrative that includes a description and reason for each proposed

revision. Contractor shall also provide a time-scaled logic diagram which compares the original sequence and durations to the revised sequence of work and activity duration.

- (c) **VTA Response.** VTA shall respond to the request for revision within 14 days. Contractor shall submit any objections to VTA's response in writing within 7 days of receipt and shall include any additional information it wishes VTA to consider in connection with the request for revision. Thereafter, VTA's determination on the request for revision shall be final and the schedule shall be updated in accordance therewith.

6.21.9. Recovery Schedule

- (a) **Submittal.** If an Update shows a date for final completion or for any of the milestones beyond the Contract dates, Contractor shall, within 7 days after submittal of the Update, submit a Recovery Schedule. Contractor's submittal shall explain the methodology, basis and assumptions used in the Recovery Schedule. If sequence changes are proposed, Contractor shall provide a schedule diagram comparing the original sequence to the proposed sequence of work.
- (b) **Acceptance.** Contractor shall incorporate any revisions to the Recovery Schedule requested by VTA. The Recovery Schedule shall not be incorporated into the Current Schedule until accepted by VTA. Change Requests and Change Notices
- (c) **Change Requests and Change Notices.** Contractor shall follow the procedures of **Section 7.65 Change Requests and Change Notices** for any changes to the Work that Contractor contends results in additional cost. Contractor's failure to submit a timely Change Request will constitute a waiver of any and all such costs and claims associated therewith including anticipated profits.

6.21.10. Time Impact Evaluation for Change Orders and Delays

- (a) **Submittal.** When Contractor becomes aware of circumstances that it considers a change to the contract resulting in delay (including Change Notices and Force Account directives), Contractor must prepare and submit a Time Impact Evaluation (TIE). The TIE must include both a written narrative and schedule diagram that shows how Contractor proposes to incorporate the change into the Current Schedule and how it impacts the critical path.
- (b) **Preparation Costs.** Contractor must be responsible for all costs associated with the preparation of TIE's and the process of incorporating them into the Current Schedule.
- (c) **Acceptance.** Once accepted by VTA, the TIE shall be incorporated into the next Update at no additional cost to VTA. If Contractor and VTA are unable to reach agreement, Contractor shall incorporate changes in accordance with VTA's direction.
- (d) **Time for Submittal/Waiver.** Contractor shall submit a TIE within 15 days of the circumstances giving rise to the change. Contractor's failure to submit a timely TIE in connection with a change causing delay shall constitute a waiver of any and all rights to a time extension, and all claims based thereon, including anticipated profits, for that change.

6.21.11. Time Extensions

- (a) **Timely Request/ Waiver.** Contractor shall request a time extension in accordance with **Section 6.21.10 Time Impact Evaluation for Change Orders and Delays** for any change, delay,

or disruption that impacts a completion date of the Current Schedule. Contractor's failure to request a time extension within 15 days of the circumstances causing the delay shall constitute a waiver of any and all rights to a time extension, compensation, and any and all claims, including but not limited to time-related overhead, indirect impacts, cumulative impacts, constructive acceleration, and loss of anticipated profits, based thereon, for that delay.

- (b) **Contractor Without Fault.** A time extension will be granted only if the change, delay, or disruption that impacts a completion date is beyond the control and without the fault or negligence of Contractor or any subcontractor and impacts the Critical Path.
- (c) **Compensable Delays.** A delay is compensable to Contractor only if it: (i) is caused by VTA; (ii) is not concurrent with Contractor's caused delays or delays that are excusable but non-compensable (e.g. weather delays); and (iii) impacts the Critical Path.
- (d) **Non-Compensable Delays.** A delay caused by VTA is non-compensable if it is concurrent with Contractor caused delays or delays that are excusable but non-compensable.
- (e) **Mitigation Plan.** For any delay for which Contractor feels they are entitled to a time extension, Contractor shall, within 15 days of the events causing the delay, submit to VTA a mitigation plan, including a schedule diagram, which explains how the impact can be mitigated. Contractor shall also include a detailed cost breakdown of the labor, equipment and material required to mitigate the delay. Contractor is responsible for the cost to prepare the mitigation plan. VTA will review and comment on the time extension and mitigation plan. Within 15 days VTA will accept, accept with comments or reject the time extension and mitigation plan.

6.21.12. Adverse Weather Delays

- (a) **Typical Inclement Weather Days.** Contractor shall assume and incorporate into all Schedules the typical number of working days lost as a result of inclement weather shown on the table set forth below. Only working days lost as a result of inclement weather in excess of those listed for a given month shall be considered for a time extension. Typical weather days for a given month, which are not actually lost, shall not be carried over to any other month.

Typical Number of Working Days Lost to Weather

<u>Month</u>	<u># of Days</u>
January	5
February	5
March	5
April	4
May	3
June	0
July	0
August	0
September	0
October	0
November	3
December	5

- (b) **Effect on Critical Path Activities.** A working day shall not be deemed lost as a result of inclement weather, and therefore eligible for a time extension, unless at least 60% of Contractor's planned work forces are unable to be employed on the critical path activities. Weather delays may consist of days lost during inclement weather, days lost because of wet soil, and days lost because of site clean-up after inclement weather.
- (c) **Time Extensions for Weather Delay.** Contractor shall establish all of the requirements of this Section and comply with **Section 6.21.11 Time Extensions** for a time extension based on weather delay.
- (d) **Non-Compensable.** All time extensions granted for weather delays shall be non-compensable.

6.21.13. Payment Provisions

- (a) **Administration of Pay Item.** If the contract contains a separate pay item for "Progress Schedule", that pay item shall be administered as follows: (i) 25% shall be invoiced upon acceptance of the Baseline, and (ii) the remaining 75% shall be invoiced in equal monthly installments for each accepted Update thereafter. The equal monthly invoice amounts shall be determined by dividing the remaining pay item amount by the number of months from the date of acceptance of the Baseline, or sixty (60) days from the first charged day, whichever is earlier, through contract completion. The final installment shall not be invoiced until after final acceptance of the Contract and a final As-Built schedule is received. There shall be no separate payment for any other required schedule submittal.
- (b) **Deductions.** If Contractor fails to submit the Baseline within sixty days from the first charged day, Contractor shall not be entitled to payment for the Baseline and therefore 25% of the total amount of the "Progress Schedule" pay item shall be deducted from the Contract. Thereafter, each month Contractor fails to submit an accepted Update, Contractor shall not be entitled to payment for that Update and the amount of that monthly installment payment shall be deducted from the Contract. Forfeiture of any payments shall not relieve Contractor from the responsibility to submit the CPM schedule update and all other requirements of this section including weekly schedule reports, daily Contractor construction reports, time impact evaluations and recovery schedules throughout the term of the contract, including the final As-Built schedule.
- (c) **Special Retention.** In addition to the amount retained by VTA, if any, from each progress payment as provided for in **Section 7.59 Progress Payments**, VTA may withhold additional amounts, not to exceed 10% of the total progress payment, for Contractor's failure to meet the requirements of **Section 6.21 Progress Schedule**. VTA will pay Contractor the amount withheld once VTA has determined that Contractor has satisfactorily complied with the requirements of **Section 6.21 Progress Schedule**.

6.22. References to Days

A "working day" is defined to mean any day not a Saturday, Sunday, or **holiday**, unless otherwise indicated. All references to "days" herein are references to "calendar days", unless otherwise indicated.

For the purposes of this contract document, recognized holidays shall be:

- New Year's Day (January 1),

- Martin Luther King, Jr. Day (3rd Monday in January),
- President's Day (the third Monday of February),
- Cesar Chavez Day (March 31),
- Memorial Day (the last Monday in May),
- Independence Day (July 4),
- Labor Day (the first Monday of September) (triple time)
- Veterans Day (November 11)
- Thanksgiving Day (the 4th Thursday in November)
- The day after Thanksgiving (Friday)
- Christmas Day (December 25)

If a holiday falls on a Sunday, the following Monday shall be deemed to be the holiday in lieu of the day observed. If a holiday falls upon a Saturday, the preceding Friday shall be deemed to be the holiday in lieu of the day observed.

6.23. Reserved

6.24. Value Engineering Change Proposal

6.24.1. Basis for Value Engineering Change Proposal

VTA encourages all contractors to develop, prepare, and submit a Value Engineering Change Proposal (VECP) voluntarily. This **Section 6.24** applies to a VECP which is originated, initiated and developed by Contractor to change the drawings, specifications or other requirements of the Contract. In order to be accepted under this **Section 6.24**, each VECP must:

- Be identified by Contractor at the time of submittal to VTA as submitted pursuant to this Section 6.24;
- Require a change to the Contract;
- Decrease the Contract Price;
- Result in a net savings to VTA of a minimum of \$50,000, or result in a reduction in the overall schedule of 30 calendar days minimum; and
- Maintain the items' required functions such as service life, reliability, economy of operation, ease of maintenance and necessary standardized features and appearance.

VTA reserves the right to reject any VECP that:

- Requires an unacceptable extension of Contract time; or
- Changes only the quantities of deliverable end items.

6.24.2. Content of VECP

Any VECP Contractor submits shall be in sufficient detail to clearly define the proposed change including:

- A description of the difference between the existing and the proposed Contract requirements, and the comparative advantages and disadvantages of each;
- Contract requirements recommended to be changed if the proposal is accepted;

- A detailed estimate of the amount of the net savings that will result from acceptance of the proposal;
- A prediction of any effects the proposed change would have on costs of maintenance and operation;
- A description and estimate of costs VTA may incur in implementing the VECP, such as test and evaluation and operating and support costs; and
- A statement of the time by which the proposal must be accepted so as to obtain the maximum price reduction, noting any effect upon the Contract completion time.

6.24.3. Acceptance of VECP

VTA may accept or reject part or all of any VECP by giving Contractor written notice thereof. Until such notice is issued, Contractor remains obligated to perform in accordance with the terms of the Contract. A VECP will be processed expeditiously; however, VTA is not liable for any delay in acting upon any proposal submitted pursuant to this **Section 6.24**. The decision of VTA as to acceptance of any such proposal shall be final. The denial of any VECP does not provide Contractor with any basis for claim for a claim for damages or delay, nor for release from contractual responsibilities. VTA's approval of a VECP does not entitle Contractor to additional compensation or time if the Work incorporating the proposal is defective, more expensive to the Contractor than what was anticipated at bid time, or takes more time than was anticipated at Bid time.

6.24.4. VECP Contract Price Adjustment

When VTA accepts a VECP submitted pursuant to this **Section 6.24**:

- An equitable adjustment in the Contract price and in any other affected provisions of the Contract shall be made and the Contract modified in accordance with this **Section 6.24**, or other applicable articles of the Contract.
- The net savings resulting from the change shall be shared between Contractor and VTA on the basis of 50 percent for Contractor and 50 percent for VTA. Net savings shall be determined by deducting the following from the estimated gross savings: (a) Contractor's costs of developing and implementing the VECP, including any amount attributable to a subcontractor, and (b) the estimated amount of increased costs to VTA resulting from the change (such as review implementation, inspection, related items and VTA-furnished property). Estimated gross savings include Contractor's labor, material, equipment, overhead profit and bond. The Contract price shall be reduced by the sum of VTA's costs and VTA's share of the net savings.
- Contractor is entitled to share in "instant contract" savings only, to the full extent provided for in this **Section 6.24**. For purposes of sharing under this **Section 6.24**, the term "instant contract" shall not include any supplemental agreements to or other modifications of the Contract, executed after acceptance of the particular VECP, by which VTA increases the quantity of any item or adds any item.

6.24.5. Inclusion in Subcontracts

Contractor shall include value engineering arrangements in any subcontract which, in Contractor's judgment, appears to offer sufficient value engineering potential.

6.24.6. Identical VECP

A VECP identical to one submitted under any other contract, by this or by any other Contractor, may also be submitted under the Contract, provided that the proposal originated with such Contractor and not with VTA.

6.24.7. Restrictions

Contractor may restrict VTA's right to use any VECP data by marking it with the following statement:

“This data, furnished pursuant to **Section 6.24 Value Engineering Change Proposal** of the Contract, may not be duplicated, used or disclosed in whole or in part, for any purpose except to evaluate the VECP, unless the VECP is accepted by VTA. The restriction does not limit VTA's right to use information contained in this data if it is or has been obtained, or is otherwise available, from Contractor or from another source, without limitations. When this proposal is accepted by VTA, VTA shall have the right to duplicate, use and disclose any data in any manner and for any purpose whatsoever, and have others do so whether under this or any Contract.”

Contractor shall have no right to share any future savings derived from incorporation of the VECP in future VTA Contracts.

6.25. Reserved

6.26. Quality Assurance and Quality Control Requirements

Contractor shall, at its own expense, submit for VTA's review and approval, a Quality Assurance program consistent **with the requirements as specified in Appendix M Quality Assurance and Quality Control Requirements** and these specifications.

6.27. Environmental Coordination and Cooperation

Attention is directed to **Appendix G Environmental Coordination and Cooperation** of these Contract Documents for a complete listing of environmental requirements applicable to the project. Contractor is advised to become thoroughly familiar with the information, processes and forms, submittal requirements, and compliance requirements in **Appendix G Environmental Coordination and Cooperation**.

6.28. Reserved

6.29. Reserved

6.30. Reserved

6.31. Reserved

SECTION 7 GENERAL CONDITIONS

LEGAL RESPONSIBILITIES AND RELATIONSHIPS

7.1. Applicable Law and Jurisdiction

This Contract incorporates provisions required by the laws of the State of California and the Federal Government. It shall be Contractor's responsibility to determine the applicability of State and Federal laws, rules and regulations to the Work.

This Contract shall be governed by California law. Any lawsuit or legal action arising from this Contract shall be commenced and prosecuted in the courts of Santa Clara County, California.

7.2. Compliance with Laws and Regulations

Contractor shall keep itself informed of, comply with, and shall cause all of its agents, employees, suppliers and subcontractors of any tier, to observe and comply with all applicable Federal, State, and local laws, regulations, and policies, including, but not limited to, all applicable terms and conditions prescribed for third party contracts by the U.S. Department of Transportation ("DOT"). Contractor shall indemnify, defend, and hold harmless VTA or any entity within whose jurisdiction or on whose property the Work is being performed, and (as applicable) their Board of Supervisors, Board of Directors or Councils as well as their officers, agents, consultants and employees from any claim, liability, loss, injury or damage arising out of, or in connection with, the performance of this Contract by Contractor and/or its agents, employees, suppliers or subcontractors of any tier, excepting only loss, injury or damage caused by the active or sole negligence or willful misconduct of personnel employed by the indemnitees.

7.3. Contractor Licensing Requirements

Contractors are required by law to be licensed in the State of California and are regulated by the Contractors State License Board. Frequently asked questions are posted at the CSLB website at <http://www.cslb.ca.gov/>. Any other questions related thereto may be referred to the Registrar of the Board whose address and contact information may be found at the CSLB website or use this address:

Contractor's State License Board
9821 Business Park Drive
Sacramento, CA 95827

7.4. Independent Contractor

Contractor represents that it is fully experienced and properly qualified to perform the class of work provided for herein, and that it is properly licensed, equipped, organized and financed to perform such work. Contractor shall act as an independent Contractor and not as the agent or employee of VTA in performing the Contract, maintaining complete control over its employees. Nothing contained in this Contract or any subcontract awarded by Contractor shall create any contractual relationship between any such subcontractor and VTA, and Contractor shall perform all Work in accordance with its own methods subject to compliance with the Contract.

7.5. Permits, Licenses, Fees and Notices

As specified in **Section 6 Special Conditions**, or as otherwise required by law, Contractor shall, before beginning any work which requires a permit or similar authorization, secure and pay for all necessary licenses, fees, bonds, charges, inspections, customs or import duties, permits, and similar authorizations from all governmental authorities required to fulfill the Contract requirements and Contractor's obligations.

7.6. Nondiscrimination

Contractor shall comply with Section 1735 of the California Labor Code, which reads as follows:

“A Contractor shall not discriminate in the employment of persons upon public works on any basis listed in subdivision (a) of Section 12940 of the Government Code, as those bases are defined in Sections 12926 and 12926.1 of the Government Code, except as otherwise provided in Section 12940 of the Government Code. Every Contractor for public works who violates this section is subject to all the penalties imposed for a violation of this chapter.”

In the performance of this Contract, Contractor and its subcontractors shall not unlawfully discriminate, harass or allow harassment, against any employee or applicant for employment because of sex, gender, gender identity, gender expression, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), genetic information, marital status, age (over 40), sexual orientation, military and veteran status, and the denial of family care leave. Contractor and its subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. Contractor and its subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code §12900 *et seq.*) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 *et seq.*). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12290 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this Contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Contract. Contractor and its subcontractors shall permit access to all records of employment, employment advertisements, application forms, and other pertinent data and records by the State Fair Employment Practices and Housing Commission, or any other agency of the State of California designated by the State, for the purpose of investigation to ascertain compliance with this clause.

7.7. Prohibited Interests

7.7.1. Solicitation

Contractor warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Contract, and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or any other consideration, contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, VTA has the right to rescind this Contract without liability.

7.7.2. Interest of Public Officials

No Board Member, officer, or employee of VTA during his or her tenure or for two (2) years thereafter is permitted to have any interest, direct or indirect, in this Contract or the proceeds thereof. If Contractor becomes aware of the existence of such an interest, Contractor must notify VTA of such interest within 1 business day of Contractor being made aware thereof.

7.7.3. Interests of Contractor

Contractor covenants that, presently, Contractor, its officers, directors, or agents, have no interest and will not acquire any interest, direct or indirect, that would conflict in any manner or degree (or create an appearance of conflict) with the performance of the Contract. Contractor further covenants that in the performance of this Contract, Contractor will not knowingly employ any person having any such interest.

7.8. Labor Provisions

7.8.1. Register with DIR

Contractor and its subcontractors must be registered with the Department of Industrial Relations (DIR). The registration form may be found at: www.dir.ca.gov/Public-Works/PublicWorks.html/

7.8.2. Safety

Pursuant to Section 107 of the Contract Work Hours and Safety Standards Act and Department of Labor Regulations at 29 CFR Part 1926, no laborer or mechanic working on this Contract shall be required to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to their health and safety as determined under applicable health standards promulgated by the Secretary of Labor.

In addition to Contractor's own safety procedures, and any safety procedures required under federal, state, or local laws or regulations, including compliance with the provisions of the California Occupational Safety and Health Act of 1973 and any additional safety requirements contained in this **Section 6 Special Conditions**, Contractor shall implement and enforce all safety requirements that are determined by VTA's Safety Coordinator to be applicable to the performance of any Work under this Contract.

7.8.3. Overtime Requirements

Neither Contractor nor any subcontractor of any tier shall require or permit any worker to work in excess of eight hours in any single calendar day or in excess of 40 hours in any single calendar work week (defined as seven sequential calendar days) unless such worker receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of eight hours in any single calendar day or in excess of 40 hours in any single calendar work week, whichever is greater. Failure to comply with the preceding requirements shall subject Contractor or any subcontractor of any tier to the penalties specified in Labor Code §1813.

7.8.4. Prevailing Wage Rates

Pursuant to appropriate Sections of the Labor Code of the State of California, the Director of the California Department of Industrial Relations has ascertained the general prevailing rate of wages (which rate includes employer payments for health and welfare, vacation, pension, and similar purposes) applicable to the Work to be performed under this Contract, for straight time, overtime, Saturday, Sunday and

holiday work. Said prevailing wage rates are incorporated herein by reference. These wage rates are on file and will be made available to any interested party on request in the Procurement, Contracts and Materials Management Office of VTA, Building B, First Floor, 3331 N. First Street, San José, CA 95134. These wage rates are also available through the California State Department of Industrial Relations at <http://www.dir.ca.gov>. Contractor shall post a copy of the prevailing wage rates at the jobsite or material staging area. The Work is subject to compliance, monitoring and enforcement by the California Department of Industrial Relations.

Workers employed in the Work must be paid at the rates at least equal to the prevailing wage rates as adopted. If Contractor uses a craft or classification not shown on the prevailing wage determinations, Contractor may be required to pay the wage rate of that craft or classification most closely related to it as shown in the general determinations effective at the time of Contract award.

Failure to pay such prevailing wages shall subject the employer to the penalties set forth in Labor Code §1775.

If **Section 1.8** and **Section 3.7** identify this project as a recipient of Federal Assistance, then this Contract is also subject to Federal requirements for payment of prevailing wages as determined by the Secretary of Labor. Where there are differences in the rates, the higher shall apply.

7.8.5. Liability for Unpaid Wages

In the event of any violation of the clause set forth in subparagraph (b) (1) of 29 CFR Section 5.5, Contractor and any subcontractor responsible hereunder shall be liable for the unpaid wages.

7.8.6. Withholding for Unpaid Wages and Liquidated Damages

The U.S. DOT or VTA may upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of Work performed by Contractor or subcontractor under this Contract or any other Federal contract with Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (b) (2) of 29 CFR Section 5.

7.8.7. Travel and Subsistence Payments

Pursuant to Labor Code §1773.8, Contractor shall be liable for travel and subsistence payments to each workman needed to execute the Work, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with the provisions of Labor Code §1773.8.

7.8.8. Retention of Labor Records

In the performance of the Work, Contractor shall be responsible for compliance with California Labor Code Section 1776 pertaining to payroll records. Contractor and all of its subcontractors of any tier shall maintain all payrolls and basic payroll records during the course of the Work and shall preserve them for a period of three years from the completion of the Contract. Such records shall contain the name, address, social security number, work classifications, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by Contractor and all of its subcontractors of any tier in connection with the Work. These records shall

be made available by Contractor or any of its subcontractors of any tier for inspection, copying, or transcription by authorized representatives of DOT, VTA or the Department of Industrial Relations, and Contractor or any of its subcontractors of any tier shall permit such representatives to interview employees during working hours on the job.

7.8.9. Employment of Apprentices

In the performance of the Work, Contractor shall be responsible for compliance with California Labor Code Section 1777.5, pertaining to the employment of registered apprentices.

7.8.10. Subcontracts

Contractor shall insert in all of its subcontracts the clauses set forth in this **Section 7.8 Labor Provisions** and also a clause requiring its subcontractors to include these clauses in any lower tier subcontracts. Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this **Section 7.8 Labor Provisions**. Contractor is prohibited from performing the Work with a subcontractor who is ineligible to perform work on a public works project pursuant to Sections 1777.1 or 1777.7 of the California Labor Code.

7.9. Hazardous Materials or Unusual Conditions

In the event underground tanks, vaults, materials or unusual conditions as specified in Public Contract Code §7104(a) are encountered during prosecution of the Work, Contractor shall immediately, and before disturbing such conditions, notify VTA in writing of any:

- Material that Contractor believes may be material that is hazardous waste as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, II or III disposal site in accordance with the provisions of existing law.
- Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to Bidders prior to Bid Opening.
- Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.

VTA shall promptly investigate the conditions, and if it finds the conditions to be materially different or to involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a change order under the procedures described in **Section 7.65 Change Requests and Change Notices** and **Section 7.66 Change Order**. Any suspension of Work shall be administered in accordance with the provisions of **Section 7.69 Suspension of the Work**. If a dispute arises between VTA and Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance of any part of the Work, Contractor shall not be excused from any scheduled completion date provided for by this Contract, but shall proceed with all Work; *provided, however*, Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

7.10. Reserved

7.11. Reserved

7.12. Patent Rights

Any discovery or invention which is an integral part of the items being furnished under this Contract, as well as all information, design, specifications, data and findings which arise or is developed in the course of performing the Work under this Contract, shall become the property of VTA (and if federally funded, the property of FTA or FHWA).

7.13. Intellectual Property, Copyright and Patent Infringement

Contractor, upon VTA's request, shall defend VTA against any claim against VTA for patent, copyright, trademark, trade secret, or other intellectual property infringement based upon VTA's use of any work, goods, or services provided by Contractor pursuant to this Contract. If VTA requests Contractor to defend against such claim, Contractor shall hold VTA harmless from, and indemnify VTA for, any liability arising from the claim. This obligation shall not apply when the alleged infringement arises entirely from modification of the Work, goods, or services by VTA without Contractor's approval.

7.14. Rights in Technical Data

VTA shall have the right to use, duplicate or disclose, in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to use: (a) any manuals, instructional materials prepared for installation, operation, maintenance or training purposes and (b) technical data pertaining to end items, components or processes which were prepared for the purpose of identifying sources, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("form, fit and function" data; e.g., specification control drawings, catalog sheets, outline drawing). The term Technical Data as used herein means technical writing, sound records, pictorial reproductions, drawings, or other graphic representations and works of a technical nature, whether or not copyrighted, which are specified to be delivered pursuant to this Contract. The term does not include financial reports, costs analyses, and other information incidental to contract administration.

For copyrighted material, Contractor agrees to and does hereby grant to VTA and the FTA (if applicable), and to their officers, agents and employees acting within the scope of their official duties, a royalty-free, nonexclusive and irrevocable license for VTA and FTA (if applicable) to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others to use, all Technical Data now or hereafter covered by copyright.

No such copyrighted matter shall be included in Technical Data furnished hereunder without written notice of the copyright owner granting VTA and FTA (if applicable) consent to use such copyrighted matter in the manner above described.

Contractor shall report to VTA promptly and in reasonable written detail each notice or claim of copyright infringement received by Contractor with respect to any Technical Data delivered hereunder.

VTA reserves the right to use the design and the tooling developed for the furnishing of equipment under this Contract in future contracts based on this specification. Contractor shall maintain design data, including drawings, layouts, and any relevant engineering data, and all necessary tooling in good order for

a minimum of four years after final acceptance of the last items furnished under this Contract, and shall transfer that data, including tooling, to VTA upon request at no cost to VTA. All plans, drawings, diagrams, schematics, and specifications shall become the property of VTA and the FTA (if applicable), unless otherwise designated by VTA.

7.15. Ownership of Work and Material

VTA shall own all materials, work in progress, and finished goods produced by Contractor pursuant to this Contract, for which progress payments have been made and which have been satisfactorily delivered to a designated area. Such ownership shall be free of all encumbrances, or, if it is not, VTA may obtain a priority lien secured pursuant to appropriate sections of the Uniform Commercial Code and other applicable state laws or local ordinances to secure its title rights. Nevertheless, Contractor shall be responsible for risk of loss for those items of Work for which Contractor has care, custody and control, until Final Acceptance.

Unless otherwise specifically provided in this Contract, Contractor shall provide and pay for materials, equipment, tools, utilities, transportation, and other facilities and services (including all taxes thereon) necessary for the prosecution of the Work.

Contractor will submit to VTA a "Final Release of All Liens and Claims" as a condition precedent to receiving final payment under this Contract.

7.16. Title and Risk of Loss

Unless otherwise provided for, title to the Work and risk of loss shall pass to VTA upon final acceptance of the Work, and Contractor shall furnish or execute all necessary documents of title at that time.

7.17. Assignment and Delegation

Contractor shall not assign any of its rights or delegate any of its responsibilities under this Contract without the prior written consent of VTA.

7.18. Subcontracts

Contractor shall be fully responsible and liable for the products and actions of all subcontractors and suppliers of any tier, and shall include in each subcontract any provisions necessary to make all of the provisions of this Contract fully effective. Contractor shall provide all necessary plans, specifications, schedules, and instructions to its suppliers and subcontractors to enable them to properly perform their work. Contractor shall submit executed copies of all subcontracts entered into pursuant to this Contract to VTA within **7 calendar days** of such execution but no later than **15 calendar days** prior to the start of subcontractor's work.

In accordance with Public Contract Code Sections 4100 – 4114, **Subletting and Subcontracting Fair Practices Act**, Contractor shall not substitute any subcontractor listed on the Bid Forms or Contract Forms without the express written approval of VTA. Further, any substitution of any subcontractor shall be subject to the requirements of **Appendix C Business Diversity Policy and Requirements**.

7.19. Waiver and Non-waiver

A waiver by one party of a right to a remedy for breach of this Contract by the other party shall not be deemed to waive the right to a remedy for a subsequent breach by the other party. VTA's acceptance of goods, services or payment under this Contract shall not preclude VTA from recovering against Contractor or Contractor's surety for damages due to Contractor's failure to comply with this Contract.

7.20. Antitrust Claims

In entering into a public works contract, or a subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor agrees to assign to the awarding body all rights and title to, and all interest in all causes of action it may have under Section 4 of the Clayton Act, or under the Cartwright Act, arising from the purchases of goods, services, or materials pursuant to the public works contracts or subcontracts. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgement by the parties.

7.21. Stop Notices

VTA will withhold payments otherwise due Contractor in order to satisfy Stop Notices which have been properly filed, in accordance with the requirements of California Civil Code Division 3, Part 4, Title 15, Chapter 4, regarding Stop Notices. Contractor shall include this **Section 7.21 Stop Notices** in all subcontracts and similar documents entered into by Contractor for the performance of Work under this Contract.

All Stop Notices, including Preliminary Notices, shall include a reference to the VTA contract number and the title of the Contract.

7.22. Reserved

7.23. Reserved

AUTHORIZED REPRESENTATIVES AND COMMUNICATIONS

7.24. Authorized Representatives

Contractor shall designate, in writing, before starting any Work, an Authorized Representative who, during performance of the Contract, shall have full authority to act on Contractor's behalf in all matters within the scope of this Contract.

When Contractor is comprised of two or more persons, firms, partnerships, or corporations functioning on a joint venture basis, said Authorized Representative shall have the authority to represent and act for the joint venture.

Said Authorized Representative shall be present at the Worksite at all times while Work is actually in progress. When Work is not in progress and during periods when Work is suspended, arrangements acceptable to VTA shall be made for any emergency Work which may be required.

Whenever said Authorized Representative is not present on any particular part of the Work where VTA may desire to give direction, orders will be given by VTA, which shall be received and obeyed by the

superintendent or foremen who may have charge of the particular Work in reference to which the orders are given.

Except as hereinafter provided, all orders by VTA shall be given in writing. Those not so given are invalid and not binding. Emergency conditions dealing with safety of persons and protection of property are excepted and such oral directions will be confirmed in writing as soon as possible, but shall be immediately complied with by Contractor.

VTA will similarly designate, in writing, a VTA Authorized Representative to be its formal contact between VTA and Contractor. Said VTA Authorized Representative will be responsible for all matters relating to the execution of Work within the scope of this Contract and will decide all questions which may arise as to the quality or acceptability of the Work and as to the manner of performance and rate of progress of the Work; all questions which may arise as to the interpretation of plans and specifications; all questions as to the acceptable fulfillment of the Contract on the part of Contractor; and all questions as to compensation for Work performed.

Matters regarding the terms and conditions of this Contract shall be the responsibility of VTA's Procurement, Contracts and Materials Management Office.

Written notification to the other party shall be provided, in advance, of changes in the name or address or the scope of authority vested in such Authorized Representative.

Each Authorized Representative may, from time to time, delegate to other named individuals certain authority and responsibilities. The names of such individuals, the scope of their authority and responsibility, and the designation of their titles will be communicated to the other party in writing.

The designation of Authorized Representatives of the parties and their delegates as outlined above shall take place at the pre-construction meeting as specified in **Section 7.26 Pre-Construction Meeting**.

7.25. Notices and Communications

7.25.1. Notices

All notices and other communications concerning this Contract shall be written in English, shall bear the number assigned to this Contract by VTA and shall follow VTA's correspondence format and reference system. Notices and other communications may be delivered personally, by private package delivery, by regular, certified, or registered mail, or any electronic means acceptable to VTA.

The names of the individuals for each of the parties and their addresses to which other communications and correspondence should be delivered will be established and made known to the other party at the pre-construction meeting as specified in **Section 7.26 Pre-Construction Meeting**.

A notice to VTA will be effective only if it is delivered to VTA's Authorized Representative at the address to be made known to Contractor at the pre-construction meeting as specified in **Section 7.26 Pre-Construction Meeting**.

7.25.2. Drawing/Plan Clarification

A drawing/plan clarification from VTA is intended to make some requirement(s) of the drawings or plans clearly understood. Drawing clarifications/plan clarifications may be sketches, drawings or in narrative form and shall not change any requirement of the Contract. Responses to Contractor inquiries shall be as outlined in **Section 7.25.3 Requests for Information (RFIs)**.

7.25.3. Requests for Information (RFIs)

In the event Contractor, or any subcontractor or supplier, at any tier, determines that some portion of the drawings, specifications or other Contract Documents requires clarification or interpretation by VTA, Contractor shall submit a Request for Information (RFI) in writing to VTA. RFIs may be submitted only by Contractor and shall only be submitted on the Request for Information form provided by VTA. Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from VTA. In the Request for Information, Contractor shall set forth its own interpretation or understanding of the requirement along with the reasons why it has reached such an understanding.

VTA will review all RFIs to determine whether they are RFIs within the meaning of this Contract. If VTA determines that the document is not a RFI it will be returned to Contractor, unreviewed as to content, for resubmittal as the appropriate document required by the subject matter.

Responses to RFIs shall be issued within 5 working days of receipt of the request from Contractor unless VTA determines that a longer period of time is necessary to provide an adequate response. If a longer period of time is determined to be necessary, VTA will notify Contractor as soon as possible within those five (5) working days of the anticipated response time. The five (5) working days shall start at the time the RFI is received by VTA's designated contact person. If Contractor submits a RFI on an activity with five (5) working days or less of float on the current approved project schedule, Contractor shall mark the RFI as "Critical". Contractor shall not be entitled to any time extension due to the time it takes VTA to respond to such Critical request provided that VTA responds within the five (5) working days set forth above.

Responses from VTA will not change any requirement of the Contract Documents unless so noted in the response to the RFI. In the event Contractor believes that a response to a RFI will cause a change to the requirements of the Contract, Contractor shall immediately give written notice to VTA in accordance with **Section 7.65 Change Requests and Change Notices**. Failure to give such written notice shall waive Contractor's right to seek additional time or cost in accordance with **Section 7.65.1** of the Contract Documents.

7.26. Pre-Construction Meeting

Prior to issuance of a Notice to Proceed, a pre-construction meeting will be held at a time and place to be designated by notice from VTA. At this meeting, detailed procedures will be discussed for handling the following items:

- Authorized Representative
- Correspondence
- Notices
- Change requests and change notices
- Change orders
- Submittals
- Approvals
- Progress payments
- Schedules
- Community relations
- Inspection plans

- Requests for information (RFI)
- Other pertinent agenda items

7.27. Project Meetings

VTA will schedule and preside over all meetings (including, but not limited to, weekly, pre-production, periodic, and special meetings) throughout the progress of the Work. Agendas for the meetings may include, but are not necessarily limited to, discussions of performance observations, problems, conflicts, schedules, delivery schedules, supplier fabrication, quality standards, Contract modifications, and any other topics that VTA determines to be relevant to the project. Contractor attendance at these meetings is mandatory.

7.28. Publicity Releases

All publicity releases or releases of reports, papers, articles, maps, or other documents in any way concerning this Contract or the Work hereunder which Contractor or any of its subcontractors desires to make shall be subject to approval by VTA prior to release.

TIME FOR PERFORMANCE OF WORK

7.29. Notice to Proceed

Contractor shall commence performance of Work under this Contract immediately after receipt of the Notice to Proceed issued by VTA, and shall continuously and diligently prosecute the Work to completion on or before the time or times set forth in **Section 6 Special Conditions** of this Contract. Any work performed or expenses incurred by Contractor prior to Contractor's receipt of Notice to Proceed shall be entirely at Contractor's risk.

Contractor will be required to give VTA a 48-hour advance notice before starting work. Contract personnel will be allowed on the job site only during normal VTA working hours unless otherwise authorized by VTA

7.30. Time of Completion

Time is of the essence in this Contract. Contractor's failure to perform Work, deliver goods, or provide services on time and in accordance with the approved progress schedule shall be a material breach of this Contract.

Refer to **Section 6.22 References to Days** for definitions of days and recognized holidays.

Time periods measured in days will be computed by excluding the day upon which the period begins to run and including the last day of the period unless the last day is Saturday, Sunday, or a holiday, in which case the period shall run until, and shall include, the next day that is not a Saturday, Sunday, or holiday.

All time periods measured in days shall be based upon calendar days unless specified otherwise.

During actual construction, a calendar day shall not be a "working day" if Contractor is specifically required by the Contract Documents to suspend construction operations or if Contractor is prevented by inclement weather or otherwise, as determined by VTA and agreed to by Contractor, from proceeding with the Work as anticipated by the parties.

Contractor shall not perform any fieldwork during three annual designated holidays: Labor Day, Thanksgiving Day and Christmas Day. Fieldwork shall not include receipt or delivery of materials or equipment or work performed in field offices. During these periods, VTA will not have the construction management personnel to support, inspect, or oversee Contractor's Work.

7.31. Progress Schedule

Contractor shall develop and maintain progress schedules in CPM format identifying critical events involved in the performance of the Work under the Contract in accordance with the requirements of **Section 6 Special Conditions**.

7.32. Excusable Delays and Extensions of Time

Except with respect to defaults of Subcontractors, neither Contractor nor VTA shall be considered in default by reason of any failure to perform in accordance with the Contract schedule if such failure arises out of causes beyond the control and without the fault or negligence of the defaulting party. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the government in its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes or other labor disputes, freight embargoes, and unusually severe weather, but in every case the failure to perform must be beyond the control and without the fault or negligence of the defaulting party. If the failure to perform of either Contractor or VTA is caused by the default of a subcontractor or a third party Contractor to VTA, and if such default arises out of causes beyond the control of all the parties, and without the fault or negligence of any of them, neither Contractor nor VTA shall be in default by reason of any such failure to perform. As used herein, the terms "Subcontractor" and "Subcontractors" mean subcontractor(s) or supplier(s) to Contractor at any tier.

Should Contractor suffer delay because of cause(s) as described herein, VTA may, upon receiving Contractor's fully documented and supported written request timely made, make an equitable revision in the Contract schedule or other terms of the Contract as appropriate.

7.33. Failure to Complete the Work on Time

If the Work is not completed by Contractor in the time specified, as that time may be extended as authorized elsewhere in the Contract, it is understood that VTA will suffer damage; and, it being impracticable and extremely difficult to determine the amount of actual damage, it is agreed that Contractor shall pay as fixed and liquidated damages, and not as a penalty, the sum set forth in **Section 6 Special Conditions** of the Contract for each calendar day of delay until the Work is completed and accepted, and Contractor and its surety shall be liable for the amount thereof.

PERFORMANCE OF WORK

7.34. Contractor's Work Area

Contractor shall be responsible for all security, utilities and upkeep of Work and laydown areas and for their restoration to a condition equal to that which existed when Contractor began using such areas. Such restoration shall be complete before final payment is made to Contractor. If VTA areas are not available to Contractor, Contractor shall be responsible for furnishing whatever areas it deems necessary to perform Work under this Contract, at no additional cost to VTA.

Contractor shall confine its equipment, storage of materials, and construction operations to such limits as may be directed by VTA and shall not unreasonably encumber the Worksite and roads with its materials and equipment. Contractor shall enforce the instructions of VTA regarding signs, advertising, fires, danger signals, barricades, and smoking, and shall require all persons employed on the Work to comply with all building or institutional regulations, vehicle, street and highway codes while on the premises and roads.

7.35. Temporary Construction Facilities and Utilities

Contractor shall furnish all temporary construction facilities, utilities, and services which are necessary to prosecute the Work. This includes, but is not limited to fencing, flagmen, sanitary facilities, security, power, water, and weather protection. Contractor shall remove all temporary facilities upon completion of the Work or when they are no longer needed for Contractor's purposes, whichever is earlier.

7.36. Character of Workers

If any Subcontractor or person employed by Contractor shall appear to VTA to be incompetent or to act in a disorderly, improper or unsafe manner, such person shall be discharged immediately on the request of VTA, and such person shall not again be employed on the Work.

7.37. Working Environment

Contractor shall ensure and maintain a working environment free of personal harassment and intimidation between Contractor's forces and VTA employees and members of the public at all VTA project sites and in all VTA facilities at which Contractor's forces are assigned to work. Conduct that creates an intimidating, hostile, or offensive working environment is prohibited. Failure to comply with the above will be considered a material breach of this Contract.

7.38. Public Convenience and Safety

Contractor shall so conduct its operations as to offer the least possible obstruction and inconvenience to the public and shall have under construction no greater length or amount of work than can be prosecuted properly with due regard to the rights of the public. Unless otherwise provided in the Contract, all public traffic shall be permitted to pass through the Work with as little inconvenience or delay as possible. Where possible, such traffic shall be routed on new or existing paved surfaces. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by Contractor at its expense. Existing traffic signal and highway lighting systems shall be kept in operation for the benefit of the traveling public during progress of the Work, and other forces will continue routine maintenance of existing systems.

Contractor shall install signs, lights, flares, barricades, and other facilities for the sole convenience and direction of public traffic and shall furnish competent flaggers or a uniformed police officer whose sole duties shall consist of directing the movement of public traffic through or around the Work.

Work shall be performed in such a manner as to eliminate unnecessary noise, obstructions and other annoyances to occupants. Contractor will not encumber premises with materials, equipment, and/or parking of cars; Contractor shall store materials, equipment and park cars in designated areas.

See **Section 8 Technical Specifications** for additional traffic control requirements, if any.

7.39. Cooperation/Coordination and Work by Others

Contractor shall coordinate its Work with all other contractors and subcontractors performing Work on the site. Contractor shall schedule its Work so as to avoid conflicts with other contractors and to avoid damage to completed or incomplete Work. Contractor shall be responsible for any damage to the Work of other contractors or subcontractors if Contractor's actions resulted in such damage and are a) willful or b) negligent and the proximate cause. Contractor shall take immediate action to remedy such damage so as to not delay the immediate prosecution of the Work.

7.40. Security

Contractor shall provide and be responsible for all security at the Worksite which is required to protect its material and equipment and all Work in place. Contractor shall also be responsible for providing all security and traffic control required by any city having jurisdiction in the area where Work is being performed.

7.41. Product Options, Supplier Approval and Substitutions

For products specified in this Contract or in Contractor's submittals by brand name or manufacturer, whether or not followed by the words "or approved equal," Contractor shall select any product or manufacturer named, or shall submit a request to substitute an equal product or manufacturer. As required by the California Public Contracts Code §3400, such request shall be made within **35 calendar days** from date of the Notice of Award in order to receive consideration, unless later submission of a request is agreed to by VTA. Contractor shall submit a separate request for each substitution. The burden of proof as to the equality of any material, process or article shall rest with Contractor. VTA's determination of the equality or superiority of an article proposed for substitution shall be based upon but need not be limited to consideration of such factors as are specified in the Technical Specifications; dimensional compatibility with other materials with which it combines to produce a unified design system; all aspects of finished appearance including form, texture, and color, as it affects other design elements. In the event an approved substitution is more expensive than the specified materials, process or article, the difference in cost of such material, process or article so furnished shall be borne by Contractor. Contractor may not make a substitution without VTA's prior written approval. If applicable, specific requirements for the submittal of such requests will be contained in **Section 6 Special Conditions**.

VTA shall approve or disapprove Contractor's request for substitution of suppliers or products within 30 days of VTA's receipt of all information required by VTA for such determination.

7.42. Source of Materials

Contractor shall be completely responsible for locating, identifying, and furnishing all materials required to be furnished under this Contract, except for VTA furnished materials specified in **Section 6 Special Conditions**. VTA shall perform or cause to be performed all tests required to demonstrate to VTA's satisfaction that the proposed materials satisfy the requirements of the Contract

7.43. Submittal of Shop Drawings, Product Data and Samples

Working and shop drawings may consist of drawings, diagrams, schedules, or other data prepared by Contractor, or any subcontractor of any tier, manufacturer, supplier or distributor, as are necessary to

adequately control the Work or to illustrate or detail some portion of the Work. No change shall be made by Contractor in any working or shop drawing after it has been approved by VTA.

Working Drawings for any part of the permanent Work shall include, but not be limited to: stress sheets, anchor bolt layouts, shop details, erection plans, equipment lists and any other information specifically required elsewhere in the Contract.

Working drawings for cribs, cofferdams, falsework, temporary support systems, haul bridges, centering and form work and for other temporary work and methods of construction Contractor proposes to use, shall be submitted when required by the Contract or ordered by VTA.

Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, or other information furnished by Contractor to illustrate materials, products, systems, or equipment for some portion of the Work.

Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work shall be judged.

Working drawings and shop drawings, product data, samples, and similar submittals shall not modify any Contract requirement, except as expressly allowed by this Contract. The purpose of their submittal is to demonstrate, for those portions of the Work for which submittals are required, the way Contractor proposes to comply with Contract requirements.

Contractor shall review, approve, and submit to VTA all working and shop drawings, product data, samples, or similar submittals required by this Contract, or that are necessary for its proper completion, in accordance with the Schedule for Technical Submittals shown in **Section 6 Special Conditions** and **Section 8 Technical Specifications**, in a sequence that causes no delay in the Work, or in the work of VTA or any other VTA Contractor.

By approving and submitting working and shop drawings, alternative construction methods, product data, samples, or similar submittals, Contractor represents that it has determined and verified all related materials, measurements, and construction criteria, and that it has checked and coordinated the information contained within its submittals with the requirements of the Work and this Contract.

Contractor shall not be relieved of responsibility for any deviation from the requirements of this Contract by VTA's approval of shop and working drawings, product data, samples, plans, programs, schedules, or similar submittals unless Contractor has specifically informed VTA at the time of submittal in writing of the deviation and VTA has given written approval of the specific deviation. Contractor shall not be relieved of responsibility for errors or omissions in working and shop drawings, product data, samples, plans, programs, schedules or similar submittals by VTA's approval of the submittal. Contractor shall not deviate from approved working and shop drawings, product data, samples, or similar submittals without VTA's written approval.

Contractor shall not commence any portion of the Work requiring submission of shop or working drawings, product data, samples, or similar submittals until the required submittal has been approved by VTA.

Contractor shall direct specific attention, in writing or on resubmitted shop and working drawings, product data, samples, or similar submittals, to revisions other than those required by VTA on previous submittals.

Specific requirements for the submittal of shop and working drawings, product data and samples are contained in **Section 6 Special Conditions**.

Full compensation for furnishing all working and shop drawings, product data and samples is included in the prices paid for the Contract Items of Work (as defined in **Section 7.56 Compensation**) to which such drawings relate and no additional compensation will be allowed.

7.44. Survey Requirements

7.44.1. Lines and Grades.

Surveying is to be provided as follows:

- (a) VTA will provide primary control monuments for the project. Horizontal and vertical datums will be provided to Contractor.
- (b) Contractor must independently verify the primary horizontal and vertical control and inform VTA of any significant differences between published values and found values.
- (c) Contractor will use said primary control to set such stakes or marks as it determines necessary to establish the line and grades required for the performance of the Work specified in the Contract. Relevant right of way data will be supplied by VTA to Contractor. Contractor is responsible for all construction staking on project.
- (d) Contractor shall notify VTA of any conflicts between design and existing conditions and submit a Request for Information (RFI) before commencing survey.
- (e) Contractor will provide systematic and organized copies of all field notes and cut sheets to VTA on a weekly basis (documents must be delivered at least 24 hours before VTA verification survey is scheduled). Name of firm, job description, party chief, crew members, and date of survey shall appear on all field notes and cut sheets.

VTA Survey will perform periodic verification surveys to quality assure construction staking effort. VTA verification surveys may be performed at any time.

7.44.2. Monument Preservation

For the purposes of this **Section 7.44.2** the word Contractor refers to the General Contractor assigned to VTA's project and the professional surveyors under the employ of said General Contractor.

Contractor shall notify VTA of any existing monuments which will be disturbed or destroyed during the course of construction and Contractor will be responsible – and bear the full costs - for tying out the existing monuments and setting new monuments, per the Professional Land Surveyors' Act, Business and Professional Code Sections 8771 through 8773.

Contractor shall place new monuments (when possible) in a location to minimize traffic exposures for surveyors. Existing monuments to be replaced by the new monuments shall be removed and disposed of by Contractor. New monuments shall be established before existing monuments are removed so that vertical and horizontal control shall be available at all times. The following guidelines will be used as part of the monument preservation process:

- (a) **Pertaining to existing, undisturbed monuments:** Contractor will reset the monument box (with cover) to final grade. If there is no monument box for the monument then Contractor will set a new one at grade to preserve the monument and to make it accessible. If the

monument is higher than final grade then Contractor's professional land surveyor will set ties to the monument and reset it below final grade and set the monument box accordingly.

- (b) **Pertaining to destroyed or disturbed monuments:** Contractor must notify VTA Survey, in advance, of any monuments that will be disturbed and/or destroyed.
- (1) Contractor will replace all monuments that VTA's Survey Department determines are of future value to professional surveyors in retracing original surveys of record and will be set according to VTA specifications. Contractor may be asked by VTA to also contact the City Engineering/Survey Department or other agency/s (e.g., County, Caltrans, Santa Clara Valley Water District, etc.) for additional information regarding monument and monument box specifications.
 - (2) Monuments shall be constructed in accordance with the appropriate City or other agency's Standard Provisions, to the dimensions and details shown on the appropriate City or other agency's Standard Details.
 - (3) Any monument that Contractor cannot replace in its original position due to obstruction or improvements must be replaced with a witness monument that is tied into the original monument by bearing and distance.
 - (4) Contractor will then establish project coordinates for all new monuments and witness monuments, adjust by least squares method and furnish VTA Survey with the results and the calculation sheets.

Note: These standards are VTA standards and Contractor is not only bound by these standards but also the most recent update of the State Land Surveyors Act and the standards currently established by the appropriate City or other agency (e.g., County, Caltrans, Santa Clara Valley Water District, etc.). VTA and the appropriate City or other agency must be allowed to review all Corner Records and/or relevant documentation before Contractor's first submittal to the County Surveyor.

Contractor will bear the full expense of all work related to the above described monument preservation program. If the above specified "advance" notice is not given to the VTA Survey Department and/or the survey monuments are disturbed or destroyed without reference points having been set, VTA will re-establish the original position of the survey monuments (and all necessary tie monuments) and the associated land surveying costs will be deducted from Contractor's budget amount.

7.45. Protection and Restoration of Property

In addition to any other requirements imposed by law, Contractor shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the Worksite which are in any way affected by Contractor's operations. Whenever any notice is required to be given by VTA or Contractor to any adjoining or adjacent landowner or other party before beginning any Work under this Contract, such notice shall be given by Contractor.

Any damage arising from or in consequence of the performance of the Contract, to improvements or property, whether above or below ground, private or public, within or adjacent to the project limits, shall be repaired at once by Contractor. If the best interests of VTA requires such repair to be made prior to the execution of any part of the Work included in this Contract, VTA will so notify Contractor who shall delay or discontinue the performance of that part of the Work until the necessary repair has been made.

Such delay shall not be considered unavoidable, and no extension of time for completion of the Contract will be made.

When ordered by VTA to make any such repair, Contractor shall start work thereon within four hours and shall prosecute the same with diligence to completion. Upon failure of Contractor to so comply with such order, or upon Contractor's failure to make immediate emergency repairs which are necessary in the best interests of VTA or of the Public, VTA shall have the authority to cause such repair to be made and to deduct the costs thereof from any money due, or which may become due Contractor.

In any emergency affecting the safety of life or property including adjoining property, Contractor, without special instructions or authorization from VTA, is authorized to act at Contractor's discretion to prevent such threatened loss or injury, and Contractor shall so act whether or not it is instructed to do so by VTA.

7.46. Utility Paint Markings

Contractor shall completely remove all utility paint markings at project completion. Removal will be by use of the high water pressure method only. Payment for removal of all utility paint markings is included in the price paid for other items of work and no additional compensation will be allowed for this work.

7.47. Reserved

7.48. Inspection

VTA shall at all times have access to the Work during construction and shall be furnished every reasonable facility for verifying that the materials and workmanship conform to the requirements of the Contract. All work done and all materials furnished shall be subject to VTA's on-site and off-site inspection and approval. VTA may test and inspect, either at Contractor's, subcontractor's or supplier's facility, all components, subsystems or workmanship prior to assembly of such components into the Work and prior to acceptance of the Work by VTA. Following such testing and inspection, VTA will issue a deficiency list to Contractor listing those items which fail to comply with the Contract. VTA may either reject or require correction of defective material, workmanship, or nonconformity to this Contract. Contractor shall, at its own expense, make available tools, pits, hoists, scaffolds, platforms, other equipment, facilities, drawings, and assistance as may be necessary for inspections or tests.

Costs of the inspectors shall be borne by VTA and shall not be a part of the Contract Price. Costs of re-inspection shall be backcharged to Contractor. The performance of, or the failure to perform, such inspection shall not relieve Contractor of any responsibility for complete Contract performance. Where shop inspection is required by the terms of the Contract, Contractor shall not ship materials until VTA releases such materials for shipment.

Contractor shall not cover any work until inspected and released by VTA. Re-examination of covered and questioned work may be ordered by the Authorized Representative at any time prior to final acceptance. If so ordered, the work shall be uncovered by Contractor. The testing and uncovering or removal, replacement and recovering shall be at Contractor's expense.

7.49. Certificates of Compliance and Testing

7.49.1. Certificates of Compliance

When so authorized in the Contract or when permitted by VTA, the use of certain materials or assemblies shall be allowed if accompanied by a Certificate of Compliance. VTA reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance. If such use is permitted, the form of the Certificate of Compliance and its disposition shall be as directed by VTA. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall be furnished with each lot of material delivered to the Work and the lot so certified must be clearly identified in the Certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested by VTA at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract and any such material not conforming to such requirements will be subject to rejection whether in place or not.

7.49.2. Testing

Contractor shall obtain the services of an independent testing company to perform all testing of materials and work in accordance with the Contract Documents. All material testing shall be paid for by Contractor.

VTA may, at its discretion, perform or cause to be performed test of materials and work independent of Contractor's responsibility above. When VTA exercises its discretion, Contractor shall furnish without cost adequate samples of all materials necessary for testing, and shall also designate the source of such material where appropriate

7.49.3. Furnish without Charge

When requested by VTA, Contractor shall furnish, without charge, samples of all materials entering into the Work, and no material shall be used prior to approval by VTA, except as provided in this **Section 7.49 Certificates of Compliance and Testing**. Samples of material from local sources shall be taken by or in the presence of VTA, otherwise the samples will not be considered for testing.

7.50. Removal of Rejected or Unauthorized Work

All work which has been rejected shall be remedied, or removed and replaced by Contractor in a manner acceptable to VTA, and no compensation will be made for such removal, replacement or remedial work.

Any work performed outside of the limits of Work shown on the drawings or established by VTA, or any extra work done without written authorization of VTA will not be paid for. Upon order of VTA such unauthorized work shall be remedied, removed or replaced at Contractor's expense.

If Contractor fails to comply within a period of seven days (or such longer period as VTA may authorize in writing) after receipt of notice from VTA specifying such failure, VTA may cause the rejected or unauthorized work to be removed, replaced, or remedied, and to deduct the costs thereof from any moneys due to Contractor.

7.51. Disposal of Materials

Except for materials generated pursuant to **Section 7.9 Hazardous Materials or Unusual Conditions**, Contractor shall be responsible for the disposal of all excess materials generated during the performance of this Contract. When any material is to be disposed of outside the project area, other than a public dump, Contractor shall first obtain a written permit from the property owner on whose property the disposal is to be made and he shall file with VTA said permit or a certified copy thereof together with a written release from the property owner absolving VTA from any and all responsibility in connection with the disposal of material and said property, and before any material is disposed of on said property, Contractor shall obtain written permission from VTA to dispose of the material at the location designated in said permit.

7.52. Protection of Completed Portions of Work

Contractor shall protect completed portions of the Work until final acceptance of the Work by VTA. Contractor shall take prompt action to remedy or repair any and all damage sustained to Work that is partially or wholly complete and has not yet been accepted by VTA.

7.53. Clean-up

In addition to any requirements which may be included in **Section 8 Technical Specifications**, Contractor shall at all times during performance of Work under this Contract, keep the site clean from all rubbish and debris. Before final inspection of the Work, Contractor shall clean the material sites and all ground occupied by it in connection with the Work of all rubbish, excess materials, falsework, forms, temporary structures, and equipment. All parts of the Work shall be left in a neat and presentable condition.

7.54. Redlined Construction Drawings

Drawings showing all approved changes made during construction which differ from the approved drawing set for construction, shall be furnished by Contractor prior to the acceptance of the Work. Final construction drawings submitted to VTA shall be in the form of redlined drawings clearly and neatly indicating all changes made with the approval of VTA and other field changes made which reflect the as-built condition of the Contract. During the construction period, redlined construction drawings shall be maintained by Contractor and made available to VTA for review on a daily basis.

7.55. Final Inspection and Acceptance of All or a Portion of the Work

7.55.1. Final Inspection and Acceptance of all the Work

When Contractor considers that all of the Work covered under this Contract has reached final completion, Contractor shall so inform VTA in writing. If necessary and required, acceptance tests on the Work will be performed as set forth in **Section 8 Technical Specifications**. VTA will prepare a punchlist covering the Work that fails to pass the acceptance tests or is otherwise unacceptable and will reject such Work. Contractor shall proceed immediately to correct or replace unsatisfactory, incomplete or unacceptable work. For items of Work not completed by Contractor VTA may proceed to have the items corrected or completed using VTA or third party forces in accordance with **Section 7.50 Removal of Rejected or Unauthorized Work**. The costs of such corrections shall be deducted from compensation due Contractor.

Unless otherwise stipulated, title to such rejected Work and risk of loss shall remain with Contractor, and Contractor shall have the responsibility and bear all costs to correct all defects or damage. All acceptance testing of Work which has been rejected previously shall be at Contractor's expense and costs incurred by VTA to perform such re-tests shall be deducted and withheld by VTA from payments otherwise due to Contractor.

Final acceptance of all of the Work deemed complete will occur after successful completion of all testing and deficiency and punchlist items, and VTA's determination that the Work conforms in all respects to all the Contract requirements. VTA shall inform Contractor of such acceptance of the Work by issuing a written notification stating that the Work has been completed in accordance with the Contract requirements and is accepted under the terms and conditions thereof. After VTA has formally accepted the Work, Contractor will be relieved of the duty of maintaining and protecting the accepted Work and will not be required to perform any further Work thereon; and Contractor shall be relieved of its responsibility for injury to persons or property or damage to the Work which occurs after formal acceptance by VTA. Acceptance of the Work shall not relieve Contractor from responsibility for errors, improper fabrication, non-conformance to a Contract requirement, latent defects, or for deficiencies within Contractor's control. Unless otherwise stipulated, all warranties begin with the date of such acceptance of all of the Work. Coincident with such acceptance, VTA may record a Notice of Completion.

7.55.2. Final Inspection and Acceptance of a Portion of the Work

VTA may at its discretion accept a discrete portion of the Work covered under this contract. When VTA considers that a discrete portion of the Work covered under this Contract has reached final completion, VTA shall inform Contractor in writing. If necessary and required, acceptance tests on the discrete portion of Work will be performed as set forth in **Section 8.0 - Technical Specifications**. VTA will prepare a punchlist covering any part of the discrete portion of Work that fails to pass the acceptance tests or is otherwise unacceptable and will reject such Work. Contractor shall proceed immediately to correct or replace unsatisfactory, incomplete or unacceptable Work. For items of Work not completed by Contractor VTA may proceed to have the items corrected or completed using VTA or third party forces in accordance with **Section 7.50 Removal of Rejected or Unauthorized Work**. The costs of such corrections shall be deducted from compensation due Contractor.

Unless otherwise stipulated, title to such rejected Work and risk of loss shall remain with Contractor, and Contractor shall have the responsibility and bear all costs to correct all defects or damage. All acceptance testing of Work which has been rejected previously shall be at Contractor's expense and costs incurred by VTA to perform such re-tests shall be deducted and withheld by VTA from payments otherwise due to Contractor.

Final acceptance of a discrete portion of Work deemed complete will occur after successful completion of all testing and deficiency and punchlist items, and VTA's determination that the Work conforms in all respects to all the Contract requirements. VTA shall inform Contractor of such acceptance of the Work by issuing a written notification stating that the Work has been completed in accordance with the Contract requirements and is accepted under the terms and conditions thereof. After VTA has accepted the Work, Contractor will be relieved of the duty of maintaining and protecting the accepted Work and will not be required to perform any further Work thereon and Contractor shall be relieved of its responsibility for injury to persons or property or damage to the Work which occurs after formal acceptance by VTA. Acceptance of a discrete portion of the Work shall not relieve Contractor from responsibility for errors, improper fabrication, non-conformance to a Contract requirement, latent defects, or for deficiencies

within Contractor's control. Unless otherwise stipulated, all warranties begin with the date of such acceptance of the particular discrete portion of the Work.

COMPENSATION, PAYMENTS, RECORDS AND AUDIT

7.56. Compensation

Contractor accepts the compensation set out in the Contract as full payment for satisfactorily completing all the Work.

Neither the payment of any progress payment nor any retained percentage shall relieve Contractor of any obligation to make good any defective work or material.

No compensation will be made in any case for the loss of anticipated profits.

Should the total performed quantity of any item of Work required under the contract exceed the quantity in the **Schedule of Quantities and Prices** by more than 25 percent, the Work in excess of 125 percent of the quantity in the **Schedule of Quantities and Prices** and not covered by an executed contract change order specifying the compensation to be paid therefore will be paid for by adjusting the contract unit price, as hereinafter provided, or at the option of VTA payment for the Work involved in the excess will be made on the basis of force account as provided in **Section 7.60 Force Account Payment**.

The adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total performed quantity of the item. If the costs applicable to the item of Work included fixed costs, the fixed costs will be deemed to have been recovered by Contractor by the payments made for 125 percent of the quantity in the **Schedule of Quantities and Prices** and in computing the actual unit cost; the fixed costs will be excluded. Subject to the above provisions, the actual unit cost will be determined by VTA in the same manner as if the Work were to be paid for on force account basis as provided in in **Section 7.60 Force Account Payment**; or the adjustment will be as agreed to by Contractor and VTA.

When the compensation payable for the number of units of an item of Work performed in excess of 125 percent of the quantity in the **Schedule of Quantities and Prices** is less than \$5,000.00 at the applicable contract unit price, VTA reserves the right to make no adjustment in the contract unit price if VTA so elects, except that an adjustment will be made if requested in writing by Contractor.

7.57. Increased or Decreased Quantities and Quantity Variation

Increases or decreases in the quantity of a Contract unit price in the Schedule of Quantities and Prices ("**Contract Item**") will be determined by comparing the total performed quantity of that item of Work with the quantity in the **Schedule of Quantities and Prices**.

If the total performed quantity of a Contract Item required under the Contract varies from the quantity in the **Schedule of Quantities and Prices** by 25 percent or less, payment will be made for the performed quantity of that item of Work at the Contract unit price.

Should the total performed quantity of any item of Work required under the Contract be less than 75 percent of the quantity in the **Schedule of Quantities and Prices**, an adjustment in compensation pursuant to this Section will not be made unless Contractor so requests in writing. If Contractor so requests, the quantity of the Contract Item, unless covered by an executed contract change order specifying the

compensation payable therefore, will be paid for by adjusting the Contract unit price as hereinafter provided, or at the option of VTA, payment for the performed quantity of that the Contract Item will be made on the basis of force account as provided in in **Section 7.60 Force Account Payment**, provided however, that in no case shall the payment for that Work be less than that which would be made at the Contract unit price.

The adjustment of the Contract unit price will be determined as hereinafter provided, of the total performed quantity of the item, including fixed costs. The actual unit cost will be determined by VTA in the same manner as if the Work were to be paid for on a force account basis as provided in in **Section 7.60 Force Account Payment** or the adjustment will be as agreed to by Contractor and VTA.

The payment for the total performed quantity of the item of Work will in no case exceed the payment, which would be made for the performance of 75 percent of the quantity in the **Schedule of Quantities and Prices** for the item at the original Contract unit price

If the total performed quantity of any item of Work required under the Contract varies from the quantity in the **Schedule of Quantities and Prices** by more than 25 percent, in the absence of any executed contract change order specifying the compensation to be paid, the compensation payable to Contractor will be determined in accordance with **this Section 7.57**.

Should the total performed quantity of any item of Work required under the Contract exceed the quantity in the **Schedule of Quantities and Prices** by more than 25 percent, the Work in excess of 125 percent of the quantity in the **Schedule of Quantities and Prices** and not covered by an executed contract change order specifying the compensation to be paid therefore will be paid for by adjusting the Contract unit price, as hereinafter provided, or at the option of VTA payment for the Work involved in the excess will be made on the basis of force account as provided in **Section 7.60 Force Account Payment**.

The adjustment of the Contract unit price will be the difference between the Contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total performed quantity of the item. If the costs applicable to the item of Work included fixed costs, the fixed costs will be deemed to have been recovered by Contractor by the payments made for 125 percent of the quantity in the **Schedule of Quantities and Prices** and in computing the actual unit cost; the fixed costs will be excluded. Subject to the above provisions, the actual unit cost will be determined by VTA in the same manner as if the Work were to be paid for on force account basis as provided in **Section 7.60 Force Account Payment**; or the adjustment will be as agreed to by Contractor and VTA.

When the compensation payable for the number of units of an item of Work performed in excess of 125 percent of the quantity in the **Schedule of Quantities and Prices** is less than \$5,000.00 at the applicable contract unit price, VTA reserves the right to make no adjustment in the Contract unit price if VTA so elects, except that an adjustment will be made if requested in writing by Contractor.

7.58. Certified Payrolls

7.58.1. Submit Certified Copies

Contractor shall submit weekly for each week in which any Contract Work is performed a certified copy of all payrolls for its employees and a certified copy of all of its subcontractor's payrolls directly to the California State Labor Commissioner, Department of Industrial Relations and VTA within one week following the week when work was performed. The payrolls shall conform to the requirements of **29 CFR Sec. 5.5 (a) (3) (i)** and the **California Labor Code Section 1776** and shall be in a form acceptable to VTA.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

7.58.2. Form of Certified Copies

Unless otherwise specified in **Section 6 Special Conditions**, Contractor and all lower-tier subcontractors and suppliers (if performing covered work) shall be required to submit certified payrolls and labor compliance documentation electronically.

Electronic submittal will be a web-based system, accessed on the internet at the address(es) provided by VTA. The web based system is LCPtracker. Contractor and each subcontractor will be given a Log On identification and password to access the reporting system. Contractor is responsible for managing and certifying all lower tier subcontractors certified payroll submittals.

Use of the system requires data entry of weekly payroll information including; employee identification, labor classification, total hours worked and hours worked on this project, wage and benefit rates paid, and Apprenticeship Certifications. Additionally, documents such as Apprenticeship Certifications, etc., will be electronically uploaded into the system.

Contractor will incorporate into every lower-tier subcontract and purchase order these instructions where labor compliance documentation is required.

In the event of a failure of the web based electronic system, Contractor shall be required to submit paper copies of certified payrolls and other required labor compliance documents.

Upon written request of Contractor, and at the sole discretion of VTA, any subcontractor may be permitted to submit paper copies of certified payrolls and other required labor compliance documentation in lieu of electronic copies.

7.59. Progress Payment

7.59.1. Schedule of Values

(1) For Contracts \geq \$500,000

Following Notice of Award and 15 days prior to the first invoice submittal Contractor shall prepare and submit for approval a detailed cost breakdown of all Lump Sum Items, setting forth the estimated value of the various elements of work in conformity with the organization indicated in the Initial 90 Day and Baseline Schedules. Each item in the Schedule of Values shall include its proper share of overhead and profit. A proposed Schedule of Values may be rejected if any item is determined by VTA to be unbalanced or VTA deems it to be incomplete. VTA may request a detailed cost breakdown of any items. This breakdown shall be for the purpose of enabling Contractor and VTA to check and verify the periodic invoices to be submitted by Contractor in connection with requests for partial payments as provided for below.

The Schedule of Values breakdown will also be used in the calculation of changes whether additive or deductive, to work performed under Lump Sum Bid Items, to the extent applicable.

(2) For Contracts $<$ \$500,000

If the Contract is bid on a Lump Sum basis, or there are Lump Sum line items in the Schedule of Quantities and Prices, within 10 working days following Notice of Award, Contractor shall prepare and submit a detailed Schedule of Values giving a complete breakdown of all Lump Sum prices, setting forth the estimated value of the various subdivisions of the work. Each item in the Schedule of Values shall include its proportionate share of overhead and profit. A proposed Schedule of Values may be rejected if any item is determined by VTA to be unbalanced or VTA deems it to be incomplete. VTA may request a detailed cost breakdown of any items. The Schedule of Values shall be for the purpose of enabling Contractor and VTA to agree upon progress payment documents as described below. Notice to Proceed shall not be given until the Schedule of Values is approved by VTA.

7.59.2. Progress Payment Processing

Once every thirty days during the term of the Contract, Contractor will prepare estimates of the work performed and materials delivered. Contractor will submit the estimates to VTA on Contractor-supplied letterhead for review. VTA will review and verify whether all items, units, quantities and prices shown on the Contractor-provided invoice are correct and that all work has been performed and materials supplied in accordance with the terms of the Contract.

If VTA is not in agreement with the quantities/prices on Contractor's invoice, VTA will schedule a meeting to review the discrepancies after which Contractor will submit a revised invoice. No payment will be due on the disputed amounts.

Upon verification and acceptance, VTA will prepare a "Progress Payment – Form B" that includes all the agreed units, quantities and prices. VTA will sign the Form B and forward the signed copy to Contractor for counter-signature and inclusion of the revised invoice for onward transmission to VTA Accounts Payable. The invoice Contractor transmits for payment must match the amount due shown on the Form B less retention and any special withholdings.

As a condition precedent to any progress payment becoming due, Contractor must include along with each invoice:

- (a) conditional waivers and releases of lien, stop payment notice, and payment bond rights every subcontractor or supplier has with respect to all labor, services, materials, and equipment covered by the invoice; and
- (b) unconditional waivers and releases of lien, stop payment notice, and payment bond rights every subcontractor or supplier has with respect to labor, services, materials, and equipment covered by the previous invoice.

Payment to Contractor will be made 30 days following receipt of Contractor's invoice in VTA's Accounts Payable department. However, no payment shall be due until Contractor returns the certified Form B, the required waivers and releases, and the accompanying invoice to VTA.

7.59.3. Full Compensation

Payment for various bid items listed in the Schedule of Quantities and Prices (Bid Form 1) shall constitute full compensation to complete the Work in conformity with the Contract. All costs for Work shown or indicated in the Contract Documents, even if not specifically provided for by a bid item in the Schedule of Quantities and Prices shall be included. Except for relief provided by **Section 7.65 Change Requests and Change Notices**, **Section 7.66 Change Order**, and **Section 7.67 Differing Site Conditions**, Contractor will

not be entitled to additional compensation for providing any activity or material necessary for the completion of the Work in accordance with the Contract even though the activity or material is not included in a specific bid item or indicated in the Contract.

7.59.4. Materials on Hand

Acceptable materials on hand consist of materials or equipment furnished and delivered by Contractor to its facility or the jobsite but not yet incorporated in the Work, and properly stored in a location acceptable to VTA.

In order for materials on hand to be approved for payment, Contractor shall request payment for them on VTA-furnished forms accompanied by documentation as therein required including evidence of purchase, if appropriate. The materials must be separated from other like materials and must be physically identified as the property of VTA for use only on this Contract. VTA may enter upon the premises of Contractor for the purpose of inspection, checking or auditing, or for any other purpose, as VTA considers necessary.

7.59.5. Retention

VTA will retain **five percent** of each progress payment as part security for the fulfillment of the Contract by Contractor, and shall pay to Contractor the balance not retained, after deducting all previous payments and all sums to be kept or retained under the provisions of the Contract. No such payment will be construed to be an acceptance of any defective Work or improper materials.

Should the Contract Amount be subsequently modified by change order(s), VTA will hold retention on payments for the additional change order Work.

If Federal requirements apply (refer to Section 1.8), then the following applies: In conformance with **Public Contract Code Section 7200(b)**, in subcontracts between Contractor and subcontractor and in subcontracts between subcontractor and any subcontractor thereunder, retention proceeds shall not be withheld, and the exceptions provided in **Public Contract Code Section 7200 (c)** shall not apply. At the option of Contractor, subcontractors shall be required to furnish payment and performance bonds issued by an admitted surety.

7.59.6. Special Withholding

VTA may withhold amounts from any payments otherwise due to Contractor as it determines necessary to cover:

- (a) Claims against Contractor arising from or in any way related to this Contract, any other contract between VTA and Contractor, or any other transaction or occurrence involving VTA and Contractor;
- (b) Defective work not remedied;
- (c) Failure of Contractor to make proper payments to any of its Subcontractors;
- (d) Failure to complete the Work in accordance with the approved Contract progress schedule.
- (e) Damage to other work or property caused by Contractor or its subcontractor of any tier.
- (f) An amount, not less than ten percent (10%) of the total progress payment, due to the failure to abate, within one (1) working day or immediately in cases of imminent danger, infractions

of Contractor's Safety Plan, CAL/OSHA, FEDERAL OSHA, ANSI or other applicable safety standards.

- (g) An amount not to exceed twenty percent (20%) of the total progress payment, due to four or more repeated infractions in a single payment period of Contractor's Safety Plan CAL/OSHA, FEDERAL OSHA, ANSI and all other applicable safety standards.
- (h) Items listed in **Appendix B Contracts Data Requirements List** or **Section 8 Technical Specifications** that are not received within the time specified. The amount withheld may be ten percent (10%) of the total progress payment or \$10,000, whichever is greater. Contractor's failure to submit any required items may subject it to the remedies of **Section 7.71 Termination for Default**.
- (i) Any and all other circumstances in which VTA determines that it is necessary to protect its interests.

Whenever VTA withholds special retention, written notice of the amount withheld and the reasons therefore shall be given Contractor. When Contractor removes the grounds for such withholding, VTA will include the amount so withheld in the next scheduled progress payment.

7.59.7. Substitution of Securities

Securities may be substituted in lieu of the withholding of retention from progress payments in accordance with **Public Contract Code § 22300**, which states.

§ 22300 Performance retentions; provision for substitute security; escrow agreement

(a) Provisions shall be included in any invitation for bid and in any contract documents to permit the substitution of securities for any moneys withheld by a public agency to ensure performance under a contract however, substitution of securities provisions shall not be required in contracts in which there will be financing provided by the Farmers Home Administration of the United States Department of Agriculture pursuant to the Consolidated Farm and Rural Development Act (7 U.S.C. § 1921 et. seq.), and where federal regulations or policies, or both, do not allow the substitution of securities. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with the public agency, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to the Contractor. Upon satisfactory completion of the contract, the securities shall be returned to Contractor.

(b) Alternatively, Contractor may request and the owner shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and Contractor shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by Contractor. Upon satisfactory completion of the contract, Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the owner, pursuant to the terms of this section.

(c) Securities eligible for investment under this section shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and the public agency.

The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.

Failure to include these provisions in bid and contract documents shall void any provisions for performance retentions in a public agency contract.

For purposes of this section, the term "public agency" shall include, but shall not be limited to, chartered cities.

(d) (1) Any contractor who elects to receive interest on moneys withheld in retention by a public agency shall, at the request of any subcontractor, make that option available to the subcontractor regarding any moneys withheld in retention by the contractor from the subcontractor. If the contractor elects to receive interest on any monies withheld in retention by a public agency, then the subcontractor shall receive the identical rate of interest received by the contractor on any retention moneys withheld from the subcontractor by the contractor, less any actual pro rata costs associated with administering and calculating that interest. In the event that the interest rate is a fluctuating rate, the rate for the subcontractor shall be determined by calculating the interest rate paid during the time that retentions were withheld from the subcontractor. If the contractor elects to substitute securities in lieu of retention, then, by mutual consent of the contractor and subcontractor, the subcontractor may substitute securities in exchange for the release of moneys held in retention by the contractor.

(2) This subdivision shall apply only to those subcontractors performing more than five percent of the contractor's total Bid.

(3) No contractor shall require any subcontractor to waive any provision of this section.

(e) The Legislature hereby declares that the provisions of this section are of statewide concern and are necessary to encourage full participation by Contractors and subcontractors in public contract procedures.

(f) The escrow agreement used hereunder shall be null, void, and unenforceable unless it is substantially similar to the following form:

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into as of _____, 201__ by and between _____, whose address is _____ hereinafter called "Owner," _____ whose address is _____ hereinafter called "Contractor" and _____, a state or federally chartered bank, whose address is _____ hereinafter called "Escrow Agent."

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the owner and Contractor for _____ in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of Contractor, the owner shall make payments of the retention earnings directly to the

Hamilton Station Stabilization
Contract C20046F

Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the owner and Contractor. Securities shall be held in the name of _____, and shall designate Contractor as the beneficial owner.

(2) The Owner shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the contractor until the time that the escrow created under this contract is terminated. The contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Owner shall have a right to draw upon the securities in the event of default by Contractor. Upon seven days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

(8) Upon receipt of written notification from the owner certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

(9) Escrow Agent shall rely on the written notifications from the owner and Contractor pursuant to Sections (6) to (8), inclusive, of this agreement and the owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

(10) The names of the persons who are authorized to give written notice or to receive written notice on behalf of the owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

Hamilton Station Stabilization
Contract C20046F

On behalf of Owner [For withdrawal or release specified in paragraphs (6) to (8)]:

(Title)
(Name)
(Signature)
(Address)

On behalf of Contractor:

(Title)
(Name)
(Signature)
(Address)

On behalf of Escrow Agent:

(Title)
(Name)
(Signature)
(Address)

(11) In accordance with Section 22300(c) of the Public Contract Code securities eligible for deposit by Contractor or investment hereunder shall be _____ and no others.

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

OWNER

(Title)
(Name)
(Signature)

CONTRACTOR

(Title)
(Name)
(Signature)

ESCROW AGENT

(Title)
(Name)
(Signature)

7.60. Force Account Payment

If work is directed by VTA to be performed on a force account basis, compensation shall be made as set forth in this provision. Such payment shall constitute full compensation to Contractor for work directed to be performed on force account and no additional compensation will be allowed therefore. Labor,

materials and equipment used in the performance of work on a force account basis shall be approved daily by VTA.

7.60.1. Work Performed by Contractor

Contractor will be paid the direct costs for labor, materials and equipment used in performing the Work as hereinafter provided except where agreement has been reached to pay in accordance with **Section 7.60.7 Work Performed by Special Forces**. A markup may be added to the total of the direct costs computed as provided in **Section 7.60.2 Labor**, **Section 7.60.3 Materials**, and **Section 7.60.4 Equipment Rental**. The added markup shall not exceed twenty percent (20%) of the cost of labor, fifteen percent (15%) of the cost of material, fifteen percent (15%) of equipment rental and five percent (5%) of the cost of subcontractors, including trucking.

The above markups shall constitute full compensation for all overhead costs (general overhead, bonding, supervision, office expenses, field office facilities, utilities, and transportation) and profit which shall be deemed to include all items of expense not specifically designated as cost or equipment rental in accordance with **Section 7.60.2 Labor**, **Section 7.60.3 Materials**, and **Section 7.60.4 Equipment Rental**.

When work paid for on a force account basis is performed by forces other than Contractor's organization, Contractor shall reach agreement with such other forces as to the distribution of the payment made by VTA for such work. No additional payment therefore will be made by VTA by reason of the performance of the Work by a subcontractor or other forces.

7.60.2. Labor

Contractor will be paid the cost of labor for the workmen (including foremen when authorized by VTA) used in the actual and direct performance of the Work. The cost of labor, whether the employer is Contractor, subcontractor, or other forces, will be the sum of the following:

- **Actual Wages.** The actual wages paid shall include any employer payments to or on behalf of the workmen for health and welfare, pension, vacation, insurance, overtime, plus other additives in accordance with collective bargaining agreements
- **Labor Surcharge.** To the actual wages, as defined above, will be added a Labor Surcharge as set forth in the State of California Department of Transportation publication entitled *Labor Surcharge & Equipment Rental Rates*, which was in effect on the date upon which the Work was accomplished. Said labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workmen, other than actual wages as defined above and the actual subsistence and travel allowance.

7.60.3. Materials

VTA reserves the right to furnish such materials as it deems advisable, and Contractor shall have no claims for costs and markup on such materials.

Only materials furnished by Contractor and necessarily used in the performance of the Work will be paid for by VTA. The cost of such materials will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof, except as the following are applicable:

- (a) If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to VTA notwithstanding the fact that such discount may not have been taken.
- (b) If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual supplier as determined by VTA. No markup except for actual costs incurred in the handling of such materials will be permitted.
- (c) If the materials are obtained from a supply or source owned wholly or in part by the purchaser, payment for these materials will not exceed the price paid by the purchaser for similar materials furnished from said source on contract items or the current wholesale price for such materials delivered to the jobsite, whichever price is lower.
- (d) If the cost of such materials is, in the opinion of VTA, excessive, then the cost of such material shall be deemed to be the lowest current wholesale price at which such materials are available in quantities concerned delivered to the jobsite, less any discounts as provided above.

7.60.4. Equipment Rental

Compensation for equipment used on force account work shall be determined from the latest schedule of equipment rental rates listed in the State of California, Business, Transportation and Housing Agency, Department of Transportation, Division of Construction Publication entitled *Labor Surcharge & Equipment Rental Rates* and in use at the time the equipment is used. The equipment rental rates listed in said publication shall be used regardless of ownership and any rental or other agreement, if such may exist for the use of such equipment entered into by Contractor. If it is deemed necessary by VTA to use equipment not listed in the publication, a suitable rental rate for such equipment will be established by VTA prior to the work being done. Contractor shall furnish any cost data which might assist VTA in the establishment of such rental rate.

The rental rate paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

Any delay or overtime for equipment agreed to by VTA will be paid for in accordance with factors stated in the above referenced publication.

Operators of rental equipment will be paid for as provided in **Section 7.60.2 Labor**.

All equipment shall, in the opinion of VTA, be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

Individual pieces of equipment or tools having a replacement value of \$250 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

7.60.5. Equipment at the Worksite

The rental time to be paid for equipment on the Work shall be the time the equipment is in operation on the Work being performed, and in addition, shall include the time required to move the equipment to the location of the Work and return it to the original location or to another location requiring no more time than that required to return it to its original location, except that moving time will not be paid for if the equipment is used at the Worksite on other than such work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made if the equipment is used at the Worksite on other than such Work.

The following shall be used in computing the rental time of equipment on the Work:

- When hourly rates are listed, less than 30 minutes of operation shall be considered to be one-half hour of operation.
- When daily rates are listed, less than 4 hours of operation shall be considered to be one-half day of operation.

7.60.6. Equipment Not at the Worksite

For the use of equipment moved onto the Worksite and used exclusively for work paid for on a force account basis Contractor will be paid the rental rates as determined in **Section 7.60.4 Equipment Rental**, and for the cost of transporting the equipment to the location of the Work and its return to its original location, all in accordance with the following provisions:

- The original location of the equipment to be hauled to the location of the Work shall be agreed to by VTA in advance.
- VTA will pay the cost of loading and unloading such equipment.
- The cost of transporting equipment in low bed trailers shall not exceed the hourly rates listed in the State of California Department of Transportation publication entitled Labor Surcharge & Equipment Rental Rates.
- The cost of transporting equipment shall not exceed the applicable minimum established rates of the Public Utilities Commission.

The rental period shall begin at the time the equipment is unloaded at the site of the Work, shall include each day that the equipment is at the site of the Work, excluding Saturdays, Sundays, and VTA holidays unless the equipment is used to perform the Work on such days, and shall terminate at the end of the day on which VTA directs Contractor to discontinue the use of such equipment. The rental time to be paid per day will be in accordance with the following:

Hours of Operation	Hours to be paid
0.....	4
0.5.....	4.25
1.....	4.5
1.5.....	4.75
2.....	5
2.5.....	5.25

3.....	5.5
3.5.....	5.75
4.....	6
4.5.....	6.25
5.....	6.5
5.5.....	6.75
6.....	7
6.5.....	7.25
7.....	7.5
7.5.....	7.75
8.....	8
Over 8.....	Actual hours in operation

The hours to be paid for equipment which is operated less than 8 hours due to breakdowns, shall not exceed 8 less the number of hours the equipment is inoperative due to breakdowns.

When hourly rates are listed, less than 30 minutes of operation shall be considered to be one-half hour of operation. When daily rates are listed, payment for one-half day will be made if the equipment is not used. If the equipment is used, payment will be made for one day. The minimum rental time to be paid for the entire rental period on an hourly basis shall not be less than 8 hours or if on a daily basis shall not be less than one day.

Should Contractor desire the return of the equipment to a location other than its original location, VTA will pay the cost of transportation in accordance with the above provisions, provided such payment shall not exceed the cost of moving the equipment to the Work.

Payment for transporting, and loading and unloading equipment, as provided above, will not be made if the equipment is used on the Work in any other way than upon Work paid for on a force account basis

When work, other than work specifically designated as Work in the Contract Documents, is to be paid for on a force account basis and VTA determines that such work requires Contractor to move equipment onto the Worksite which could not reasonably have been expected to be needed in the performance of the Contract, payment for the use of such equipment at equipment rental rates in excess of those listed as applicable for the use of such equipment will be made subject to the following additional conditions:

- VTA shall specifically approve the necessity for the use of particular equipment on such Work.
- Contractor shall establish to the satisfaction of VTA that such equipment cannot be obtained from its normal equipment source or sources and those of its subcontractors.
- Contractor shall establish to the satisfaction of VTA that the proposed equipment rental rate for such equipment from its proposed source is reasonable and appropriate for the expected period of use.
- VTA shall approve the equipment source and the equipment rental rate to be paid by VTA before Contractor begins work involving the use of said equipment.

7.60.7. Work Performed by Special Forces or Other Special Services

When VTA and Contractor, by mutual agreement, determine that a special service or an item of work cannot be performed by the forces of Contractor, or those of any of its subcontractors, such service or

work item may be performed by a specialist. Payment for such service or item of work, performed by a specialist on the basis of the current market price thereof, may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide such complete itemization.

In those instances wherein a Contractor is required to perform work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the jobsite, the charges for that portion of the Work performed in such a facility, may, by mutual agreement, be accepted as a specialist billing.

In lieu of the percent markups provided above in **Section 7.60.1 Work Performed by Contractor**, a markup not to exceed fifteen percent (15%) will be added to the specialist price, less a credit to VTA for any cash or trade discount offered or available, whether or not such discount may have been taken.

7.60.8. Owner-Operated Equipment

When "Owner-Operated Equipment" is used to perform work to be paid on a force account basis, Contractor will be paid for the equipment and operator, as follows:

- Payment for the Equipment will be made in accordance with **Section 7.60.4 Equipment Rental**.
- Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by Contractor to other workmen operating similar equipment already on the project or, in the absence of such other workmen, at the rates for such labor established by collective bargaining agreements for the type of workmen and location of the Work, whether or not the "Owner-Operator" is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein, in accordance with the provisions of Subsection entitled "Labor Surcharge."
- To the direct cost of equipment rental and labor, computed as provided herein, will be added the markups for labor and equipment rental as provided in **Section 7.60.1 Work Performed by Contractor**.

If, at any time after Contractor commences the force account work, a method of compensation other than that specified in this **Section 7.60** has been agreed upon for the force account work or a portion of such work, such compensation shall be made in accordance with such agreement.

Contractor shall keep accurate daily records of the actual cost to Contractor for all work performed pursuant to this **Section 7.60** and shall make them available to VTA upon reasonable notice and request. Such records shall be maintained in such a manner so as to be completely discernible from records associated with the basic Contract scope.

7.61. Prompt Payment

7.61.1. Prompt Payment to Contractor

Public Contract Code Section 20104.50 requiring prompt payment to Contractors is applicable to this Contract. Undisputed and properly submitted payment requests shall be paid within thirty (30) days of receipt by VTA. Any undisputed and properly submitted payment request not paid within thirty (30) days shall accrue interest at the legal rate set forth in **Code of Civil Procedure Section 685.010**.

A certified **Progress Payment – Form B document**, as described in **Section 7.59 Progress Payments** shall constitute a payment request. Any payment request determined by VTA not to be a proper payment request shall be returned to Contractor within seven (7) days of receipt setting forth in writing the reasons why the payment request is not proper.

7.61.2. Payment to Subcontractors

Contractor shall adhere to all federal and California prompt payment laws and regulations including **Business and Professions Code Section 7108.5** requiring Contractor to pay subcontractors within seven (7) days of receipt of each progress payment to the extent of each subcontractor's interest therein, unless otherwise agreed to in writing between Contractor and the subcontractor.

Any violation of this provision shall subject Contractor or subcontractor to the penalties, sanctions and other remedies specified in **Section 7108.5 of the California Business and Professions Code**. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by Contractor or deficient subcontract performance, or noncompliance by a subcontractor.

This provision applies to all contractors and subcontractors.

Contractor must include in its subcontract language a provision that it will use appropriate alternative dispute resolution mechanisms to resolve any payment disputes with subcontractors or suppliers.

Any subcontract entered into as a result of this Contract shall contain all of the provisions of this section.

7.62. Final Payment

Final payment shall not become due until the following actions have been satisfactorily completed:

- Satisfactory completion of final inspection of all the Work under the Contract
- Contractor submittal to VTA of:
 - An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid or otherwise satisfied, and
 - A release of liens and claims arising out of the Contract, to the extent and in the form designated by VTA. If a claim remains unsatisfied after all payments are made, Contractor shall reimburse VTA for all monies that VTA may be compelled to pay in discharging the claim, including all costs and reasonable attorney's fees.
- Issuance by VTA of a Letter of Final Acceptance of the Work.
- The recording of a Notice of Completion by VTA.

VTA may at its option and at any time retain out of any amounts due Contractor, sums sufficient to cover claims, filed pursuant to California Civil Code Section 9000 et seq.

VTA will make final payment within **30-60 calendar days** of the recording of the Notice of Completion.

The acceptance of final payment by Contractor shall constitute a waiver of all claims against VTA arising under the Contract.

7.63. Project Records

Comprehensive records and documentation relating to this project shall be kept by Contractor and all subcontractors. The records shall include, but are not limited to Contract Documents, Drawings, Specifications, Addenda, Shop Drawings and Submittals, Change Orders, Modifications, Test Records, redline construction plans, As-Built Drawings, and cost and pricing data. Contractor shall maintain a complete set of records relating to this Contract for a period of seven years from final payment for this Work.

The cost records shall be complete and in sufficient detail to allow evaluation of the accuracy and completeness, and currency of the costs or prices. Contractor shall permit the authorized representatives of VTA, the U.S. Department of Transportation, and the Comptroller General of the United States to examine and audit all such records and any subcontracts under this Contract during the time period so specified. In addition, **every contract and subcontract involving the expenditure of public funds in excess of ten thousand dollars (\$10,000) entered into by a public entity in the State of California shall be subject to the examination and audit of the State Auditor**, at the request of the public entity or as part of any audit of the public entity, for a period of three years after final payment under the Contract.

CONTRACT MODIFICATIONS, DISPUTES AND CLAIMS

7.64. Reserved

7.65. Change Requests and Change Notices

7.65.1. Change Request

Contractor may make a written request to VTA to modify the Contract (Change Request) based upon the receipt of, or the discovery of information that changes the scope, price, schedule, level of performance, or other facet of the Contract.

Contractor shall deliver a document entitled "Change Request" to VTA within thirty (30) days after receipt of, or the discovery of, information (other than receipt of a "Change Notice") that Contractor believes will cause a change to the scope, price, schedule, level of performance, or other facet of the Contract. Upon receipt of a Change Notice, Contractor shall follow the procedures of **Section 7.65.2 Change Notice**. All Change Requests, and any Claims based thereon including any request or claim for cumulative impact costs shall be deemed waived unless a Change Request is delivered to VTA within the thirty (30) calendar days specified herein.

The Change Request shall include information necessary to substantiate the effect of the change and any impacts to the Work, including any change in schedule or Contract Price, and shall include all existing documentation or a description of anticipated documentation. In addition, the Change Request shall contain a detailed description of the proposed adjustment to the Contract Price or currently approved progress schedule, or both, and shall reference any other provisions of the Contract that will require modification because of the change. If a Change Request proposes an adjustment in the Contract Price, upon request of VTA, Contractor shall submit a complete breakdown of costs including detailed pricing and back up information for all work and any impacts thereto contemplated by the change.

The unavailability of all information necessary to quantify the change shall not excuse the timely submission of the Change Request. Contractor shall supplement the Change Request with additional

information or documentation, as it becomes available. If VTA has not received sufficient substantiating documentation or information within a reasonable time after receipt of the Change Request, such insufficiency may be grounds to deny the Change Request.

If a Change Request or portions thereof are acceptable to VTA, VTA will issue a Contract Change Order consistent therewith. If a Change Request or portions thereof are not acceptable to VTA, VTA shall notify Contractor in writing.

Any request by Contractor to modify the Contract must first be submitted to VTA and proceed as a Change Request pursuant to these provisions. Contractor may submit the matter as a Claim pursuant to **Section 7.68 Claims and Claim Resolution** only if: (i) the Change Request has been denied by VTA in whole or in part; or (ii) the Change Request has not been resolved within ninety (90) days after receipt by VTA.

In the event of a dispute, Contractor shall proceed with the Work without delay, as directed by VTA.

7.65.2. Change Notices

VTA may, at any time during performance of the Contract notify Contractor of changes to the Contract by issuing a **Change Notice** to that effect. Contractor shall, within fifteen (15) days after receipt of such Change Notice, provide to VTA a written response identifying any proposed adjustment in Contract Price, including any adjustment for cumulative impact costs and schedule to perform the changes identified in the Change Notice, unless another time period for response is specified in the Change Notice. Upon request of VTA, Contractor shall submit a complete breakdown of costs including detailed pricing information and backup for all work and any impacts thereto caused by the change. VTA shall then issue an appropriate change order.

If VTA directs Contractor to perform additional work, the basis for compensation for such work shall be either: 1) increase in quantity of a Contract Item(s), 2) negotiated lump sum price, 3) unit prices mutually agreed upon under the Schedule of Values, or 4) force account, as determined by VTA. The markups described in **Section 7.60.1 Work Performed by Contractor** shall be the maximum allowed for all additional work directed by VTA.

VTA retains the right to direct Contractor to complete a portion of the Work at a time different than that specified in the Contract or reflected in the currently approved progress schedule. Such direction will be in writing and will provide for an equitable adjustment in the compensation to be paid to Contractor, if any. If such direction modifies the amount of compensation or time required for the completion of the Work, an appropriate change order will be issued.

If Contractor and VTA cannot agree on the appropriate adjustment to the Contract Price or schedule, Contractor may either accept VTA's determination or identify and submit the matter as a Claim pursuant to the provisions of **Section 7.68 Claims and Claim Resolution**. In the event of a dispute, Contractor shall proceed with the Work without delay as directed by VTA.

7.66. Change Order

A change order is a written document issued by VTA, that:

- Changes the Total Contract Price, as modified by any previously executed change orders, or
- Alters the scope of Work under the Contract, or

- Alters the schedule for performance of the Work under the Contract as set forth in the currently approved schedule, or
- Makes any other change to the Contract, or makes a combination of any of the aforementioned Contract changes.

7.67. Differing Site Conditions

7.67.1. Soil Boring or Other Data

Where VTA has included soil boring information or other data in the Contract, they are included for Contractor's information only and VTA does not guarantee the accuracy of the information contained therein.

7.67.2. Notice of Differing Conditions

Contractor shall promptly and before such conditions are disturbed, notify VTA in writing of subsurface or latent physical conditions at the site differing materially from those indicated in the Contract, or unknown physical conditions at the site, of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.

All Change Requests involving differing site conditions and any Claims based thereon shall be deemed waived unless Contractor has given written notice before the conditions are disturbed as specified herein.

VTA will, as soon as practicable, investigate or cause to be investigated the items noted by Contractor and, if it is determined that such conditions do materially so differ and cause an increase or decrease in Contractor's cost of or time required for the performance of any part of the Work under the Contract, whether or not changed as a result of such conditions, an equitable adjustment will be made and the Contract modified.

7.68. Claims and Claim Resolution

As required by law, VTA sets forth the provisions of **Public Contract Code section 9204**, which apply to all claims by a contractor in connection with a public works project.

7.68.1. Claim Defined

"Claim" means a separate demand by Contractor, sent by registered mail or certified mail with return receipt requested for:

- A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a VTA under a contract for a public works project;
- Payment by VTA of money or damages arising from work done by, or on behalf of, Contractor pursuant to the Contract and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled to; or
- Payment of an amount that is disputed by VTA.

7.68.2. Claim Requirements

Claim requirements are as follows:

- (a) Any submittal intended by Contractor to be evaluated by VTA as a Claim shall be entitled "Claim"
- (b) All Claims must be submitted by Contractor within thirty (30) days after the date of the event giving rise to the Claim, such as, for example, the denial by VTA of a Change Request, the failure of VTA to respond to a Change Request within ninety (90) days after receipt of required substantiating information and documentation, or the issuance by VTA of a disputed Change Order. Any Claim not submitted within the specified thirty (30) days is waived.
- (c) Claims must be in writing and must be submitted with all documents reasonably necessary to substantiate the Claim. A Claim must state in as much detail as possible the basis for the Claim and the additional compensation or extra time to which Contractor believes it is entitled. If the Claim is silent regarding entitlement to extra time, Contractor is not entitled to any extra time in connection with the Claim. If the Claim is silent regarding additional compensation, Contractor is not entitled to any additional compensation in connection with the Claim.
- (d) Contractor must notify VTA promptly in writing of any changes in its estimates of additional compensation or extra time, and the notification must state the reasons for the changes.
- (e) All Claims and any amendments thereto shall include the fully executed certification set forth below. Any Claim submitted without a fully executed certification shall be rejected by VTA and returned to Contractor.

I, _____, BEING THE _____ (MUST BE AN OFFICER) OF _____ (CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND SAID CLAIM IS MADE IN GOOD FAITH; THE SUPPORTING DATA IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH CONTRACTOR BELIEVES THE OWNER IS LIABLE; AND, FURTHER, THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650 ET SEQ, PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT, AND/OR OTHER SEVERE LEGAL CONSEQUENCES.

By _____

- (f) Contractor may not file any Claims after the date of final payment.

7.68.3. Claim Review

VTA will conduct a reasonable review of the claim and respond in writing to Contractor's Claim within forty-five (45) calendar days after VTA's receipt of the Claim.

VTA's written response will identify what portion of the Claim is disputed and what portion is undisputed.

VTA and Contractor may, by mutual agreement extend the time period for VTA's review and response to the Claim.

If VTA needs approval from its governing body to provide Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

7.68.4. Payment of Undisputed Portion

Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after VTA issues its written statement. If VTA fails to issue a written statement within the time specified or agreed, **Section 7.68.5 Meet and Confer** will apply.

7.68.5. Meet and Confer

If Contractor disputes VTA's written response, or if VTA fails to respond to a Claim within the time prescribed, Contractor may so notify VTA, in writing, either within fifteen (15) days of receipt of VTA's response or within fifteen (15) days of VTA's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, VTA shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

Within 10 working days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, VTA shall provide Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed.

Any payment due on the undisputed portion of the Claim following the meet-and-confer conference shall be processed and made within 60 days after VTA issues its written statement.

Any disputed portion of the Claim, as identified by Contractor in writing, shall be submitted to nonbinding mediation, with VTA and Contractor sharing the associated costs equally. VTA and Contractor shall mutually agree to a mediator within 10 working days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to all other applicable contractual and legal provisions.

For purposes of this **Section 7.68.5**, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this **Section 7.68.5**.

Following the meet and confer conference, if the Claim or any portion remains in dispute, Contractor may file a Government Code claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a Government Code claim must be filed shall be tolled from the time Contractor submits its written Claim pursuant to the above provisions

until the time the Claim is denied as a result of the meet-and-confer process, including any period of time utilized by the meet-and-confer process.

The above procedures do not apply to Government Code claims for tort damages and are not intended, and shall not be construed, to change the time for filing such claims.

7.68.6. Inaction Deemed Rejection

Failure by VTA to respond to a Claim within the time periods described in this **Section 7.68** or to otherwise meet the time requirements of **Public Contract Code Section 9204** shall result in the claim being deemed rejected in its entirety. A Claim that is denied by reason of VTA's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of Public Contract Code section 9204, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

7.68.7. Subcontractor Claims

If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against VTA because privity of contract does not exist, Contractor may present to VTA a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to VTA shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, Contractor shall notify the subcontractor in writing as to whether Contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

7.68.8. Waivers of Rights under Public Contract Code Section 9204

A waiver of the rights granted by **Public Contract Code Section 9204** is void and contrary to public policy, provided, however, that (1) upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) VTA may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

7.68.9. Procedures for Civil Actions

As required by law VTA sets forth below the provisions of **Public Contract Code Section 20104.4**, which applies to civil actions filed to resolve claims of \$375,000 or less:

- (a) Within 60 days, but no earlier than 30 days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.*

(b) (1) *If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 commencing with Section 2016.0103 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.*

(2) *Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.*

(3) *In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.*

(c) *The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.*

However, unless otherwise agreed to by VTA and Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

The above claims procedures are also subject to **Public Contract Code § 20104.6**, which provides:

- (a) *No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the Contract.*
- (b) *In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.*

SUSPENSION OF WORK, CONTRACT TERMINATION

7.69. Suspension of Work

In addition to the right of VTA to suspend Work under any other provision of this Contract, VTA may require Contractor to suspend all or part of the Work called for by this Contract at any time for up to **ninety (90) days** after a written Suspension Order is delivered to Contractor, and for any further period to which the parties may agree. The Suspension Order shall include the following:

- A clear description of the Work to be suspended;
- Guidance as to the action to be taken on subcontracts; and
- Other requests for minimizing costs.

Upon receipt of a Suspension Order, Contractor shall comply with its terms immediately and take all reasonable steps to minimize cost allocable to the Work covered by the Order during the period of work stoppage. Within the period specified by the Order, or within any extension of that period to which the parties may agree, VTA may:

- Terminate the Work covered by the Order as set forth in this section.
- Cancel the Suspension Order; or
- Allow the period of the Suspension Order to expire.

Contractor shall resume work upon the cancellation or expiration of a Suspension Order. An equitable adjustment shall be made in the Work scope, Contract Price, or Contract time, as appropriate, and the Contract shall be modified in writing in accordance with this section and **Section 7.32 Excusable Delays and Extensions of Time** if:

- The Suspension Order results in an increase in the time required for, or in Contractor's cost properly allocable to, the performance of any part of this Contract; and
- Contractor asserts a claim for an adjustment within thirty (30) days after the end of the period of work stoppage; and
- The Suspension Order was not caused by Contractor's default or other act or omission within the control or responsibility of Contractor.

In preparation for and during suspensions of work, Contractor shall take every reasonable precaution to prevent damage to or deterioration of the Work. Contractor shall repair or replace, at no cost to VTA, Work that is damaged or deteriorated during a work suspension due to Contractor's failure to comply with this duty. If VTA determines that Contractor is not taking reasonable precautions and Contractor fails to take the corrective action within five days after written notice from VTA, VTA may cause such action to be taken and recover the reasonable cost thereof from Contractor.

7.70. Termination for Convenience or in the Public Interest

VTA may terminate the performance of Work in whole or in part at any time by written notice to Contractor if VTA determines that termination is in the best interest of VTA or the public. If performance of Work is so terminated, Contractor shall be entitled to payment for all Work performed acceptably and to payment for all acceptable goods or services ordered by and delivered to Contractor before termination, provided that Contractor provides a final itemized invoice, including all necessary documentation to substantiate all costs incurred, for the above amounts within thirty (30) days after receiving the termination notice.

7.71. Termination for Default

7.71.1. Events or Conditions

Contractor is in default under the Contract upon the occurrence of any one or more of the following events or conditions:

- (a) Contractor does not promptly begin the Work under the Contract Documents; or
- (b) Contractor does not perform the Work in accordance with the Contract Documents, including:
 - (i) conforming to applicable standards set forth therein in designing and/or constructing the

- Project, (ii) providing schedules or other documentation required by the Contract Documents, or (iii) refuses to remove and replace rejected materials or unacceptable Work; or
- (c) Contractor discontinues the prosecution of the Work (exclusive of work stoppage due to termination or suspension of the Work by VTA), does not prosecute the Work within the schedule, or prosecutes the Work so as to endanger the performance of this Contract in accordance with its terms; or
 - (d) Contractor does not resume performance of Work which has been suspended or stopped, within a reasonable time after receipt of notice from VTA to do so or (if applicable) after cessation of the event preventing performance; or
 - (e) Contractor becomes insolvent, or generally does not pay its debts as they become due, or admits in writing its inability to pay its debts or makes an assignment for the benefit of creditors; or
 - (f) Insolvency, receivership, reorganization or bankruptcy proceedings are commenced by or against Contractor; or
 - (g) Any representation or warranty made by Contractor in the Contract Documents or any certificate, schedule, instrument or other document delivered by Contractor pursuant to the Contract Documents is false or materially misleading when made; or
 - (h) Contractor breaches any agreement, representation or warranty contained in the Contract Documents; or
 - (i) Contractor assigns or transfers the Contract Documents or any right or interest herein, except as expressly permitted by the Contract Documents; or
 - (j) Contractor does not discharge or obtain a stay of any final judgment(s) or order for the payment of money against it in excess of \$25,000 in the aggregate arising out of the prosecution of the Work (provided that for purposes hereof posting of a bond in the amount of 125 percent of such judgment or order shall be deemed an effective stay); or
 - (k) Contractor does not, absent a valid dispute, make payment when due for labor, equipment or materials in accordance with its agreements with Subcontractors and applicable law; or
 - (l) Contractor fails reasonably to comply with any instructions of VTA consistent with the Contract Documents; or
 - (m) Contractor violates any laws, regulations and ordinances, or order of any government entity applicable to Contractor, the Work, or the Contract; or
 - (n) Contractor does not provide and maintain the Performance and Payment Bonds and insurance as required hereunder; or
 - (o) Contractor or one of its subcontractors causes, through its negligence, gross negligence, recklessness, or willful misconduct, death or grievous bodily injury to any person or property damage in excess of \$25,000; or
 - (p) Contractor does not defend or indemnify any party that Contractor is obligated to defend or indemnify under the Contract Documents; or

- (q) Contractor offers or gives any improper consideration, in any form, either directly or through an intermediary, to any VTA director, officer, employee, contractor, or authorized representative, with the intent of securing the Contract or the making of any determination with respect to Contractor's performance of the Work; or
- (r) Contractor is placed on the California State Labor Commissioner's list of debarred contractors pursuant to **Labor Code §1771.1 or §1771.7**; or
- (s) Contractor or any of its directors, members, officers, partners, principals, employees, or any Contractor's representative is convicted for a violation of any Law related to Contractor's obligations under the Contract, including without limitation, in connection with the Work, goods supplied, payments to be made, or Claims submitted

7.71.2. Notice and Procedures

Contractor and its Surety (as defined in the Performance Bond for Public Works required by this Contract (Performance Bond)) are entitled to seven (7) days' notice and opportunity to cure any breach described in **Sections 7.71.1 (a) through (d) and (i) through (l), and any non-material breach described in Sections 7.71.1 (h) or (m)**. Contractor and its Surety are entitled to three (3) days' notice and opportunity to cure any breach described **Sections 7.71.1 (n) and (p)**. Except as specified above, Contractor and its Surety have no right to notice or opportunity to cure with respect to any breach described in **Sections 7.71.1 (e), (f), (g), (h) (m), (o), or (q) through (s)**. If Contractor is unable to cure the applicable default within the time period specified, but in VTA's reasonable determination (i) Contractor has diligently and continuously undertaken efforts to cure such default, and (ii) such failure to cure is beyond the control of Contractor, VTA may extend the cure period in accordance with its discretion.

If any breach described in **Sections 7.71.1 (a) through (s)** is not subject to cure or is not cured within the period (if any) specified, VTA may declare that an "Event of Default" has occurred and notify Contractor to discontinue the Work. The declaration of an Event of Default must be in writing and given to Contractor and Surety. In addition to all other rights and remedies provided by law or equity and such rights and remedies as are otherwise available under the Contract and the Performance Bond, VTA may assume any of Contractor's subcontracts, appropriate any or all materials and equipment on the Worksite and any or all work product, including plans and specifications, as may be suitable and acceptable, and may direct the Surety to complete the Contract or may enter into an agreement for the completion of the Contract according to the terms and provisions hereof with another contractor or the Surety, or use such other methods as may be required for the completion of the Contract, including completion of the Work by VTA. Upon completion of such work, Contractor is entitled to return of all unused materials and its equipment, tools and appliances, except that there shall be no claim on account of usual and ordinary depreciation, loss, or wear and tear.

If Contractor's right to proceed is so terminated, Contractor shall not be entitled to receive any further payment until the Work is completed. Contractor and its surety(s) shall be liable to VTA for any additional costs of completion of the Work, including compensation for additional managerial and administrative services, plus liquidated damages accruing under the terms of this Contract from the Contract completion date, as extended by authorized time extensions, to the date of final completion.

If, after termination for failure to fulfill contract obligations, it is determined that Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of VTA.

7.72. Contractor's Duties Upon Termination

Immediately after receipt of a notice of termination, either for default or convenience (Notice of Termination), Contractor shall:

- Stop work under the Contract on the date and to the extent specified in the Notice of Termination;
- Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;
- Assign to VTA in a manner, at the times, and to the extent directed by VTA, all of the right, title, and interest of Contractor under the orders and subcontracts as designated by VTA;
- Terminate all other orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination; and
- Assign to VTA in a manner, at the times, and to the extent directed by VTA, all of the remaining right, title, and interest of Contractor under the orders and subcontracts so terminated.

WARRANTY PROVISIONS

7.73. Warranty

It is a condition of this Contract that the equipment, materials or design furnished, and workmanship performed by Contractor or any subcontractor or supplier at any tier, shall conform to the requirements of this Contract and shall be free of any defect. Neither inspection, testing and acceptance by VTA of such equipment, materials, design or work performed, partial or final payment, nor any provisions of the Contract relieves Contractor from responsibility for any latent defect, gross mistakes or fraud. Contractor and its surety(s) warrant all equipment, materials, design and workmanship for a period of one (1) year from the date of final acceptance by VTA of all, or, in VTA's sole discretion, a discrete portion of the Work. Contractor shall extend to VTA any warranty from a subcontractor or supplier that exceeds the above warranty period. If additional or varying guarantees are required, they will be specified in **Section 6 Special Conditions** of this contract. VTA retains the right, at its sole discretion, to assign to a third Party any warranty received under this Contract.

7.74. Warranty Work

Contractor is responsible for all warranty-covered repair work during the warranty period as specified above. Contractor shall provide at its own expense all spare parts and tools required for repairs. To the extent practicable, VTA will allow Contractor or its Authorized Representative to perform such work. When warranty repairs are required, VTA and Contractor's Authorized Representative must confer on the most appropriate remedy to be performed within a reasonable time. If Contractor fails to remedy any failure or defect within a reasonable time, VTA shall have the right to replace, repair, or otherwise remedy the failure or defect at Contractor's expense. At its discretion, VTA may also perform such work if it deems necessary to do so to meet its operational commitments or other requirements. Contractor shall reimburse VTA for all expenses for such work including materials and labor. The hourly shop labor rates

shall be based on VTA's current labor cost accounting system. Contractor shall reimburse VTA for such work within sixty (60) days of receipt of warranty claim.

7.75. Warranty on Repaired or Replaced Parts

Contractor warrants any materials, parts or components which are used for replacement under the initial warranty period again for the total original warranty period of the replaced particular material, part or component.

7.76. Systematic Failures

In the event that, during the warranty period, repairs or modifications necessitated by defective design, material, or workmanship occur to an extent in excess of ten percent (10%) of the components used for the same function in the same assembly or subsystem purchased under this Contract, Contractor shall promptly furnish all necessary labor and material to effect such repairs and modifications for every system delivered under the Contract under the terms and conditions outlined, including systems in which the item has not yet failed. When requested by VTA, Contractor will be required to provide a written failure analysis report for defective products supplied under this Contract and which occurred during the warranty period. The report shall be received by VTA within forty-five (45) days from the date of request.

SECTION 8 TECHNICAL SPECIFICATIONS

The Technical Specifications are provided in the following pages.

[This Page Intentionally Left Blank]

LIST OF TECHNICAL SPECIFICATIONS

DIVISION 1 GENERAL REQUIREMENTS

- Section 01 11 00 – Summary of Work
- Section 01 33 00 -- Submittal Procedures
- Section 01 33 23 – Shop Drawings, Product Data, and Samples
- Section 01 45 30 – Structural Quality Control
- Section 01 55 26 – Traffic Control
- Section 01 57 10 – Signing and Delineation Materials
- Section 01 71 13 – Mobilization
- Section 01 71 23 – Field Engineering
- Section 01 74 12 – Cleaning
- Section 01 77 00 - Closeout Procedures
- Section 01 78 23 – Operation and Maintenance Data
- Section 01 78 39 – Project Record Documents

DIVISION 2 SITEWORK

- Section 02 10 10 – Maintenance of Existing Facilities
- Section 02 41 19 – Selective Structure Demolition

DIVISION 3 CONCRETE

- Section 03 05 15 – Portland Cement Concrete
- Section 03 11 00 – Concrete Forming
- Section 03 15 00 – Concrete Accessories
- Section 03 20 00 – Concrete Reinforcing
- Section 03 30 00 – Cast-In-Place Concrete
- Section 03 30 53 – Polyester Concrete
- Section 03 35 00 – Concrete Finishing
- Section 03 41 00 – Precast Structural Concrete
- Section 03 61 30 – Backfill Grouting

DIVISION 5 METALS

- Section 05 05 22 – Metal Welding
- Section 05 50 00 – Metal Fabrications

DIVISION 9 FINISHES

- Section 09 65 00 – Tactile Warning Band
- Section 09 90 00 – Paints and Coatings

**Hamilton Station Stabilization
C20046F**

DIVISION 31 EARTHWORK

Section 31 00 00 – Earthwork

Section 31 23 16 – Structural Excavation

Section 31 23 23 – Structural Backfill

Section 31 32 26 – Tieback Assembly

DIVISION 33 UTILITIES

Section 33 05 10 – Utility Grade Adjustments

DIVISION 34 TRANSPORTATION

Section 34 11 10 – Track Construction General Requirements

Section 34 11 12 – Track Construction Materials

Section 34 11 14 – Ballast

Section 34 11 15 – Running Rails

Section 34 11 19 – Bonded Insulated Joints

Section 34 11 20 – Rail Rehabilitation

Section 34 11 22 – Welding of Rail

Section 34 11 23 – Special Trackwork Materials

Section 34 11 31 – Concrete Ties

Section 34 11 93 – Miscellaneous Trackwork Elements

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The Work is defined in Section 1.0 Invitation for Bids and includes, but is not limited to, the following items:
1. Retaining Wall Repairs:
 - Install tieback assemblies and concrete walers to realign and brace existing MSE wall panels.
 - Realign existing MSE wall panels
 - Grout voids behind MSE wall panels
 - Adjust existing guardrail panels at MSE wall coping.
 - Cast polyester concrete at top of MSE wall coping.
 - Repair MSE wall panel spalls and panel joints
 2. Track Realignment
 - Shift, tamp, line, surface, and destress tracks:
 - At front of Platform and Refuge Area.
 3. Platform Repairs:
 - Adjust platform edge to accommodate new track alignment.
 - Adjust platform elevation to accommodate new track profile.
 - Reconstruct station facilities as required for adjusting the platform.
 - Adjust station facilities to finished grade as required for adjusting the platform.

1.02 INTERPRETATION (These Technical Specifications impose requirements and prohibitions on Contractor. Contractor must interpret these Technical Specifications accordingly, even if no actor or subject is specified in a particular sentence or statement).

1.03 PROJECT WORK NOT IN THIS CONTRACT

- A. VTA will endeavor to advise Contractor on the known schedules of other parties performing work at or near the Worksite for this Contract and will review with Contractor the Construction Schedule to seek a mutually acceptable resolution of conflicts.
- B. The nature of the Work is such that the presence and activities of other parties performing work at or near the Worksite cannot be precisely anticipated, and Contractor shall have flexibility in its schedule to accommodate unexpected activities of other parties at the Worksite.
- C. Contractor must cooperate with other parties performing work at or near the Worksite; and, if necessary, revise Contractor's schedule to allow such work by other parties to be performed in a timely manner.

1.04 NOT USED

**Hamilton Station Stabilization
C20046F**

1.05 REFERENCE SPECIFICATIONS AND CODES

- A. As part of mobilization, as soon as possible but no later than 45 calendar days following Notice to Proceed, Contractor must obtain copies of each of the individual specifications and codes referenced in these technical specifications. These publications shall be made readily available for use by the inspectors, Contractor's and subcontractor's staff in carrying out the QA/QC Programs specified herein and to ensure the specification and code requirements referenced in the Contract Documents are met.

1.06 RESERVED

1.07 RESERVED

1.08 RESERVED

1.09 RESERVED

1.10 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. List of material sources.
- B. Submittal requirements.

1.02 RELATED SECTIONS

- A. General requirements and procedures for preparing and submitting Shop Drawings, product data, and samples are specified in Section 6.6 – Project Data Requirements and Section 01 33 23 - Shop Drawings, Product Data, and Samples.
- B. Submittals required to complete the Contract closeout are specified in Section 01 77 00 - Closeout Procedures.
- C. Preparation and submission of project record documents are specified in Section 01 78 39 - Project Record Documents.
- D. Preparation and submission of equipment and systems operation and maintenance manuals are specified in Section 01 78 23 - Operation and Maintenance Data.

1.03 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

1.04 LIST OF MATERIALS SOURCES

- A. Contractor shall submit to VTA, a list of Contractor's sources of materials. The list shall be submitted in sufficient time to permit proper inspections and testing of materials to be furnished from such listed sources in advance of their use.

1.05 SUBMITTAL REQUIREMENTS

- A. Schedule of Submittals: Within ten calendar days after the effective date of Notice to Proceed, the Contractor shall submit a completed submittal schedule and list of products for all items requiring VTA's review and approval, as follows:
 - 1. Submittals, including description of the item and name of manufacturer, trade name and model number.
 - 2. Specification reference.
 - 3. Intended submission/resubmission date(s).
 - 4. Order release date.
 - 5. Lead time to delivery/anticipated delivery date(s).

**Hamilton Station Stabilization
C20046F**

6. Highlight any items that require expedited review to meet the project schedule.

These schedules shall be presented in a form acceptable to VTA in both electronic and hard copy versions and shall be updated and sent to VTA on a monthly basis. Identify all submittals that are required by the Contract Documents and determine the date on which each submittal will be submitted.

Approval: The terms “approval”, “approve”, and their variants, as used herein, mean VTA’s review and return of a submittal as either “NET” or “MCN” and do not in any way mean or imply VTA’s assumption of liability for or VTA’s excuse of Contractor’s failure to comply with the Contract Documents

- B. Professional Seal Required: Submittals involving engineering design services, when required by the Contract Documents or by governing codes and regulations, such as shoring and underpinning, excavation support structures, falsework for concrete, fire protection system design, and load and design calculations, shall be sealed and signed in blue ink by a professional engineer, currently registered in the State of California, for the discipline involved.
- C. Review Period:
1. Prepare submittals sufficiently in advance so that approval may be given before commencement of related work.
 2. Allow 30 calendar days after receipt by VTA for review of each submittal, including resubmittals.
 3. The Contractor shall be responsible for determining whether or not certain governmental entities and utility districts require longer review periods. When longer review periods are required, the Contractor shall schedule the Work accordingly, so that the Work and project progress schedules are not adversely impacted.
- D. Submittal Delivery: Ship submittals prepaid or deliver by hand directly to VTA.
- E. Transmittal Form: Accompany submittals with a District-furnished transmittal form in duplicate containing the following information:
1. Contractor’s name, address, and telephone number;
 2. Submittal number and date;
 3. Contract title and number;
 4. Supplier's, manufacturer's, or Subcontractor's name, address, and telephone number; and
 5. Subject identification including Contract Drawing and Specification reference.
- F. Changes in Approved Submittals: Changes in approved submittals will not be allowed unless those approved submittals with changes have been resubmitted and approved, in the same manner as the original submittal.
- G. Supplemental Submittals: Supplemental submittals initiated by Contractor for consideration of corrective procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals.

1.06 CONTRACTOR’S RESPONSIBILITIES

- A. Contractor's Review and Approval:

**Hamilton Station Stabilization
C20046F**

1. Each submittal shall be reviewed, stamped, and signed as reviewed and approved by Contractor prior to submission. Contractor's approval shall indicate review and approval with respect to the following responsibilities:
 2. Contractor is responsible for:
 - a. The correctness of the drawings, for shop fits and field connections, and for the results obtained by the use of such drawings.
 - b. Verification of catalog numbers, and similar data.
 - c. Determination and verification of field measurements and field construction criteria.
 - d. Checking and coordinating information in the submittal with requirements of the Work and of the Contract Documents.
 - e. Determination of accuracy and completeness of dimensions and quantities.
 - f. Confirmation and coordination of dimensions and field conditions at the site.
 - g. Safety precautions.
 - h. Errors or omissions on submittals.
 - i. Coordination and performance of work of all trades.
 - j. Identification of deviation(s) from Contract requirements.
 3. Contractor shall coordinate each submittal with the requirements of the Work, placing particular emphasis upon assuring that each submittal of one trade is compatible with other submittals of related work. Ensure submittal is complete with all relevant data required for review.
 4. Contractor shall stamp, initial or sign the submittal, certifying:
 - a. Dimensional compatibility of the product with the space in which it is intended to be used.
 - b. Review of submittals for compliance with Contract requirements.
 5. Do not start work for that requires approval by VTA until submittals have been returned to Contractor with official indication that approval has been granted by VTA.
 6. If the submittal is designated to be sent to VTA for information, approval by the designated approval authority shall take place before submission to VTA.
 7. Approval of drawings and associated calculations by VTA shall not relieve Contractor from the responsibility for errors or omissions in the drawings and associated calculations, or from deviations from the Contract Documents, unless submittals containing such deviations were submitted to VTA and the deviations were specifically called to the attention of VTA in the letter of transmittal and within the submittal, and approved specifically by VTA as a Contract change.
- B. Submittal Quantities: Refer to Contract Specifications Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal quantities.
- C. Review by VTA: One marked up reproducible set of drawings, one copy of product data, and one sample will be returned to the Contractor.

**Hamilton Station Stabilization
C20046F**

- D. Distribution of Submittals after Review: Distribute prints or copies of approved submittals, bearing VTA's or designated review authority's stamp and signature, to Contractor's field office and VTA's field office; to affected and concerned Subcontractors, Suppliers, and fabricators; and to affected and concerned members of Contractor's workforce.

END OF SECTION 01 33 00

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Shop drawings.
- C. List of materials sources.
- D. Other submittals.
- E. Product data.
- F. Samples.

1.02 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

1.03 DEFINITIONS

- A. Drawings: The term “Shop Drawings,” as used herein, includes fabrication, erection and installation, application, layout, and setting drawings, lists or schedules of materials and equipment, manufacturer’s standard drawings, wiring and control diagrams, all other drawings as may be required to show that the materials, equipment, and systems, and the positions thereof, comply with Contract requirements.
- B. Product Data: The term “product data,” as used herein, includes manufacturer-prepared descriptive literature, catalog sheets, brochures, performance data, test data, printed diagrams, schedules, illustrations, and other information furnished by Contractor or the various product and materials suppliers to illustrate and describe a product, material, system, or assembly for some portion of the Work.
- C. Samples: The term “samples,” as used herein, are physical examples which illustrate materials, equipment, colors, textures, finishes, functions, configuration, and work quality, and establish the standards of quality and utility by which the Work will be judged for acceptance.
- D. Approval: The terms “approval”, “approve”, and their variants, as used herein, mean VTA’s review and return of a submittal as either “No Exceptions Taken” or “Make Corrections Noted” and do not in any way mean or imply VTA’s assumption of liability for or VTA’s excuse of Contractor’s failure to comply with the Contract Documents.

1.04 SUBMITTALS

- A. Refer to Section 01 33 00, Submittal Procedures, for submittal procedures.
- B. Quantities:
 - 1. Three full size bond prints of each drawing.

**Hamilton Station Stabilization
C20046F**

2. Three copies of manufacturers' standard schematic drawings.
3. Three copies of Contractor's or manufacturers' calculations, and three copies of manufacturers' Standard data.
4. Three copies of manufacturers' printed installation, assembly, erection, application, and placement instructions.
5. Three of each sample item specified in the various Specification Sections, unless otherwise specified.
6. Three copies of inspection reports, test reports, and certificates of compliance.
7. Where submittals are submitted to VTA for information or record purposes, submit two copies.
8. Where permits and licenses and other such documents are obtained in VTA's name, submit the original and one copy.

1.05 SHOP DRAWINGS

A. Drawings shall be prepared in accordance with ANSI Y14, Drafting Standards Manual, and the following requirements:

1. Drawings shall be limited to the following standard sizes in inches: Maximum size shall be 22 inches by 34 inches.

<u>WIDTH (Vertical)</u>	<u>LENGTH (Horizontal)</u>
8 1/2 inches (215.9mm)	11.0 inches (279.4mm)
11.0 inches (279.4mm)	8 1/2 inches (215.9mm)
11.0 inches (279.4mm)	17.0 inches (431.8mm)
17.0 inches (431.8mm)	22.0 inches (558.8mm)
22.0 inches (558.8mm)	34.0 inches (863.6mm) (Maximum)

2. Each drawing shall have the following information in the title block.
 - a. Drawing number, date, title, revision number, and sheet number.
 - b. Contract number, Contract sheet number, Contract page number.
 - c. Contractor's name.
 - d. Subcontractor/manufacturer name (if applicable)
 - e. Name of installation location.
3. Each drawing shall use symbols from one standard reference source.
4. Each drawing shall include details necessary for the procurement, installation, maintenance, and repair of all components or facilities equipment provided. Change Order notices that are attached to drawings shall not constitute revised drawings. Each drawing shall include all changes and be upgraded to reflect the latest configuration.

B. Drawings shall be submitted in accordance with the following requirements:

1. The first drawings submitted by Contractor will be reviewed for conformance to the requirements herein. Once approval is given, Contractor shall use this approved drawing as the

**Hamilton Station Stabilization
C20046F**

- standard, and prepare subsequent drawings to a quality equal to or better than the approved standard.
2. Each drawing prepared and submitted for review shall have in the lower right hand corner, just above the title block, a five-inch square blank space in which VTA may indicate the action taken.
 3. All final approved drawings and catalog cuts shall be submitted to VTA upon completion of the work as specified in Section 01 78 39, Project Record Documents.
- C. When specified, shop drawings shall be prepared and submitted electronically. Such drawings shall be created using AutoCAD in accordance with VTA's Drawing Requirements. Shop drawings to be prepared and submitted electronically include shop drawings which will be utilized as illustrations and drawings in Operation and Maintenance Manuals.
1. The initial submittal of such shop drawings shall include electronic copies for review of their conformance with applicable drafting standards. VTA will make the Contract Drawing CADD Requirements available upon request.

1.06 OTHER SUBMITTALS

- A. Other submittals shall be furnished upon request for VTA's approval to verify compliance of all equipment and materials with the Contract Documents. These submittals shall include in addition to drawings: catalog cuts, certifications of compliance, or any other substantiating information or samples of material items as necessary.

1.07 PRODUCT DATA

- A. Contractor shall modify manufacturers' standard diagrams, charts, illustrations, brochures, calculations, schematics, catalog cuts, and other descriptive data to delete information which is not applicable to the Contract. Contractor shall supplement standard information with additional information applicable to this Contract, and indicate dimensions, clearances, performance characteristics, capacities, wiring and other diagrams, and controls.
- B. If Contractor utilizes drawings prepared by others, such drawings may include the standards and symbols of others if the drawings are a mix of existing product drawings and drawings prepared specifically for this Contract. In the event others provide drawings prepared specifically for this Contract, such drawings shall conform in symbols, media and standards to Contractor's drawings.
- C. Contractor shall modify the manufacturer's printed installation, erection, application, and placing instructions to delete information which is not applicable to the Contract.
- D. Submittals shall include the following:
1. Date and revision dates.
 2. Contract title and number.
 3. Reference Contract Drawing numbers.
 4. Applicable Contract Specification Section numbers.
 5. Identification of product by either description, model number, style number, serial number, or lot number.
 6. The names of the Contractor, Subcontractors, Suppliers, and manufacturers as applicable.

**Hamilton Station Stabilization
C20046F**

7. Applicable standards, such as ASTM or Federal specification numbers.

E. Certificates of Compliance:

1. VTA may permit the use of certain materials prior to sampling and testing if accompanied by a certificate of compliance stating that the materials involved comply in all respects with the requirements of the Contract Documents. The certificate shall be signed by the manufacturer of the material. A certificate of compliance shall be furnished with each lot of material delivered to the Work, and the lot so certified shall be clearly identified in the certificate.
2. All materials used on the basis of a certificate of compliance may be sampled and tested at any time. The fact that material is used on the basis of a certificate of compliance shall not relieve Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents. Any such material not conforming to such requirements shall be subject to rejection whether in place or not.
3. VTA reserves the right to refuse the use of material submitted for approval solely on the basis of a certificate of compliance.
4. The form of the certificate of compliance and its disposition shall be as approved by VTA.

1.08 SAMPLES

- A. Contractor shall furnish to VTA samples required by the Contract Documents. Samples shall be submitted without charge, with shipping charges prepaid. Materials for which samples are required shall not be used in the Work until approved in writing by VTA.
- B. Sample Label: Each sample shall be labeled with the following data:
1. Name, number, and location on project;
 2. Name of Contractor;
 3. Material or equipment represented, and location in the project;
 4. Name of producer, brand, trade name if applicable, and place of origin; and
 5. Date of submittal.
- C. Contractor shall forward a letter to VTA submitting each shipment of samples and containing the information listed on the Sample Label specified herein. Approval of a sample shall be only for the characteristics and use named in the submittal and approval, and shall not be construed to change or modify any Contract requirement. Before submitting samples, Contractor shall assure itself that the materials or equipment will be available in the quantities required in the Contract, as no change or substitution shall be permitted after a sample has been approved unless such change or substitution is approved by VTA in writing.
- D. Samples of material from local sources shall be taken by or in the presence of VTA. Samples taken otherwise shall not be considered for testing.
- E. Inspection and tests will be made, but it is understood that such inspections and tests, if made at any point other than the point of incorporation in the Work, in no way shall be considered as a guaranty of acceptance of any material which may be delivered later for incorporation in the Work.
- F. Approved samples not damaged in testing may be incorporated in the finished work if marked for identification and approved by VTA. Materials incorporated in the Work shall match the approved samples.

**Hamilton Station Stabilization
C20046F**

- G. Failure of any material to pass the specified tests shall be sufficient cause for refusal to consider, under the Contract, any further samples of the same brand, make, or source of that material. VTA reserves the right to disapprove any material which has previously proven unsatisfactory in service.
- H. Samples of material delivered to the site or installed in place may be taken by VTA for testing. Failure of samples to meet Contract requirements shall annul previous approvals of the item tested.

END OF SECTION 01 33 23

SECTION 01 45 30

STRUCTURAL QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor's structural quality control
- B. Inspections and testing by Independent Testing Agency

1.02 RELATED SECTIONS

- A. Section 7.43, Submittal of Shop Drawings, Product Data and Samples.
- B. Section 6.26, Quality Assurance and Quality Control Requirements.
- C. Section 02 41 19, Selective Structure Demolition.
- D. Section 03 05 15, Portland Cement Concrete.
- E. Section 03 11 00, Concrete Forming.
- F. Section 03 15 00, Concrete Accessories.
- G. Section 03 20 00, Concrete Reinforcing.
- H. Section 03 30 00, Cast-in-Place Concrete.
- I. Section 03 30 53, Polyester Concrete.
- J. Section 03 35 00, Concrete Finishing.
- K. Section 03 41 00, Precast Structural Concrete.
- L. Section 03 61 30, Backfill Grouting.
- M. Section 05 05 22, Metal Welding.
- N. Section 05 50 00, Metal Fabrications.
- O. Section 31 32 36, Tieback Assembly.

1.03 MEASUREMENT AND PAYMENT

- A. Full compensation for Structural Quality Assurance is included in the Contract lump sum price paid for Quality Assurance Program and no separate payment will be made therefor.
- B. Full compensation for Structural Quality Control is included in the Contract price paid for the various items of work involved and no additional compensation will be allowed therefor.
- C. Full compensation for Independent Testing Agency and for performing all specified independent sampling, testing, and inspection is included in the Contract price paid for the various items of work involved and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

1.04 REFERENCES

- A. American Society for Nondestructive Testing (ASNT):
 - 1. Recommended Practice No. SNT-TC-1A – Personnel Qualification and Certification in Nondestructive Testing
- B. American Welding Society (AWS):
 - 1. AWS QC1 Standard for AWS Certification of Welding Inspectors
- C. Valley Transportation Authority (VTA):
 - 1. Silicon Valley Rapid Transit Program - Draft Inspection, Sampling and Testing Plan, dated June 9, 2010

1.05 SUBMITTALS

- A. General: Submittals for structural quality control shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submit the following number of Shop Drawings, Calculations, Product Data, and the like.

	<i>Size</i>	<i>Originals</i>	<u>Total Number of Submittals</u>		<u>Submittals Required for Structural Engineer of Record Review</u>	
			<i>Copies</i>	<i>Originals</i>	<i>Copies</i>	<i>Copies</i>
<u>Contractor Structural Quality Control</u>						
Structural Quality Control Plan	8½x11	N/A	3	N/A	2	
Qualifications	8½x11	N/A	3	N/A	2	
<u>Independent Testing Agency</u>						
Qualifications	8½x11	N/A	3	N/A	2	

- 2. All submittals shall be made to the Resident for review by VTA and the Structural Engineer of Record in accordance with the table above. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and stamped by the Structural Engineer of Record with a Shop Drawing stamp marked "No Exceptions Taken" or "Make Corrections Noted" and returned to Contractor by VTA.
- 3. Approval: The terms "approval", "approve", and their variants, as used herein, mean VTA's review and return of a submittal as either "No Exceptions Taken" or "Make Corrections Noted" and do not in any way mean or imply VTA's assumption of liability for or VTA's excuse of Contractor's failure to comply with the Contract Documents.
- B. Structural Quality Control Plan: Submit a Quality Control Plan in accordance with the provisions of Article 1.06B, "Structural Quality Control Plan," herein and Section 01 43 00 - Quality Assurance and Quality Control.

**Hamilton Station Stabilization
C20046F**

- C. Qualifications: Submit qualifications and documentation of certifications for personnel, facilities and agencies in accordance with the provisions of Article 1.06B, "Structural Quality Control Plan," and Article 1.08B, "Qualifications of the Independent Testing Agency," herein and Section 6.26 Quality Assurance and Quality Control Requirements.

1.06 CONTRACTOR STRUCTURAL QUALITY CONTROL

A. Contractor Structural Quality Control:

1. Quality Control and Quality Assurance for construction of all structures and structure components shall conform to the requirements of Section 6.26 Quality Assurance and Quality Control Requirements, and these Technical Specifications.
2. Contractor shall designate in writing a Structural Quality Control Manager (SQCM) to monitor the quality of work related to construction of structural components. The SQCM shall be responsible directly to Contractor's Quality Manager for the quality of all structural construction operations, including materials and workmanship, performed by Contractor and all subcontractors.
 - a. The SQCM shall be responsible to the Contractor's Quality Manager for submitting, receiving, and approving all correspondence, required submittals, and reports related to quality control and quality assurance for construction of structures.
 - b. The SQCM shall not be employed or compensated by any subcontractor, or other persons or entities hired by subcontractors, or suppliers, who will provide other services or materials for the project. The SQCM may be an employee of the Contractor. The responsibilities of the SQCM may be fulfilled by Contractor's Quality Manager per Section 6.26 Quality Assurance and Quality Control Requirements.
3. Structural Quality Control shall be the responsibility of the Contractor for the construction of all structures and all of the structural components of work as shown on the Structural Contract Drawings and as specified in these Technical Specifications. Structural construction operations shall include, but not necessarily be limited to the following:
 - a. Furnishing, forming, placing, and finishing cast-in-place concrete b. Fabricating, furnishing, and erecting precast concrete
 - b. Furnishing, forming, placing, and finishing polyester concrete
 - c. Fabricating, furnishing, and erecting metal fabrications and miscellaneous metal
 - d. Welding operations
 - e. Fabricating, furnishing, and constructing tieback assemblies and concrete walers
 - f. Grouting voids behind existing MSE wall panels.
 - g. Repairing spalls in existing MSE wall panels.

B. Structural Quality Control Plan:

1. The SQCM shall provide a Structural Quality Control Plan (SQCP) to assure quality control and uniformity of materials and workmanship and conformance with the Structural Contract Drawings and these Technical Specifications. The SQCP shall be an extension of Contractor's Quality Plan (CQP) as outlined in Section 6.26 Quality Assurance and Quality Control Requirements.

**Hamilton Station Stabilization
C20046F**

2. Prior to submitting the SQCP required herein, a meeting between VTA, Contractor, the SQCM and a representative from the Independent Testing Agency shall be held to discuss the requirements for Structural Quality Control.
3. As a minimum, the SQCP shall include the following information:
 - a. An organizational chart showing all QC personnel and their assigned responsibilities;
 - b. The name and qualifications of the SQCM. The SQCM shall be a licensed civil engineer in the state of California with a minimum of 10 years of experience in the construction of structures;
 - c. The name, address, telephone number, and qualifications of the Independent Testing Agency;
 - d. The names, qualifications, and documentation of certifications for all Quality Control (QC) inspection personnel to be used by the Independent Testing Agency;
 - e. The methods and frequencies for performing all required quality control procedures, including all inspections, material testing, and any required special procedures for all structural components of work;
 - f. A system for identification and tracking of required work, Shop Drawings, reviews, sampling, testing and inspections;
 - g. Forms to be used for Certificates of Compliance, daily production logs, and daily reports; and
 - h. Additional provisions and requirements as outlined in this Section and these Technical Specifications.
4. Additional SQCP Requirements for Cast-in-Place Concrete:
 - a. Refer to Section 03 05 15 – Portland Cement Concrete, for additional requirements pertaining to preparation of a Concrete Quality Control Plan (CQCP).
5. Additional SQCP Requirements for Welding:
 - a. The SQCP shall include a list of all laboratory facilities, technicians and inspectors and indicate which tests each will perform. Submit copies of all current certifications for approval by VTA.
 - b. Refer to Section 05 05 22 - Metal Welding for additional requirements pertaining to welder qualifications and Welding Procedure Specifications (WPS), for general welding.
6. It is expressly understood that VTA's review of Contractor's SQCP and any inspection or testing performed by VTA does not relieve Contractor of any responsibility under the Contract for the successful completion of the Work in conformance with the requirements of the Contract Drawings and Technical Specifications. VTA's approval neither constitutes a waiver of any of the requirements of the Contract Drawings and Technical Specifications nor relieves Contractor of any obligation thereunder; and defective work, materials, and equipment may be rejected notwithstanding approval of the SQCP.

**Hamilton Station Stabilization
C20046F**

1.07 VTA QUALITY ASSURANCE OVERSIGHT:

- A. VTA will monitor the implementation of Contractor's quality control programs through observation, inspection, sampling and testing.
- B. Regardless of the acceptance for a given structural component by Contractor or Independent Testing Agency, VTA will reject any structural component that does not conform to the approved Structural Quality Control Plan (SQCP), the details shown on the Contract Drawings, or the requirements in these Technical Specifications.

1.08 INDEPENDENT TESTING AGENCY

A. Sampling, Testing and Inspection:

- 1. Contractor's approved Independent Testing Agency shall perform sampling, testing, and inspections to verify compliance with these Technical Specifications. The Independent Testing Agency shall be responsible directly to the SQCM for the quality of all structural sampling, testing and inspection of materials, workmanship, and operations, required by these Technical Specifications and as directed by VTA.
- 2. The Independent Testing Agency shall perform inspection and testing prior to, during, and after structural construction operations as necessary to ensure that materials and workmanship conform to the details shown on the Contract Drawings, and to these Technical Specifications.
- 3. Notify VTA at least 48 hours in advance of sampling, tests and inspections being performed by the Independent Testing Agency. VTA may elect to observe these procedures. Provide samples and facilities for inspection to VTA if requested.
- 4. The Independent Testing Agency shall collect samples of materials for testing in accordance with the provisions of these Technical Specifications and as directed by VTA

B. Qualifications of the Independent Testing Agency:

- 1. The Independent Testing Agency cannot be a subsidiary or be partly or wholly owned by Contractor or any subcontractor.
- 2. Laboratory tests shall be carried out in facilities that have current accreditation for that test.
- 3. California laboratory tests shall be carried out in a facility that is a Caltrans Approved laboratory for that test. Technicians shall be Caltrans Certified Technicians for that test.
- 4. Field tests, inspections and sampling required in these Technical Specifications to meet California Tests shall be performed by a Caltrans Certified Inspector.
- 5. Field tests, inspections and sampling of concrete shall be performed by an International Code Council (ICC) Certified Special Inspector for Reinforced Concrete.
- 6. Inspections of plant-precast concrete shall be performed by a civil engineer licensed in the State of California, or a Plant Quality Personnel Certification, Level II Inspector, certified by the Precast/Prestressed Concrete Institute. An inspector from the Independent Testing Agency shall witness all precast concrete operations.
- 7. Inspections of field-precast concrete shall be in accordance with the requirements for cast-in-place concrete.
- 8. Field Inspections and sampling of structural steel and miscellaneous metal shall be performed by an ICC Certified Special Inspector for Structural Steel.

**Hamilton Station Stabilization
C20046F**

9. Welding inspections shall be performed and certified by an AWS Certified Welding Inspector (CWI), certified in accordance with AWS QC1.
10. Nondestructive testing (NDT) shall be performed and certified by an inspector certified in accordance with ASNT Recommended Practice No. SNT-TC-1A. Only persons certified for NDT Level I and working under a NDT Level II person or persons certified for NDT Level II may perform nondestructive testing.
11. Inspections of structural earthwork shall be performed by a geotechnical engineer licensed in the State of California.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION 01 45 30

SECTION 01 55 26

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for preparing traffic control and detour plans, obtaining applicable permits, complying with local jurisdictional agency requirements, adapting the traffic control and detour plans to changing conditions, and providing temporary pedestrian facilities.
- B. This Section also includes requirements for flagging and traffic handling equipment and devices for use by Contractor in discharging its responsibilities for convenience of the public and public traffic.
- C. This Section also includes requirements for providing light rail passenger temporary access facilities on the platform.
- D. Other items as described in detail in this section
- E. See General Conditions and Special Conditions for additional requirements for work included in this section.

1.02 RELATED SECTIONS

1.03 REFERENCED STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. D6.1 Manual of Uniform Traffic Control Devices for Streets and Highways.
- B. State of California, Department of Transportation (Caltrans), Standard Specifications:
 - 1. Section 12 Construction Area Traffic Control Devices.
 - 2. Section 84 Traffic Stripes and Pavement Markings.
 - 3. Section 85 Pavement Markers.

1.04 SUBMITTALS

- A. Contractor shall submit traffic control working drawings for each staged activity or detour that requires re-routing of traffic including re-routing of pedestrian and bicycle traffic or a lane closure to VTA for review and appropriate action. These working drawings shall be submitted no less than 25 working days before performing the staged activity or detour that affects the traffic flow. The construction dates shall be in accordance with the approved construction schedule. Include haul routes and provisions for access to and egress from medians. Include construction area signage and signage for business access on traffic control working drawings.
 - 1. VTA reserves the option to revise the drawings as deemed necessary to comply with site specific conditions. Contractor shall not detour traffic or interfere with the normal flow of traffic until Contractor's detour and traffic control plans are approved by VTA.

**Hamilton Station Stabilization
C20046F**

2. Traffic control plans which may be included in the Contract Drawings do not relieve Contractor from submitting traffic control working drawings for approval as specified herein.
 3. Plan for providing flagging and safety personnel to maintain traffic and safety of the LRT operations. In work zones with LRT speed below 35 MPH, Contractor may provide its own watchman with qualified VTA Employee-In-Charge (EIC) training. In work zones with LRT speed at or above 35 MPH, Contractor shall obtain VTA watchman.
- B. Platform accessibility: Submit working drawings showing layout of platform temporary access facilities for light rail passengers including but not limited to, detailing showing walking surface and ramps.

1.05 SYSTEM DESCRIPTION

- A. A traffic control system shall consist of all flagging, traffic control submittals, construction traffic control devices, in accordance with the requirements of the local jurisdiction.
- B. Attention is directed to Section 7.38, "Public Convenience and Safety," and Section 12 of the Caltrans Standard Specifications, and these technical specifications. Nothing in these technical specifications may be construed as relieving Contractor from the responsibilities specified in Section 7.38, "Public Convenience and Safety." Contractor must maintain property and pedestrian access and bicycle routes at all times.
- C. Contractor shall be responsible for obtaining approvals and permits for traffic control plan, including temporary and interim traffic signals, closure of part or all roads or streets, and diversion of traffic. Such approval shall be obtained from VTA. Necessary submittals and approvals shall be shown in Contractor's Progress Schedule, with time allowances for submittals, resubmittals, and approvals.
- D. Detour Plans: Traffic control working drawings shall include detour Plans indicating the following:
1. The extent and configuration of traffic pattern changes, including beginning and completion dates of the work and duration of temporary and interim traffic control.
 2. The means and devices for traffic control, including details of type and locations of signs, portable changeable message signs, arrow boards, striping, markers, barriers, delineators, and other devices.
 3. Description of the work, time required for roadway closure and detours, method of roadway repairs and paving conforms before opening, and required construction area signs.
 4. Haul routes and ingress to and egress from medians.
- E. Traffic control working drawings submitted by Contractor shall include specific details for transportation of materials and equipment to and from the Worksite. These details shall include haul routes and times, ingress/egress locations, methods of delivery, and traffic control measures to be taken to provide safe ingress/egress without disruption to the traveling public. These delivery plans are required for each traffic stage and delivery location. Specific mention shall be made to deliveries performed during peak traffic hours which are generally from 5:00 AM to 9:00 AM and from 3:00 PM to 8:00 PM on weekdays.
- F. Closures and detours shall conform to the following:
1. Contractor may not impact traffic or close traffic lanes during peak commute hours. Peak commute hours are on weekdays from 5 a.m. until 9 a.m. and from 3 p.m. until 8 p.m. Lane closures shall consist of closing only one traffic lane in a single direction. Contractor shall fully close lanes before intersections and not within intersections to avoid traffic merging within the intersection.

**Hamilton Station Stabilization
C20046F**

2. Signs of all complete road closures and detours will be posted, and notices distributed to adjacent and fronting businesses and residents 1 week in advance of the road closure.
3. All road closures shall be coordinated with, and approved by, the traffic engineers of the relevant authorities before providing the required advance notifications.

1.06 SEQUENCING AND SCHEDULING

- A. Contractor shall notify VTA of Contractor's intent to begin work at least 10 working days before the Work is begun. Contractor shall cooperate with local authorities relative to handling traffic through the area.
- B. Vehicular Traffic: The traveled way shall be open for use by public traffic when construction operations are not actively in progress.
- C. Pedestrian walkways shall be provided to allow unimpeded pedestrian movement along streets and at crosswalks. At least one side of the street shall be open to pedestrian traffic at all times. If Contractor requires closure of a pedestrian walk or crosswalk, an alternate and convenient walk shall be provided during such closure. Alternative walk shall be appropriately signed.
- D. Minor deviations from the requirements of this Section concerning hours of work which do not significantly change the cost of the Work may be permitted upon the written request to VTA. Permission may be granted if, in the opinion of VTA, public traffic will be better served and the Work expedited. Such deviations shall not be adopted until VTA has indicated its written approval. All other modifications will be made by contract change order.
- E. Contractor shall provide construction area signs to notify bike riders and pedestrians of pending bike and pedestrian route closures and detours at least 1 week in advance of closure.
- F. Lane reductions are not allowed on arterial streets on weekdays between 5:00 AM to 9:00 AM, and between 3:00 PM to 8:00 PM, i.e., "peak commute hours," excluding holidays.

1.07 MEASUREMENT AND PAYMENT

- A. Traffic Control and all Work listed in this specification will be measured for payment as part of Traffic Control lump sum.
- B. Payment for Traffic Control shall include installing, maintaining, and removing traffic control devices, pedestrian and bicycle facilities, temporary platform access facilities, flagman, lane closures, temporary striping including removal.
- C. Payment for Traffic Control shall include permitting and associated costs provided by city forces including flagging and police patrol.
- D. All other Work listed in this section is included in the lump sum bid for Traffic Control.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS

2.01 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

- A. Channelizers: Channelizers shall be surface mounted type conforming to the provisions in Section 01 57 10, "Signing and Delineation Materials." Channelizer posts shall be orange in color. If channelizers are surface mounted with epoxy to pavement to remain, Contractor shall replace damaged paving to the satisfaction of VTA at no additional expense to VTA. Channelizers shall have double-base.

- B. Pavement Markers: Temporary reflective raised pavement markers shall be, at the option of Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in Section 01 57 10, "Signing and Delineation Materials."

- C. Traffic Control Signs: Provide each change in location of traffic with adequately posted signs mounted on barricades or standard posts. Regulatory signs required for the construction areas, as well as temporary NO PARKING signs which are to be used for short periods, shall be provided and removed by Contractor in accordance with the approved traffic plan.

- D. Portable Changeable Message Sign (CMS)
 - 1. When conditions warrant, portable changeable message signs shall be furnished, placed, operated, and maintained at locations indicated or designated by the Resident, in accordance with Section 12-3.01. "General," of the Caltrans Standard Specifications.
 - 2. CMS shall be placed at a location 800 to 1000 feet upstream from the beginning of temporary barriers alerting motorists of slow trucks ingressing or egressing the median.
 - 3. The message shall read: "CAUTION - SLOW TRUCKS AHEAD," unless other words are required by the Resident.
 - 4. The CMS shall be in continuous operation during the hours when trucks are entering or leaving the median at a rate greater than two trucks per hour.
 - 5. When two trucks or less per hour are leaving the median, the CMS shall be in operation only during the time when trucks are entering the traveled way. The CMS shall be turned off after the truck has safely entered the traveled way.
 - 6. Each portable changeable message sign unit shall consist of a 3-line matrix sign panel, a controller unit, a power supply, and a structural support system all mounted on a trailer. The unit shall be assembled to form a complete self-contained portable changeable message sign that can be delivered to the site of the work and placed in immediate operation. The complete message sign unit shall be capable of operating in an ambient air temperature range of minus 20 degrees C to plus 70 degrees C and must not be affected by mobile radio transmissions.
 - 7. The trailer shall be equipped with at least 3 adjustable outrigger leveling pads near the frame corners to permit stable worksite installations. The unit shall be capable of resisting overturning under wind loads of 60 mph with the sign in the fully elevated position. The overall width of the trailer unit, including the sign and mounting brackets, shall not exceed 102 inches while being towed.
 - 8. The message displayed on the sign shall be visible from 1200 feet and shall be legible from a distance of 750 feet, at noon on a cloudless day, by persons with vision corrected to 20/20. The sign shall be capable of displaying a minimum of 8 characters per line on each of three lines.
 - 9. The sign face shall be flat black and shall be protected from sun-glare by a method that does not interfere with the clarity of the sign message. The sign shall be raised and lowered by means of a power-driven lifting mechanism.

**Hamilton Station Stabilization
C20046F**

10. The matrix sign shall be capable of a complete alphanumeric selection.
11. Lamp matrix type signs shall be equipped with an automatic dimming operational mode which automatically compensates for the influence of a temporary light source or other abnormal lighting conditions. The sign shall have manual dimming operation modes of three or more different lamp intensities.
12. Non-lamp matrix signs shall be internally illuminated at night.
13. The controller shall be an all solid-state unit containing all the necessary circuitry for the storage of at least five pre-programmed messages. The controller shall be installed in a location allowing the operator to perform all functions from one position. A keyboard entry system shall be provided to allow an operator to generate an infinite number of additional messages over the preprogrammed five. The keyboard shall be equipped with a security lockout feature to prevent unauthorized use of the controller.
14. The controller shall contain a non-volatile memory to hold the keyboard created messages in memory during a non-power period. It shall allow for a variable message display rate that allows the operator to match the information display to the speed of the approaching motorists. The flashing off time shall be operator adjustable within the control cabinet.
15. Full operation height shall be with the bottom of the sign at least 7 feet above the ground and the top no more than 14 feet, 6 inches above the ground.
16. The portable changeable message signs, when no longer required for the work, shall become the property of Contractor.

PART 3 EXECUTION

3.01 MAINTENANCE AND CONTROL OF TRAFFIC

- A. Contractor must furnish, install, maintain, and remove when no longer required, traffic control and protective devices required on the approved traffic plan. Traffic control and protective devices shall include temporary directional electrical warning signs (arrow boards), detour signs, informational signs, and danger signals; temporary barricades and guard rails; temporary lighting, overhead warning lights, and flashing lights; removal of permanent and temporary pavement markings; and the services of qualified flagmen. Contractor must maintain communication with VTA regarding Contractor's operations in maintaining and controlling traffic. Street and road closures shall comply with the General Conditions.
- B. Redirecting Traffic:
 1. Channelizing, shifting of traffic lanes, and barricading of traffic in connection with the work will be done in accordance with the approved traffic plan. Existing local standards for signing and marking of construction areas will apply in addition to ANSI D6.1.
 2. When required by these technical specifications, shown on the Contract Drawings, or required by responsible public agencies, construct, maintain, and remove detours and detour bridges for the use of public traffic.
 3. The failure or refusal of Contractor to construct and maintain detours at the proper time shall be sufficient cause for closing down the Work, at Contractor's expense, until such detours are in satisfactory condition for use by public traffic.

**Hamilton Station Stabilization
C20046F**

- C. Temporary Closing: Before temporarily closing to traffic part of any street, sidewalk, or other access or to changing traffic patterns from those indicated on the Contract Drawings. Contractor must obtain approval from VTA at least 2 weeks before such closures or changes are made. VTA will obtain approval from the jurisdictional authorities. Deviations will be for an emergency condition affecting life and property only, and Contractor shall immediately notify VTA and the appropriate jurisdictional agency of any such emergency changes. Copies of approvals shall be furnished to VTA. Contractor to submit City of San Jose and Santa Clara County "Street/Lane Closure Request Form" at least two weeks prior to closure.
- D. Temporary Walkways: In areas where removal of existing sidewalks is necessary. Contractor must maintain access to adjacent businesses, entrances, and properties by temporary walkways having a width of not less than 4 feet. Refer to pedestrian facilities specified herein.
- E. Intersections: When an intersection is indicated on the Contract Drawings or on Contractor's traffic control working drawings to remain open during construction within the intersection, phase construction so that the required number of traffic lanes on each street will be provided at all times during these operations.
- F. Maintenance of Traffic Control System:
 - 1. Contractor shall patrol the traffic control area and reset all disturbed signs and traffic control devices immediately on a continuous 24-hour basis including weekends and holidays. All inapplicable signs shall be removed or covered during periods not needed.
 - 2. Upon failure of Contractor to provide immediately such flagmen, or to properly provide, erect, maintain, or remove such barricades and lights, and erects, maintain, or remove standard signs when ordered to do so by VTA, VTA will be at liberty, without further notice to Contractor or its surety, to provide the necessary flagmen or local reserve police forces, to provide, erect, maintain, or remove barricades and lights, and to erect, maintain and remove standard sign, and deduct all of the costs thereof from any payments due or coming due Contractor.
- G. Contractor shall maintain access for fire, ambulance and law enforcement emergency vehicles at all times. Said access requirements may require Contractor to temporarily suspend its operations until the emergency is over.
- H. Contractor shall coordinate its Plans for control of traffic with local authorities having jurisdiction over the area and shall cooperate with such authorities during the period of control of traffic.
 - 1. The traffic engineering division or field inspector of the authority having jurisdiction shall be advised by Contractor of Contractor's Plans for implementing the approved traffic control measures at least 48 hours in advance of execution of such control measures.

3.02 TRAFFIC CONTROL

- A. Contractor shall control the flow of traffic in the area of the Work as necessary.
 - 1. Methods and procedures for such control shall be coordinated with VTA and shall be subject to VTA's approval.
- B. Not less than 10 working days before performing staged activity or detour affecting the flow of traffic, Contractor shall notify VTA of intent to perform such Work.
 - 1. Such notification shall be accompanied by a detour plan.
 - 2. VTA and local jurisdiction will review Contractor's detour plan for approval. Contractor shall cooperate with such authorities during the period of control of traffic.

**Hamilton Station Stabilization
C20046F**

3. Contractor shall not detour traffic without prior written approval of the detour plan.
- C. Parking:
1. Contractor shall keep the worksite free of parked vehicles. Contractor shall make its own arrangements relative to keeping the working area clear of parked vehicles.
 2. Contractor shall not park vehicles of Contractor or Contractor's employees on the traveled way or shoulders, even if such areas are closed to the public.
- D. Contractor shall observe laws and rules of traffic when moving Contractor's vehicles or equipment on roadways open to the public.
- E. Contractor shall not allow vehicles to stop in temporary traffic lanes or in loading, unloading, or storage areas.
1. NO STOPPING, NO PARKING, and TOW AWAY warning signs shall be posted by Contractor in accordance with the approved traffic plan.
 2. In accordance with California Vehicle Code Article 22652, the signs shall remain in position for 24 hours before the stopping and parking restrictions become enforceable.
 3. The signs shall state the days and hours when the restrictions apply.
 4. Construction traffic shall be coordinated with all other projects within the same area.

3.03 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

- A. Contractor must provide an arrow board for each lane closure.
- B. The provisions in this Section will not relieve Contractor from the responsibility to provide additional devices or take the measures as may be necessary to comply with the provisions in the General Conditions of these Contract Documents.
- C. If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the Work, Contractor shall immediately repair the component to its original condition or replace the component and shall restore the component to its original location.
- D. Stationary Type Lane Closure: When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If Contractor so elects, the components may be stored at selected central locations, approved by VTA, within the limits of the right of way.
- E. Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the Contract Drawings shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

**Hamilton Station Stabilization
C20046F**

- F. Moving Type Lane Closure: Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 7 feet above the ground, but should be as high as practicable.

3.04 PEDESTRIAN AND BICYCLE FACILITIES

- A. Pedestrian Facilities, General:
1. Pedestrian walkways shall have skid resistant surfaces and shall be free of irregularities.
 2. Hand railings shall be provided on each side of temporary pedestrian walkways as necessary to protect pedestrian traffic from hazards due to construction operations and adjacent vehicular traffic and to prevent pedestrian movement to construction areas and vehicular traffic lanes.
 3. Protective overhead covering shall be provided as necessary to provide protection from falling objects and drip from overhead structures.
 4. Railings and walkways shall be maintained in good condition by Contractor. Walkways shall be kept free of obstructions or hazards. Slope of ramp shall be a maximum of 1:12.
- B. Temporary pedestrian walkways that are constructed shall be provided with surfacing of asphalt concrete, Portland cement concrete, or timber.
- C. Railings for temporary walkways shall be constructed of wood, S4S, and shall be painted white.
- D. If a street or lane closure will block a bicycle route or pedestrian sidewalk, provide signs adjacent to proposed closure at least 1 week in advance of closure. Provide alternative bicycle and pedestrian routes.

3.05 MAINTANANCE OF PLATFORM ACCESSIBILITY

- A. Whenever the light rail station is in operation, Contractor shall furnish and maintain platform temporary access facilities, including but not limited to walking surface and ramps, for light rail passengers egressing and engrossing the trains and moving on the platform through the construction area.
- B. Platform temporary access facilities shall have skid resistant surfaces and shall be free of irregularities. Walk surface shall be kept free of obstructions or hazards. Slope of ramp shall be a maximum of 1:12
- C. Hand railings shall be provided between platform temporary access facilities and construction areas as necessary to protect passengers from hazards due to construction operations.

END OF SECTION 01 55 26

SECTION 01 57 10

SIGNING AND DELINEATION MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes a list of signing and delineation materials which have been prequalified and tested by the California State Department of Transportation (Caltrans).
- B. Approval of these materials does not preclude VTA from sampling and testing any of the signing and delineation materials or products at any time.
- C. None of the signing and delineation materials and products listed below may be used in the work unless such material or product is listed on VTA's List of Approved Traffic Products.
 - 1. Temporary pavement markers
 - 2. Striping and pavement marking tape
 - 3. Pavement markers, reflective and non-reflective
 - 4. Flexible Class 1 delineators and channelizers
 - 5. Railing and barrier delineators
 - 6. Sign sheeting and base materials
 - 7. Reflective sheeting for barricades
 - 8. Reflective sheeting for channelizers
 - 9. Reflective sheeting for markers and delineators
 - 10. Reflective sheeting for traffic cone sleeves
 - 11. Reflective sheeting for barrels and drums

1.02 SUBMITTALS

- A. Submit a Certificate of Compliance as specified in Section 7.49, "Certificates of Compliance and Testing," for signing and delineation materials and products. Said certificate shall also certify that the signing and delineation material or product conforms to the prequalified testing and approval of VTA and was manufactured in accordance with the approved quality control program
- B. Submittals for Addition to VTA's List: Materials and products will be considered for addition to said approved prequalified and tested list if the manufacturer of the material or product submits to VTA a sample of the material or product. The sample shall be sufficient to permit performance of all required tests. Approval of such materials products will be dependent upon a determination as to compliance with the specifications and any test VTA may elect to perform.

**Hamilton Station Stabilization
C20046F**

1.03 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 LIST

- A. The following is a listing of approved prequalified and tested signing and delineation materials and products.
1. Refer to City of San José Standard Specifications for pavement markers.
 2. Pavement Markers, Temporary Type
 - a. Temporary pavement markers for long term day/night use (6 months or less):
 - 1) Apex Universal, Model 924 (4" x 4"), or approved equal.
 - 2) Davidson Plastics Co., "RPM" (4" x 4") or approved equal.
 - 3) Elgin "Empco-Lite" Model 901 (4" round) or approved equal.
 - b. Temporary pavement markers for short-term day/night use (14 days or less):
 - 1) Davidson Plastics, Models TOM (Standard) with Reflexite PC-1000, or (WZ) with Reflexite AC-1000 Sheeting, or approved equal.
 - 2) Stimsonite Model 300 "Temporary Overlay Marker," or approved equal.
 - 3) Hi-Way Safety, Inc., Model 1280/1281 with Reflexite PC-1000, or approved equal.
 - 4) 3M Scotch-Lane A200 Pavement Marking System (4" x 12") or approved equal.
 - c. Temporary pavement markers for short-term day/night use (14 days and less) at seal coat locations:
 - 1) Davidson Plastics, TRPM (Standard) with Reflexite PC-1000, or (WZ) with Reflexite AC-1000 Sheeting, or approved equal.
 - 2) Davidson Plastics, "HH" (High Heat) TRPM (Standard) with Reflexite PC-1000, or (WZ) AC-1000 Sheeting, or approved equal.
 - 3) Stimsonite, Model 301 Chip Seal Marker with 0.5" x 4" Stimsonite Type IIIC Sheeting or approved equal.
 - 4) Hi-Way Safety, Inc., Model 1280/1281 with Reflexite PC-1000, or approved equal.
 3. Striping and Pavement Marking Material
 - a. Removable Traffic Paint:
 - 1) Belpro, Series 250/253 and No. 93, or approved equal.
 - 2) "Remover" or approved equal.
 4. Class 1 Delineators
 - a. One-piece drivable flexible type (48").
 - 1) All West Plastics "Flexi-Guide 400" or approved equal.
 - 2) Carsonite Curve-Flex CFRM-400 or approved equal.
 - 3) Carsonite Roadmarker CRM-375 or approved equal.
 - 4) GreenLine Model HWD1-66 or approved equal.
 - 5) GreenLine Model CGD1-66 or approved equal.

**Hamilton Station Stabilization
C20046F**

- b. Special use flexible type (48")
 - 1) Carsonite "Impactor" with 18" soil anchor or approved equal.
 - 2) Carsonite "Survivor" with 18" U-Channel anchor or approved equal.
 - 3) FlexStake, H-D, or approved equal.
 - 4) GreenLine HWD w/18" soil anchor or approved equal.
 - 5) GreenLine CGD w/18" soil anchor or approved equal.
 - 6) Polyform, Inc., "Vista-Flex", or approved equal.
 - 7) Safe-Hit with 8" pavement anchor (SH248-GPR and SHAI-08-PI) or approved equal.
 - 8) Safe-Hit with 15" soil anchor (SHA5-15C-GL), or approved equal.
 - 9) Safe-Hit with 18" soil anchor (SH248-GPR and SHA No.-18C-PL), or approved equal.
 - c. Surface mount flexible type-(48")
 - 1) Carsonite, "Super Duck II", or approved equal.
 - 2) FlexStake Surface Mount H-D or approved equal.
5. Channelizers
- a. Surface mount type (36")
 - 1) Carsonite "Super Duck" (Flat SDF-436, Round SDR-336), or approved equal.
 - 2) Carsonite Super Duck II "The Channelizer" or approved equal.
 - 3) FlexStake Surface Mount H-D or approved equal.
 - 4) GreenLine SMD-36 or approved equal.
 - 5) Repo, Models 300 and 400, or approved equal.
 - 6) Safe-Hit, Guide Post, Model with glue down base (SH236SMA), or approved equal.
 - 7) The Line Connection, "Dura-Post" Model DP36-3C, or approved equal.
6. Object Markers
- a. Type "K" (18")
 - 1) Carsonite Models SMD 615 and SMD 615-A or approved equal.
 - 2) Repo, Models 300 and 400, or approved equal.
 - 3) Safe-Hit, Model SH718SMA, or approved equal.
 - 4) The Line Connection, Model "DP21-4K" (Vertical configuration only) or approved equal.
 - b. Type "K-4" Object Marker (24") (Traffic Manual Type "Q")
 - 1) Carsonite, Super Duck II, or approved equal.
 - 2) The Line Connection, Model "DP21-4Q", or approved equal.
 - 3) Repo, Models 300 and 400, or approved equal.
 - 4) Safe-Hit, Models SH824SMA--WA and SH824GP3--WA or approved equal.
7. Concrete Barrier Markers and Temporary Railing (Type K) Reflectors
- a. Impactable Type
 - 1) All West Plastics "Flexi-Guide 235" or approved equal.
 - 2) Duraflex Corp. "Flexi 2020" or approved equal.
 - 3) Davidson Plastics PCBM-12 or approved equal.
 - b. Non-Impactable Type
 - 1) Astro-Optics JD Series, or approved equal.
 - 2) Stimsonite Model 967 (with 3-1/4" acrylic cube corner reflector) or approved equal.
 - 3) Stimsonite, Model 967LS (with Stimsonite Type IIIC Sheeting), or approved equal.

**Hamilton Station Stabilization
C20046F**

- c. Thrie Beam Barrier Markers (For use to the left of traffic)
 - 1) Duraflex Corp., “Railrider”, or approved equal.
 - 2) Davidson Plastics, “Mini” (3”x10”), or approved equal.

- 8. Guard Railing Delineator
 - a. Concrete Barrier Delineators* (16”) (For use to the right of traffic)
 - 1) All West Plastics “Flexi-Guide FG-122” or approved equal.
 - 2) Davidson Plastics, Model PCBM-16, or approved equal.
 - 3) Safe-Hit, Model SH216RBM, or approved equal.

 - b. Guard Railing Delineators* (27” Wood Post Type) (For use to the right or left of traffic)
 - 1) Carsonite, Model 427, or approved equal.
 - 2) Safe-Hit, Model SH227GRD, or approved equal.
 - 3) All West Plastics “Flexi-Guide 327” or approved equal.

 - c. Guard Railing Delineators* (27” Steel Post Type) (For use to the right or left of traffic)
 - 1) Carsonite, Model CFGR-327 with CFGRBK300 Mounting Brackets, or approved equal.

- 9. Reflective Sheeting
 - a. Reflective Sheeting For Channelizers and Delineators
 - 1) 3M High Intensity (Long Term) or approved equal.
 - 2) Reflexite PC-1000 Metalized Polycarbonate (Long Term) or approved equal.
 - 3) Reflexite AC-1000 Acrylic (Long Term) or approved equal.
 - 4) Reflexite, AP-1000, Metalized Polyester (Short Term), or approved equal.
 - 5) Stimsonite, Series 4500 (For Carsonite CurveFlex and Roadmarker only), or approved equal.

 - b. Reflective Sheeting For Barricades
 - 1) Type II Reflective Sign Sheeting (Engineer Grade) or approved equal.
 - 2) American Decal, Adcolite, or approved equal.
 - 3) Avery Dennison, 1500/1600, or approved equal.
 - 4) Nikkalite (Formerly Seibulite), 8100 Series, or approved equal.
 - 5) 3M, Scotchlite, or approved equal.

 - c. Reflective Sheeting For Traffic Cone Sleeves
 - 1) Reflexite, “SB” Vinyl (Metalized), or approved equal.
 - 2) Reflexite, “TR” Semi-Transparent, or approved equal.

 - d. Reflective Sheeting For Barrels and Drums
 - 1) Reflexite, “Super High Intensity”, or approved equal.

 - e. Reflective Sheeting For Signs
 - 1) TYPE IIA (Super Engineer Grade) - Avery Dennison, “Fasign” 2500 Series, or approved equal Nikkalite “Super Engineer Grade,” 1800 Series, or approved equal.
 - 2) TYPE IIIA (High Performance) - 3M, High Intensity, or approved equal.
 - 3) TYPE IIIC - Stimsonite, Series 4200 (Orange Only), or approved equal. For contractor furnished signs only.
 - 4) TYPE IV - Reflexite, Vinyl (Roll-Up Signs), or approved equal.

**Hamilton Station Stabilization
C20046F**

- 10. Signs
 - a. Sign Substrate for Construction Area Signs
 - 1) Aluminum.
 - 2) Fiberglass Reinforced Plastic (FRP).
 - 3) Sequentia, "Polyplate".
 - 4) Fiber-Brite.

END OF SECTION 01 57 10

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 01 71 13

MOBILIZATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for mobilization.

1.02 REQUIREMENTS

- A. Mobilization consists of preparatory Work and operations, including, but not limited to, those necessary for the movement of personnel, equipment supplies, including incidentals to the Worksite; for the establishment of offices, buildings, Site Surveys, and other facilities necessary the Work; for all other Work and operations which will be performed or costs incurred before beginning the Work on the various Contract items on the Worksite.

1.03 MEASUREMENT AND PAYMENT

- A. The Contract lump sum price paid for mobilization includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all the work involved in mobilization, complete in place, as shown on the Contract Drawings, as specified in these technical specifications, and as directed by VTA.
- B. Payments for mobilization will be made as follows:
1. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5 percent or more of the original Contract amount, 50 percent of the Contract item price for mobilization or 5 percent of the original Contract amount, whichever is the lesser, will be included in said estimate for payment.
 2. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 10 percent or more of the original Contract amount, the total amount earned for mobilization shall be 75 percent of the contract item price for mobilization or 7.5 percent of the original Contract amount, whichever is the lesser, will be included in said estimate for payment.
 3. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 20 percent or more of the original Contract amount, the total amount earned for mobilization shall be 95 percent of the contract item price for mobilization or 9.5 percent of the original Contract amount, whichever is the lesser, will be included in said estimate for payment.
 4. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 50 percent or more of the original Contract amount, the total amount earned for mobilization shall be 100 percent of the contract item price for mobilization or 10 percent of the original Contract amount, whichever is the lesser, will be included in said estimate for payment.
 5. After acceptance of the Contract, the amount, if any, of the contract item price for mobilization in excess of 10 percent of the original Contract amount will be included for payment of the final estimate.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 71 13

SECTION 01 71 23

FIELD ENGINEERING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the requirements for construction surveys and other measurements as required to establish lines, slopes, continuous profile grade for track roadway and crossing streets; center lines, benchmarks and other controls deemed necessary for the Work.

1.02 SUBMITTALS

- A. Contractor shall submit the name and address of a Land Surveyor, licensed in the State of California, who will be directly responsible for the survey work, for approval, a minimum of 10 days prior to commencing the survey work.
- B. Upon request of the Resident, field notes, calculations, and other documents shall be submitted to verify the accuracy of the field engineering Work. Field notes for quantity computations for payment shall be submitted at least 5 days in advance of the Resident's calculation of progress estimates.
- C. Within 30 days of completion of the Work, two sets of field notes, calculations, drawings and other documents necessary to accomplish the field engineering work for this contract shall be submitted.
- D. Submit seven copies of calculations used in establishing survey points, temporary benchmarks, stakes for centerlines and other control stakes for line and grade of the Work. Submit information within five working days of installation of stakes in the field.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall provide its own surveyor for construction staking. Contractor shall assume full responsibility for the accuracy of the measurements and controls provided by him. The Resident reserves the right to verify the grades and locations. Any discrepancies from the grades and locations shown on the Contract Drawings shall be corrected by Contractor at no cost to VTA.
- B. VTA will provide, at no cost to Contractor, control survey baseline, monuments and benchmarks as shown on the Contract Drawings. Contractor shall be held responsible for the preservation of all monuments and bench marks, as provided by VTA, and other existing property boundaries and survey monuments of record requiring replacement during construction shall be done by a licensed surveyor and at no cost to VTA. In addition, Contractor shall protect all survey markers found during construction. Contractor shall perform survey to verify and document existing track alignment, monuments, and benchmarks prior to removal of existing track. Contractor shall pay to VTA all costs of re-establishing monuments identified in the Contract Drawings if they are disturbed or destroyed. Contractor shall immediately notify the Resident of any discrepancies in the control survey.
- C. Contractor shall immediately notify the Resident in writing of obvious errors or omissions in the Contract Drawings identified during construction plan review and preparation of stake out documents.

1.04 ACCURACY

- A. Control traverse field surveys and computations, including surveys of main control lines to determine alignment of major structure components, shall be performed to an accuracy of at least 1:25000.

**Hamilton Station Stabilization
C20046F**

- B. The tolerances generally applicable in setting survey stakes shall be as set forth below. Such tolerances must not supersede stricter tolerances required by the Contract Drawings or Specifications and shall not otherwise relieve Contractor of responsibility for measurements in compliance therewith.
- C. Tolerances in setting survey must not exceed the following:

<u>Survey Stake or Markers</u>	<u>Distance</u>	<u>Tangent</u>	<u>Curve</u>
Markers on hubs and monuments on centerlines and offset centerlines	1:10,000	0.01 ft.	10 sec.
Intermediate stakes or markers on centerlines and offset centerlines for:			
Rough excavation and embankment for trackway, roadways, and work not otherwise provided	1:2,000	0.01 ft.	1 min.
Equipment installation	As required by manufacturer		
Roadway surfacing, steel reinforcement, and other formed concrete	1:5,000	0.02 ft.	1/2 min.

Offset Grade stakes or Markers for:

<u>Survey Stake or Markers</u>	<u>Horizontal Distance</u>	<u>Elevation</u>
Rough excavation and embankment for trackway, roadways, and work not otherwise provided	0.01 ft.	0.10 ft.
Trimming or preparation of subgrade for trackway, roadway, and concrete structures	0.05 ft.	0.05 ft.
Track, roadway surfacing, formed concrete	0.01 ft.	0.01 ft.
Conduit, Junction Boxes, Vaults	0.02 ft.	0.01 ft.
Equipment Installation	As required by manufacturer	

1.05 QUALITY CONTROL

- A. Contractor shall assign a competent Professional Licensed Land Surveyor to perform or direct all necessary work to layout all items described in the specifications and indicated on the Contract Drawings.
- B. The Professional Licensed Land Surveyor whose resume and credentials have been reviewed and approved by the Resident prior to commencement of work will be the only individual authorized to perform work as described herein.
- C. The final approval of the Professional Licensed Land Surveyor rests with the Resident.
- D. If for any reason, and at any time, the candidate submitted by Contractor is not acceptable to the Resident or becomes unacceptable, Contractor shall propose additional candidates.

**Hamilton Station Stabilization
C20046F**

- E. If for any reason Contractor wishes to replace the approved Professional License Land Surveyor at any time during the performance of the Contract, Contractor shall submit the resume and other credentials of its new candidate to the Resident for approval. No substitution shall be allowed without the Resident's written approval.

1.06 DIARY AND FIELD NOTES

- A. A daily diary shall be maintained of all work performed by the survey crews. This diary or daily record shall include the date, weather, crew, type and location of work being performed, and work accomplished.
- B. Field notes shall be maintained for all items of survey work and measurements. Notes shall be neat, legible, precise and sufficiently detailed.
- C. All construction field notes shall be accurate, clear, and complete, and shall be recorded on standard note weatherproof forms.

1.07 CONSTRUCTION STAKES

- A. PK nails or other types of permanent markers shall be set at intervals not more than 10 feet apart for track center lines or layout lines.
- B. Points that may be disturbed or destroyed during construction shall be referenced to safe and stable locations.

1.08 BENCHMARKS

- A. The benchmarks shown on the Contract Drawings shall be checked for location and elevations, and additional benchmarks shall be installed as required. Benchmarks must not be set on utility poles.

1.09 MEASUREMENT AND PAYMENT

- A. Field Engineering and all Work listed in this specification will be measured for payment as part of Field Engineering lump sum.
- B. Payment for field engineering as specified herein, including all the construction survey calculations, copying of field notes, preservation or surveying of monuments, and final as-built survey to verify track alignment for VTA's acceptance, is included in Field Engineering and no additional payment will be made.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION NOT USED

END OF SECTION 01 71 23

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

**Hamilton Station Stabilization
C20046F**

SECTION 01 74 12

CLEANING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for maintaining a clean, orderly, hazard-free Worksite and final cleaning for VTA's occupancy.

1.02 STANDARD DOCUMENTS

- A. Submit, as part of the ESCAPE, detailed list of volatile and potential contaminants planned or expected to be present at the Worksite and how they will be mitigated if spilled.

1.03 JOB CONDITIONS

- A. Safety Requirements: Maintain the Worksite to be neat, orderly, and hazard-free until final acceptance of the Work in conformance with the local governmental and CAL OSHA requirements. Keep catwalks, underground structures, Worksite walks, public sidewalks, roadways, and streets, along with public and private walkways adjacent to Worksite, free from hazards caused by construction activities. Inspect those facilities regularly for hazardous conditions caused by construction activities.
- B. Hazards Control:
1. Store volatile wastes in covered metal containers and remove those wastes from Worksite daily.
 2. If volatile and/or noxious substances are being used in spaces which are not naturally ventilated, provide artificial ventilation.
 3. Conform to applicable Federal, State and local rules and regulations for hazard controls, including those covering hazardous communications.
 4. Submit, as part of the ESCAPE, detailed list of volatile and potential contaminants planned or expected to be present at the Worksite and how they will be mitigated if spilled. Make submittal as part of the ESCAPE, if applicable.
- C. Access: Maintain the Worksite in such a way as to permit access by others; refer to Section 01 11 00, "Summary of Work".

1.04 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

- A. Use the type of cleaning materials recommended by the manufacturer of the surfaces to be cleaned. Products used in this Section shall be selected by Contractor, subject to approval by VTA.

PART 3 EXECUTION

**Hamilton Station Stabilization
C20046F**

3.01 INTERIM CLEANING

- A. Clean the Worksite every workday during the construction of the Contract. Maintain structures, grounds, railroads and other areas of Worksite, including public streets and public and private properties immediately adjacent to Worksite, free from accumulations of waste materials caused by construction operations. Place waste materials in metal containers.
- B. Remove or secure loose material on open decks and on other exposed surfaces at the end of each workday, or more often, in a manner which will maintain the Worksite hazard-free. Secure material in a manner which will prevent its dislodgment by wind and other forces.
- C. Promptly empty waste containers when they become full but in no case less frequently than once a week, and legally dispose of the contents at dumping areas off VTA's property.
- D. Control the handling of waste materials. Do not permit materials to be dropped or thrown from structures.
- E. Immediately remove spillages of construction-related material from haul routes.
- F. Clean only when dust and other contaminants will not precipitate upon newly painted surfaces.

3.02 FINAL CLEANUP

- A. Inspect interior and exterior surfaces, including concealed spaces, in preparation for completion and acceptance.
- B. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains, and extraneous markings.
- C. Remove surplus materials, except those materials intended for maintenance.
- D. Remove tools and equipment used in the construction, except that for VTA's property.
- E. Remove detachable labels and tags. File them with the manufacturer's specifications for that specific material for VTA's records.
- F. Repair damaged materials to the specified finish or remove and replace.

END OF SECTION 01 74 12

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements preparatory to final inspection.
- B. Final inspection.
- C. Acceptance of the Work and final payment.

1.02 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

1.03 REQUIREMENTS PREPARATORY TO FINAL INSPECTION

- A. Contractor shall request a preliminary final inspection to determine the state of completion of the Work.
- B. The request shall be made in writing, addressed to VTA, at least seven days in advance of the requested date of the preliminary inspection.
- C. VTA will perform the preliminary inspection within three days of the requested date.
- D. Prior to the requested date of the preliminary inspection, Contractor shall perform or provide the following, as applicable:
 - 1. Temporary facilities, except as may be required for punch list work, shall be removed from the site.
 - 2. The site and all applicable appurtenances and improvements shall be cleaned as specified in Section 01 74 12 - Cleaning.
 - 3. Record drawings and specifications shall be completed, signed, and submitted to VTA as specified in Section 01 78 39 - Project Record Documents.
 - 4. Operating instructions for equipment shall be properly mounted and posted as specified in Section 01 78 23 - Operation and Maintenance Data.
 - 5. FF Guaranties and warranties shall be submitted to VTA, as specified in the General Conditions and various sections of the Specifications, along with required operations and maintenance manuals as specified in Section 01 78 23 - Operation and Maintenance Data.
- E. Contractor shall be represented by its principal superintendent and such Subcontractors and Suppliers as may be necessary to answer the questions of VTA's inspection team.
- F. Certain elements of the Work, such as mechanical and electrical work, may be scheduled separately at appointed times in order to keep the preliminary inspection more focused and the number of persons in VTA's inspection team to a minimum.

**Hamilton Station Stabilization
C20046F**

- G. From the information gathered from this inspection, VTA will prepare a punch list of work to be performed, corrected, or completed.
- H. All work on the punch list shall be completed by Contractor prior to requesting the final inspection.

1.04 FINAL INSPECTION

- A. When all requirements of the above prepared punch list have been completed, Contractor shall request the final inspection to determine eligibility for issuance of the Certificate of Substantial Completion.
- B. The request shall be made in writing, addressed to VTA, at least seven days in advance of the requested date of the final inspection.
- C. Contractor shall be represented by its principal superintendent and such subcontractors and suppliers as may be necessary to verify the completion of the Work including punch list items.
- D. Depending on the extensiveness of the punch list items, certain elements of the Work may be scheduled separately for final inspection at appointed times.
- E. If the Work has been substantially completed in accordance with the Contract Documents, and only minor corrective measures are required, VTA will recommend that VTA issue a Certificate of Substantial Completion, based upon Contractor's assurance that remaining corrective measures will be completed within the shortest practicable time period. VTA will attach a corresponding punch list to the Certificate of Substantial Completion. A fixed schedule for such corrective measures shall be submitted to VTA, for approval.
- F. If the Work has not been substantially completed in accordance with the Contract Documents, and corrective measures are still required, a new punch list will be prepared by VTA, based on the information gathered from the final inspection, and Contractor will be required to complete this work and then call for another final inspection, following the procedure outlined above.
- G. The date of the Certificate of Substantial Completion will establish the completion date of the Work, or portions thereof as specifically referenced in the Certificate, for determining liquidated damages.

1.05 ACCEPTANCE OF THE WORK AND FINAL PAYMENT

- A. Upon completion of the Substantial Completion punch list items, VTA will recommend that VTA formally accept the Work.
- B. Acceptance of the Work will be made in accordance with Section 7.55 of the General Conditions. Final payment will be made in accordance with Section 7.62 of the General Conditions.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 77 00

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Post operating instructions.
- B. Manual description.
- C. Submittal requirements.
- D. Submittal of final Operation and Maintenance (O&M) Manuals.
- E. Liquidated damages in regard to O&M Manual submittals.
- F. Off-the-Shelf Equipment Manuals.
- G. Native electronic file format for System Manuals
- H. Format and technical content for System Manuals.
- I. Printed Manual requirements.
- J. Electronic version of Manual (eManual) for System Manuals.
- K. Manual revision control.

1.02 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

1.03 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. ANSI Y14.5 – Geometric Dimensioning and Tolerancing Standards
 - 2. ANSI Y32.2 - Graphic Symbols for Electrical and Electronics Diagram

1.04 POSTED OPERATING INSTRUCTIONS

- A. Provide, where directed, printed sheets under framed clear acrylic plastic, giving brief, concise operating and maintenance instructions for all items of mechanical and electrical equipment and similar equipment and specialty items, as applicable, at their respective locations.

**Hamilton Station Stabilization
C20046F**

1.05 OPERATION AND MAINTENANCE MANUAL DESCRIPTION

- A. Manuals shall be provided for all equipment and systems furnished under the Contract that require maintenance, operation, or modification including testing and training equipment. Manuals shall also be provided for other items, such as finishes, when specified in the Contract Specifications. Provide Manuals for each item of equipment and its component parts.
- B. Prepare Manuals in English.
- C. Manuals will be subject to revisions, updates, and other alternations as determined by VTA.
- D. Manuals shall be provided in one of the three following formats:
 - 1. Off-the-Shelf Equipment Manuals shall be provided for off-the-shelf items. Such equipment includes sub-assemblies and components that will be replaced instead of repaired or has no need for modifications, drawings, or manual revisions. Off-the-Shelf Equipment Manuals shall conform to the requirements specified in Articles 1.07, 1.08, 1.09 and 1.10 herein.
 - 2. System Manuals shall conform to the requirements specified herein. System Manuals shall be provided whenever stipulated in the Contract Specifications. Typically, such systems and equipment will include systems and equipment which have been specifically built for VTA and which require repairs and modifications beyond the scope of manufacturer's pre-existing operation and maintenance instructions. Systems Manuals shall be VTA specific and not include copies of manufacturer's operation and maintenance instructions and catalog cuts. Submit manufacturer's operation and maintenance instructions, if required, separately. System Manuals shall conform to the requirements specified herein with the exception of Article 1.10.
 - 3. Manuals for Elevators: Manuals containing manufacturers' operation and maintenance instructions and catalog cuts are acceptable for elevator manuals provided the manuals meet the technical content requirements set forth in Article 1.12 in addition to the requirements specified for Off-the-Shelf Equipment Manuals.
- E. Instructions and manuals from suppliers of VTA-furnished equipment will be furnished to Contractor.

1.06 SUBMITTALS

- A. Reserved
- B. Submit 2 sets of hard copy originals for review of each draft manual and for VTA's use of each final approval manual. For System Manuals, concurrently submit electronic media samples in native electronic file format with submittal of each draft and final approved manual with the exception of the Outline.
- C. System Manuals shall be submitted in accordance with the following requirements:
 - 1. Submit Outline, Complete Draft, and Pre-Final submittals for review before submitting final version.
 - a. Outline – Submit manual layout, sections and headings after final design of system or equipment has been approved.
 - b. Complete Draft – Submit all text and illustrations. Sample of binder and electronic files prior to first delivery of system or equipment.
 - c. Pre-Final – Submit complete manual in accordance with criteria specified herein.

**Hamilton Station Stabilization
C20046F**

2. Pre-Final O&M Manual Review: Submit for approval prior to final acceptance tests for the particular system or equipment and no later than 30 days prior to initial training course for VTA personnel.
 - a. Information gathered during final acceptance testing and training courses shall be used to develop final draft version of the manual.
- D. Off-The-Shelf Equipment Manuals:
 1. Submit draft Manual for review prior to initial delivery of particular equipment.
 2. For elevator Manuals prior to submittal of draft Manual, submit and obtain approval of the proposed Table of Contents including chapter numbers and titles.
- E. One set of each manual will be returned to Contractor, marked with review-stamp- action-block marks.
- F. Any non-compliant portions of the manual will be noted in the manual or otherwise communicated to Contractor in writing by VTA.
- G. Revise manual returned to Contractor marked “NOT APPROVED” and resubmit 6 sets for review within 30 days. If VTA returns a manual to Contractor that is marked “Approved” or “Approved as Noted”, make any noted corrections and submit copies of manual to VTA in its final printed form.

1.07 SUBMITTAL OF FINAL OPERATION AND MAINTENANCE MANUALS

- A. Schedule: Submit final manuals no later than 30 days following the satisfactory completion of acceptance tests for the subject system or equipment.
- B. The requirements specified in this Article apply to both System and Off-the-Shelf Equipment Manuals.
- C. Submission of each Manual (except for Off-the-Shelf Equipment Manual) in its final form shall include two CD-ROMS of the electronic version (eManual) along with all native electronic files required to create the submitted Manual. Electronic files shall include a matrix or document showing how the files are set up and how to access them. Include no extraneous files.

1.08 LIQUIDATED DAMAGES IN REGARD TO O&M MANUAL SUBMITTALS

- A. Failure of Contractor to obtain approval within the required schedule of milestones for manuals will make Contractor liable for liquidated damages. Liquidated damages are specified in the Contract Specifications Section 01 11 00 – Summary of Work.

1.09 OFF-THE-SHELF EQUIPMENT MANUALS

- A. Obtain through VTA a book number assigned by VTA for each manual.
- B. Manuals shall consist of a legible copy of the manufacturer’s operating instructions and other operation and maintenance information available from the manufacturer.
- C. Manuals shall include legible copies of manufacturer’s catalog cuts with specific items bubbled or clearly marked with arrows. When it would be clearer to cross-out irrelevant portions of a page, neatly cross-out irrelevant information using a straight-edge. Manuals shall include catalog pages, manufacturer’s pre-printed maintenance and operations instructions, wiring diagrams, parts lists, warranty slips, and manufacturer’s certificates, as applicable and as required by VTA.

**Hamilton Station Stabilization
C20046F**

- D. Manuals shall contain a Table of Contents that reflects all procedure numbers, page numbers, figure numbers, and tables, as well as the volumes, chapters and/or sections of each manual.
- E. Divide each chapter or section of the manual using divider pages that comply with the requirements specified in Article 1.13 herein.
- F. Manuals for HVAC, Plumbing and Fire Protection equipment shall list the following information:
 - 1. Equipment identification
 - 2. Make and model
 - 3. Location of equipment
 - 4. Filter sizes and quantities
 - 5. Service and dealer directory including the authorized dealer name, phone number, address, email address, and web site for each piece of equipment.
 - 6. Valve directory including the valve number, type, size, location and function.
 - 7. Damper certification and verification.
 - 8. Domestic water system cleaning and disinfection test results and report.
 - 9. Air and water system balance reports.
 - 10. Controls operation and maintenance data with wiring diagrams.
 - 11. Approved seismic restraint inspection report, certified by professional licensed Seismic Engineer or approved representative.
 - 12. Warranties: Submit effective date, expiration date, extent of warranty, name and contact information of firm providing warranty.
- G. Binders for each Manual shall comply with the requirements specified in Article 1.13.

1.10 NATIVE ELECTRONIC FILE FORMAT FOR SYSTEM MANUALS

- A. The native electronic file formats are the programs used to create the Operation and Maintenance Manual.
- B. Text pages shall be created using MS Word, latest release in use by VTA.
- C. Parts Lists created for Chapter 7, titled “Illustrated Parts Catalog” (all Volumes), shall be created using MS Excel, latest release in use by VTA.
- D. Illustrations and drawings, including technical illustrations, shall be created using AutoCAD, latest release in use by VTA, in accordance with the Contract Drawings CADD Requirements in the Appendices/VTA Standards. Contract Drawing CADD Requirements Appendix is available upon request.
- E. Text pages containing illustrations shall have the AutoCAD files inserted into the MSWord file as an object. AutoCAD files shall have a white background.

**Hamilton Station Stabilization
C20046F**

1.11 FORMAT AND TECHNICAL CONTENT FOR SYSTEM MANUALS

A. Each Manual shall meet the following requirements:

1. Be developed in conjunction with maintainability requirements.
2. Be organized so that each major subsystem is treated as an integrated system and not as a grouping of disassociated parts.
3. Contain data required to maintain equipment during equipment service life.
4. Contain data required to operate and maintain test equipment during equipment service life.
5. Contain no extraneous information, such as advertisements or company or manufacturer's logos. Any reference to the manufacturer or contractor, other than necessary references to the equipment in the text, is considered advertisement. Manufacturer or contractor's name must not appear in the page titles, headers, footers or anywhere else in the document.
6. Contain all operating instructions. If required, provide a separate operating manual.
7. Drawings and illustrations shall include details necessary for the installation, maintenance, and repair of equipment provided.

B. Numbering and Content Minimum Requirements:

1. Obtain through VTA a book number assigned by VTA for each Manual.
2. Each Manual shall be composed of one or more volumes titled and organized by subject matter. Each volume may be contained in one or more binders, if necessary, and shall be designated accordingly (i.e. Volume 1A, Volume 1B, Volume 1C, etc.). Manuals for complex, multi-component systems may be organized into volumes with each volume covering a subsystem or component of the greater system. Multiple volumes shall be used when specified in the Contract Specifications, when required by VTA, or when proposed by Contractor and accepted by VTA.
3. Each volume shall be consecutively numbered (i.e. Volume 1, Volume 2, Volume 3, etc.).

C. Manual (or Volume in the case of multi-volume Manuals) shall contain a Table of Contents and be organized into nine specific chapters as outlined herein.

1. Chapter 1 – General Information and Specification
2. Chapter 2 – Theory of Operation
3. Chapter 3 – Troubleshooting
4. Chapter 4 – Primary Repair
5. Chapter 5 – Secondary Repair (Component Level)
6. Chapter 6 – Preventive Maintenance
7. Chapter 7 – Illustrated Parts Catalog
8. Chapter 8 – Miscellaneous
9. Chapter 9 – Wiring Diagram

**Hamilton Station Stabilization
C20046F**

- D. Table of Contents shall reflect procedure numbers, page numbers, figure numbers, and tables, as well as the volumes, chapters, and sections of each manual, as applicable. Table of Contents shall list and contain the following:
1. Chapter titles
 2. Section titles
 3. Sub-section titles and corresponding page numbers
 4. Drawing titles, numbers and corresponding page numbers
 5. Figure titles, numbers and corresponding page numbers
 6. Table titles, numbers and corresponding page numbers
 7. Procedure numbers and corresponding page numbers.
- E. Each chapter shall have a Table of Contents which include the following:
1. Section Titles
 2. Sub-section titles and corresponding page numbers
 3. Drawing titles, numbers and corresponding page numbers
 4. Figure titles, numbers and corresponding page numbers
 5. Table titles, numbers and corresponding page numbers
- F. Chapters shall comply with the following requirements:
1. Chapter 1 – “General Information and Specifications”
 - a. A “List of Acronyms and Abbreviations” in the form of a table.
 - b. General non-technical description of equipment, including interface relationships and general functions.
 - c. Pictorial views of the subassembly components and parts described.
 - d. Tables listing the performance specifications of equipment.
 2. Chapter 2 – “Theory of Operation” shall provide a technically detailed description of equipment, by subsystem, including:
 - a. Location of parts in subassembly or component being discussed.
 - b. Location, function, and operation of pertinent controls, gauges, indicators, and switches.
 - c. Subsystem setup and shutdown procedures
 - d. Trouble symptoms and first-response diagnostic methods.
 - e. Emergency procedures and safety requirements.
 - f. Electrical wiring diagrams, electronic schematics, and mechanical configurations.

**Hamilton Station Stabilization
C20046F**

- g. Block diagrams of provided subsystems, signal flow diagrams, including interface connections to other subsystems.
 - h. Applicable charts, figures and drawings to be located at the end of text for each subsystem.
- 3. Chapter 3 – “Troubleshooting” shall contain:
 - a. Necessary information for troubleshooting and fault isolation.
 - b. Charts and tables as applicable listing symptoms and probable causes of improper operation or failure of subsystem and probable remedies.
- 4. Chapter 4 – “Primary Repair” shall contain the following information to allow maintenance to be performed at equipment location site:
 - a. Detailed corrective maintenance procedures to be performed on equipment shall include particulars on testing alignment, adjustment and tuning. Include detailed views of mechanical parts or schematics for tests.
 - b. Step-by step procedures of installation and removal of components and subassemblies (field replaceable units).
 - c. Procedures for use of special test equipment.
 - d. Warning and caution notes as required.
 - e. Applicable charts, figures, and drawings to be located at the end of text for each subsystem.
- 5. Chapter 5 – “Secondary (Component) Repair”, shall contain the following in regard to maintenance to be performed in a shop other than equipment location site:
 - a. Detailed corrective maintenance procedure to be performed on subassemblies and components shall include particulars on testing alignment and tuning. Include detailed views of mechanical parts or schematics.
 - b. Step-by-step procedures for installation and removal of parts in assemblies and components.
 - c. Procedures for use of special test equipment.
 - d. Incorporate warning and caution notes, as required.
 - e. Applicable charts, figures and drawings to be located at the end of text for each subsystem.
- 6. Chapter 6 – “Preventive Maintenance”, shall contain:
 - a. Preventive maintenance procedures, schedules, and tables including lubrication requirements and frequency of application.
 - b. Inspection and maintenance standards, including wear limits, settings, tolerances, and criticality of tolerances.
 - c. Storage instructions for spare parts, special tools and test equipment.

**Hamilton Station Stabilization
C20046F**

7. Chapter 7 – “Illustrated Parts Catalog”, shall contain:
 - a. Instructions for use of Illustrated Parts Catalog.
 - b. Index by subassembly.
 - c. Illustrations which are exploded views of assemblies, components, and parts with leader lines and circled callout numbers to each item.
 - d. Detailed Parts List, including:
 - 1) Figure Number
 - 2) Part index number, not to exceed 19 alphanumeric characters
 - 3) Description of part, including manufacturers and vendor’s part number
 - 4) Equivalent parts available from other manufacturers.
 - 5) Disposition of part (repairable, non-repairable, etc.)
 - 6) Quantity required per assembly
 8. Chapter 8 – “Miscellaneous”, shall contain information that is deemed inappropriate for any other chapter including descriptive brochures, manufacturer’s certificates and warranty slips.
 9. Chapter 9 – “Wiring Diagrams”, shall contain:
 - a. Applicable electrical, electronic, pneumatic, and schematic diagrams.
 - b. Wiring diagrams, including wire color code, size, and rating; terminal and connector pin numbers; and plug and socket numbers.
 - c. Pin-to-pin description of each wire, using wire-marking format. Additionally, wires at each terminal block and each connector shall be independently identified and cross-referenced at the next terminating point.
 - d. Diagram size in accordance with that previously stated in these specifications.
- G. Front Cover Page Specifications
1. Front cover page shall be on white bond paper, 8.5” x 11”, 60-pound minimum.
 2. VTA will provide artwork for the front cover page. Artwork will include VTA’s logo artwork, title of the manual, book number, volume, username, issue date, and VTA’s name, address and phone number.
 3. Reproduce provided artwork.
- H. Paper, Page Layout and Page Numbers
1. Paper used for text and drawings shall be 40-pound bond grade paper. All pages, except for drawings, shall be 8.5 x 11 inches, portrait style. Drawing pages shall be 8.5 x 11 inches or 11 x 17 inches.
 2. Pages shall be 3-hole punched.
 3. Pages shall be printed double-sided except 11 x 17 inch drawings.
 4. Left, right and top margins shall be set at one inch from edge of page; Last line of body text shall be set 1.5 inches from bottom of page; last line of footer text shall be set 0.75 inch from bottom of page.

**Hamilton Station Stabilization
C20046F**

5. Page numbering depends on the size of the manual. Larger manuals shall be broken up into volumes and have sectional page numbers while smaller ones may be in chapters and sections, and have sequential page numbers (1, 2, 3).
 6. As a general rule, number pages Chapter-Section-Page. If the chapters are not broken down into sections, number pages Chapter-Page. Any drawings or illustrations within each chapter shall have figure numbers, also reflecting Chapter-Section-Figure. The same applies for tables.
 7. The page number shall appear at the bottom of the page with the book number on the first line, the volume number (if applicable) on the next line and the page number on the last line. Example: Book 50, Volume 10, Page 4-9-1. If the book does not have a volume number, the book number shall appear first, the chapter number shall appear on the next line and the page number on the last line.
 8. For double-sided pages, the book, volume, chapter and page numbers shall appear at the bottom of the page, alternately, beginning on the right side for the first and odd- numbered pages of each chapter or section, and the left side for the even-numbered pages. If the book is printed one-sided, the numbers shall appear on the bottom, right- hand corner of each page.
 9. The revision date shall appear at the bottom center on all pages with Rev. and the month (first three letters) a forward slash, and the year (last two numbers). Example: Rev. Dec/94.
 10. New sections and chapters shall begin on a right-hand facing page. At the end of each chapter or section if there is a blank left-hand page, print on the left-hand page, "This page intentionally left blank," in whatever font style the body text of the document is.
 11. Fan-fold 11 x 17 inches pages to 8.5 x 11 inches. For pages larger than 8.5 x 11 inches, display page identification on last fold of folded page so as to be readable without unfolding.
 12. Each 11 x 17 inch illustration shall be considered as one page. There shall be no double page numbering (Example: Page 11/12).
- I. Font and Paragraph Layout: Samples will be provided upon request.
1. Body text shall be 10 pt. Arial font, except as otherwise specified.
 2. Body text shall be left justified, ragged right and single-spaced, with 12 pt separating paragraphs.
 3. Titles and first level headers shall be 10 pt. Arial, unless otherwise specified, bold and all caps. Second level headers or subheadings shall be 10 pt. Arial, bold, and upper and lower case.
 4. Titles of procedures shall be all caps, bold, and centered on the page.
 5. Bullets:
 - a. First level bullets shall be solid style and indented once under margin of last level text, with one space between bullet and beginning of text.
 - b. Next level bullets (used when listing information below a bullet) shall be dash style and indented twice with one space between dash and beginning of text.
 6. Indents shall be 0.5" (five spaces).
- J. Notice Messages:
1. Notice Messages: Warnings, Cautions and Notes are notice messages. They shall all be in bold type with no lines or borders around them. Notice messages shall be formatted as follows:

**Hamilton Station Stabilization
C20046F**

- a. “WARNING!” is the most important. It denotes something that is life threatening or can severely damage the equipment or system if the procedure is not followed properly. Warnings shall be in all caps, bold, two points larger than the regular body text, and flush with the section in which they appear. Warnings shall end with an exclamation point.
- b. “CAUTION:” is used when injury or equipment damage can occur if procedure is not followed properly. Cautions shall be all caps, bold, indented, two points larger than the regular body text, and flush with the section in which they appear. Cautions shall end with a colon.
- c. “Note:” flags important information. Notes shall be bold, two points larger than the regular body text, and in upper and lower case. Notes shall be indented under margin of last level text (but not underlined).

K. Technical Illustrations:

- 1. Draw illustrations, including “exploded” views and illustrated part breakdowns. Utilize illustrations to facilitate descriptions of assemblies and the relationships of components, subsystems, and systems. Illustrations shall conform to the requirements and the recommendations of referenced ANSI Standards.
- 2. Technical illustrations shall comply with the following requirements:
 - a. Illustrations shall include details necessary for the installation, maintenance and repair of all equipment provided.
 - b. Each illustration shall be designated as a “figure”. The word "Figure," accompanying numerical designation and caption shall be the same size, style, and type as the written text. Its physical location shall be the same on each page.
 - c. Figure numbers and descriptions of figures shall be readable in the horizontal position as you read the page from left to right.
 - d. Figures containing graphics, illustrations, diagrams, and similar drawings, shall appear at the end of the applicable section or procedure.
 - e. Pages containing illustrations, charts and tables shall be size 8-1/2 x 11 inches or 11 x 17 inches (fan-folded to 8-1/2 x 11 inches). Pages which are 11 x 17 inches shall be landscape style. These also include Chapter 9 drawings.
 - f. Folded sheets shall display identification on last fold, readable without unfolding.
 - g. Whenever callout numbers are used in an illustration, they shall be circled.
 - h. Graphic symbols used for electrical and electronics shall conform to ANSI Y32.2.
 - i. Graphic symbols used for logic diagrams shall conform to ANSI Y14.5.

L. Revisions to Text and Drawings:

- 1. Revisions shall be made for design changes, retrofits, and errors as required, and based upon changes generated during testing. These revisions shall be listed on a List of Effective Pages to be issued with each review submittal and revision of the manuals until expiration of the Contract.
- 2. Include at the beginning of each completed manual or volume, a Configuration Control Record form adhering to the format provided by VTA. Form shall include columns for the chapter, page number, BECO number, revision number, revision date, and revision description.

**Hamilton Station Stabilization
C20046F**

3. Refer to Article entitled "Manual Revision Control" herein for revision requirements applicable to revisions to final draft and approved manuals.

1.12 PRINTED MANUAL REQUIREMENTS

A. Binder Specifications:

1. Manuals shall be bound in three-ring, O-ring binders, ranging in thickness from one to three inches depending on the size of each volume. If VTA accepts use of binders with a thickness greater than 3 inches, binders shall be heavy-duty type acceptable to VTA. Binders shall be white in color and have clear plastic slip-in pockets on cover and spine. Cover material shall be virgin vinyl .014 ga. inside and out, sealed over 120-point chip board with serrated hinges. Binders shall be durable and capable of long-time service in maintenance shop environment. Covers shall be oil, water, and wear resistant. Rings must not bend or misalign under normal shop conditions and should be able to hold contents without bending or misaligning. Binder rings shall be manufacturer's standard diameter designed to accommodate standard three-hole punching. Binders shall contain front and back plastic sheet lifters.
2. VTA will provide artwork for front cover and spine. Label cover and spine with slip- in printed sheets in accordance with format provided by VTA. Artwork for front cover and spine will include the name of the manual, volume, book number printed in a visible location. Artwork will include VTA's name and address printed in the lower left-hand corner of the cover. Artwork on spine shall begin one inch from top of spine.
3. Maximum size of binders shall be 11.5 inches high and 11 inches wide.
4. Binders shall accept 8.5 x 11 inch pages.
5. Manuals shall lie flat when opened. Pages must not bind or join when turned for normal reading.
6. Manuals shall allow enough space for insertion of revised pages.

B. Divider Page Specifications: Each chapter including the table of contents shall have divider tabs. The chapter number and title shall be printed on both sides of the tab.

1. Divider pages with tabs shall be white in color, 8.5 x 11 inches in size, card stock, and three hole punched for ring binders. Holes shall be reinforced with a strip of mylar.
2. Tabs shall be white in color with 3/8 inch extension with rounded corners and shall comply with the following requirements:
 - a. Have bold capital letters, Arial font, using black ink and printed on both sides.
 - b. Slide-in type tabs are not acceptable.
3. Sample of divider tab will be available upon request.

C. Final Assembly: All hard copies shall be printed out, assembled, and placed in binders. Each volume (if applicable) or book shall be assembled in the following order:

1. The first section for each volume or book shall contain the cover sheet for that volume/book, the VTA Configuration Control Record for that volume/book and the master Table of Contents listing all of the chapters for the entire volume/book. When a volume is contained in more than one binder, each binder shall include a cover sheet, and master Table of Contents for the entire volume/book.

**Hamilton Station Stabilization
C20046F**

1.13 ELECTRONIC VERSION OF MANUAL (eManual) FOR SYSTEM MANUALS

- A. The eManual shall be created from the native electronic files, as specified in Article 1.11 entitled “Native Electronic File Format”, using Adobe Acrobat, (latest release in use by VTA).
- B. Each item listed in the Table of Contents shall hyperlink to the corresponding sub-section, drawing, figure, or table.
- C. The Table of Contents shall have Bookmarks to all corresponding pages.
- D. Any references to Figures or Tables within text pages shall be hyperlinked to the referenced document(s).
- E. In Chapter 7, entitled “Illustrated Parts Catalog”, each item number callout in the illustration will be linked to the corresponding sub-assembly or line item number listed in the Parts List.
- F. Link properties shall be as follows unless otherwise noted or approved by VTA:
 - 1. Type: Invisible Rectangle
 - 2. Highlight: None
 - 3. Action Type: Go to View
- G. All Chapter PDF files for each Volume shall be on the same CD. The CD shall be labeled according to the book number, book title, volume number, volume title, and creation date.

1.14 MANUAL REVISION CONTROL

- A. Revisions of final draft and approved Manuals shall be listed on a Configuration Control Record form in the front of each Manual. The list shall be issued with each revision and shall show the date of each revision and the page reference.
 - 1. Contractor shall maintain updated lists and revisions in the Manuals until the warranty period expires. Revisions shall be prepared prior to the arrival of altered components, and as soon as possible after procedures are changed or errors are found.
 - 2. Contractor shall provide revisions to the approved Manuals on a not less than quarterly basis during the first 12 months after the final Manuals are delivered, and then on a not less than semi-annual basis for the duration of the warranty period.
 - 3. Contractor shall issue revisions related to major alterations of principal subsystems or assemblies prior to the arrival of components.

END OF SECTION 01 78 23

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A. Maintenance of Record Documents.
- B. Drawings.
- C. Specifications.
- D. Submission of documents.

1.02 MEASUREMENT AND PAYMENT:

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of Work to which they pertain and no separate payment will be made therefor.

1.03 MAINTENANCE OF RECORD DOCUMENTS:

- A. Contractor must maintain at the jobsite one copy of the following documents for record purposes:
 - 1. Conformed Contract Plans. One set of full size 22 by 34-inch prints shall be maintained for recording "as-built" revisions and special features, and shall be identified as project record drawings.
 - 2. Conformed Contract Specifications.
 - 3. Change Orders.
 - 4. Approved Submittals.
 - 5. Design Change Notices (DCNs)
 - 6. Request for Information (RFIs)
 - 7. Inspection Reports.
 - 8. Laboratory Test Records.
 - 9. Field Test Reports and Records.
 - 10. Factory Test Reports and Records.
- B. Contractor must maintain for record purposes at a location approved by VTA, electronic files for those shop drawings and other documents which are required to be submitted electronically. Contractor must ensure that backups of electronic files are made on a regular basis and stored at a remote location.
- C. Contractor must store documents used for record purposes in Contractor's field office or other approved location, apart from documents used for construction. Contractor must not use project record documents for construction or fabrication purposes.

**Hamilton Station Stabilization
C20046F**

- D. Contractor must provide files and racks for storage of documents.
- E. Contractor must file documents in accordance with the filing format of the Technical Specifications, by Section number and title.
- F. Contractor must maintain documents in clean, dry, legible condition.
- G. Contractor must label each document "Project Record".
- H. Contractor must make documents available at all times for inspection by VTA. Make copies of electronic documents available upon VTA's request.

1.04 DRAWINGS:

- A. Record ("As-Built") Drawings:
 - 1. VTA will furnish Contractor a complete set of full-size (22" x 34") copies of the Contract Drawings for the purpose of making prints for Record ("as-built") Drawings.
 - 2. These drawings shall be kept up-to-date by Contractor and are required to be so certified by VTA at the time invoices are submitted for progress payments.
 - 3. Contractor must maintain record ("as-built") drawings of all work and subcontracts, continuously as the job progresses. A separate set of prints, for this purpose only, shall be kept at Contractor's field office at all times.
 - 4. Where the Contract Drawings are not of sufficient size, scale, or detail, Contractor shall furnish its own drawings for incorporation of details and dimensions.
 - 5. Contractor's QA/QC staff and the Resident will note and observe that Contractor is maintaining one annotated as-built set of all contract documents, shop drawings, permits, change orders, and submittals at a pre-determined site. All such documents shall be stamped "PROJECT RECORD DOCUMENTS". Moreover, Contractor must mark each sheet of the Contract Drawings and the cover of each Contract specification book with "PROJECT RECORD DOCUMENTS".
 - 6. During the course of construction, Contractor shall mark (i.e. red-line) copies of conformed drawings and specifications to record actual construction progress. These documents shall be maintained as the as-built set. All changes must be clearly identified with Change Order (CO), Request for Information (RFI), and/or Field Memo numbers, or other documents that cause as-built documents to be modified. Where more than one change is made in any area of the drawings, the sequence of changes shall be clearly identified graphically, by overlay or by marking a reproducible copy of the preceding changes. Overlays and or new reproducible copies shall be inserted into the as-built drawing set on top of the preceding red-lined construction drawing in a manner which shall preclude losing or damaging documents.
 - 7. Contractor shall legibly record changes concurrent with the construction progress on a weekly basis, at a minimum. No work shall be covered or concealed (e.g. underground) prior to the changes being recorded. In the event that contract documents are not updated, VTA may withhold part of Contractor's progress payments until the contract documents are updated to the satisfaction of VTA.
 - 8. Contractor shall red-line construction documents (drawings and specifications) to show as-built conditions, including field changes, which deviate from the initial conformed bid-issued set of contract documents. The location, elevation, and dimensions of each underground or otherwise concealed structure, utility, abandoned cut-off pile, abandoned tieback, subsurface obstruction, and appurtenance not shown on the contract plans or where elevations and dimensions vary from

**Hamilton Station Stabilization
C20046F**

those indicated on the contract plans shall be clearly marked. Reference locations and elevations to permanent surface features shall also be included.

9. Contractor must use red felt-tip pens to clearly mark up as-built documents. Transparent inks are not allowed.
10. Red-lined construction drawings shall be on full-size (560mm x 860mm) (22" x 34") paper bond media.
11. All changes shall be clearly indicated with a bubble (revision cloud) and an adjacent triangle containing a revision number on the most current drawing and checked against the drawing control log. A current Drawing Control Log shall be maintained to facilitate efficient tracking of drawing changes.
12. New drawings developed by Contractor, e.g. shop drawings and sketches, shall also be included in the as-built drawings set and must meet the following requirements:
 - a. The drawing information must fit in a standard full-size sheet (560 mm x 860 mm) (22" x 34") including the border frame of the drawing.
 - b. The drawing and any design calculations or specifications shall be stamped and sealed by an engineer registered in California, complete with VTA's full signature and registration expiration date.
 - c. The company name, logo and the contract number shall appear on the drawing.
 - d. The drawing title, drawing number and sheet number is assigned by the Project Manager, except for Contractor shop drawings. The drawing title, drawing number and sheet number are to be included in the index. The drawings index shall reflect all drawings in the package.
 - e. New drawings shall be attached to the end of the drawings package.
13. COs shall be added and/or noted in the contract as-built drawings and specifications. References to COs, field memos, or RFIs will not be accepted as the sole description of the change. All changes shall be shown complete on the drawings.
14. When VTA issues COs (including Change Notices (CNs) and Design Change Notices (DCNs)), Contractor shall insert the revised drawings into the conformed set and mark the replaced drawing "SUPERSEDED". If revised half-size drawings are issued, Contractor shall place a revision cloud and a triangle with the revision number as well as the CO number in the revision block on the drawing. Revised half-size drawings shall be affixed to the back of the previous drawing in the drawing set. Both revision blocks (right and left side) on the drawing must match.
15. At Contract closeout and prior to final acceptance, Contractor shall submit to VTA a stamped, final, corrected, accurate and complete set of red-lined construction as-built drawings and specifications to show the actual work performed, installed, placed, erected, and applied. Each sheet of the as-built drawings and the cover sheet of the specification book shall be stamped with "PROJECT RECORD DOCUMENTS". Each set shall be initialed and dated by Contractor's representative responsible for maintaining the contract as-built documents and must also include a log of as-built changes in both hard copy and electronic file, and all relevant contract documents associated with changes to the as-built documents. These items shall be delivered to VTA with a Submittal Cover Letter.
16. Upon receipt of the final as-built documents from Contractor at Contract closeout, the Resident will review the documents for completeness against the VTA log of as-built changes and the VTA copy of red-lined construction contract documents. The Resident will thoroughly check the final submitted as-built documents to ensure that the following requirements have been met:

**Hamilton Station Stabilization
C20046F**

- a. One full-size set of red-lined construction drawings.
 - b. One set of red-lined project record specifications.
 - c. A log of as-built changes in both hard copy and electronic file format.
 - d. All contract documents associated with changes to the red-lined documents, e.g. COs, RFIs, DCNs, CNs, and Field Memos.
 - e. Any other contract documents that modified or added to the contract.
 - f. All pages of each document shall be stapled together. Documents shall be hole-punched, folded and secured in standard 2-inch (maximum), 3-ring binders. Each document shall be index tabbed and labeled by Document Type and Document Number (e.g. CO # 1) to facilitate filing and retrieval.
 - g. Each binder shall be clearly labeled to identify VTA Project Number, Contract Number, and consecutive CO numbers included in their respective binder. Each attachment which is affixed to the project record documents shall also be marked to identify the Contract Number, Document Type and Number, Drawing Number, and Date of Change, and stamped "ATTACHMENT TO PROJECT RECORD DOCUMENTS".
 - h. Items associated with a CO shall be index tabbed and filed directly after the respective CO, including CN or DCN documents. Index tabbed documents shall be organized in binders in order of ascending CO number.
 - i. Separate sections shall be reserved in the binders for items other items, including RFIs and Field Memos. Each section shall be organized in order of ascending document number.
 - j. Documents from other active VTA contracts which generate changes relevant to the as-built documents shall be stapled, hole-punched, folded, index tabbed and secured in binders as described herein. The index tabbed items shall be filed in the appropriate section of the binder.
 - k. Any voided or superseded documents, whether in part or in total, shall be labeled as such by clear "VOID" or "SUPERSEDED" markings.
 - l. Attachments and field notes added for construction purposes only which are not to be incorporated in the project record documents shall be clearly marked as "NOT FOR PROJECT RECORD DOCUMENTS".
 - m. Stamps required (e.g. "PROJECT RECORD DOCUMENTS", "ATTACHMENT TO PROJECT RECORD DOCUMENTS", "VOID", "SUPERSEDED", or "NOT FOR PROJECT RECORD DOCUMENTS") shall be provided by VTA.
- B. COs:
- 1. Changes to the Contract Drawings affected by COs shall be incorporated on the prints, and these changes shall be identified by CO number and effective date.
 - 2. When revised Contract Drawings are issued as the basis of, or along with, COs, these revised drawings shall be incorporated into the Record ("as-built") Drawing set with appropriate annotation. Drawings deleted by CO will not be part of the Record ("as-built") Drawing set. VTA will furnish Contractor with reproductions of such revised VTA-furnished Contract Drawings.
- C. Submittals:
- 1. One complete set of approved Submittals, including shop drawings, product data, manufacturers' printed catalog cuts and data, shall be collected and maintained for record purposes. One set of Final Record as-built prints showing no more than one change for the Signal System.
 - 2. Include Bill of Material for each system, list of spare parts, O&M Manuals, Software, Licenses etc. for each system as part of the submittal or deliverables.
 - 3. Pages of catalog cuts shall be clear, legible, and permanent. The drawings shall be on vellum or bond paper. Blueprints will not be acceptable. These drawings and catalog cuts shall become the property of VTA.

**Hamilton Station Stabilization
C20046F**

4. Submittals shall be filed and maintained separate from Contract Drawings. Shop Drawings shall be filed in 9 inch by 12 inch file folders to the greatest extent possible and shall be indexed.
 5. Submittals shall be delivered in new paperboard boxes manufactured for the storage of file folders. Boxes shall have covers and cutout handles, and shall be accurately identified as to the contents. Include a packing list of all boxes and their contents.
- D. Electronic Documents: Record (“as-built”) information, as applicable, shall be recorded on an electronic copy of those documents which are required to be submitted electronically.
1. Record documents for each submittal which was required to be prepared and submitted electronically shall include two CD-ROMs of the electronic version. Electronic files shall include a matrix or document showing how the files are set up and how to access them. Include no extraneous files.

1.05 SPECIFICATIONS

A. Contract Specifications:

1. The specifications for record purposes shall be filed in one or more large-ring, 3-ring binder or binders.
2. Information, changes, and notes shall be recorded in the specifications in blank areas, such as page margins or the backs of opposite pages, or on separate sheets inserted in the binder. All such information, changes, and notes shall be legibly recorded with red pen or red printing as appropriate.
3. In applicable specification sections, record the manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually furnished and installed, including manufacturer and supplier’s address and telephone number.
4. The record specifications shall be complete and shall include all applicable Contract Documents other than drawings.
5. Each section of the Contract as-built specifications must also be legibly red-lined by Contractor to reflect changes made by COs or field conditions. All changes to contract specifications must also be bubbled (revision clouds) with a triangle and a revision number. Tabs shall be placed on specification pages with changes.

B. COs:

1. COs shall be incorporated into the front of the record specifications in reverse chronological order. Use appropriate page dividers to identify COs and to separate COs from the Specifications.
2. In addition, changes to the Specifications effected by CO shall be legibly annotated on the affected page or pages of the Specifications or adjacent thereto.

1.06 SUBMISSION OF DOCUMENTS:

- A. At completion of the Work, and before requesting final inspection, deliver project record documents to VTA.
- B. For Record (“as-built”) Drawings, submit the blackline print (full size) with revisions incorporated on the prints in red ink. For those documents which are required to be maintained electronically, submit a half-size plot of drawings, full size hard copies of 8 1/2 by 11 inch documents, and electronic files on CD-ROM.

**Hamilton Station Stabilization
C20046F**

- C. Software:
1. Submit all documentation, licenses, and electronic media associated with the purchase of commercially available software furnished to VTA under this Contract. The documentation and media shall be submitted in appropriate storage containers or in the original media packaging.
 2. Where development of User's Guides is specified, User's Guides shall be submitted.
 3. Unless otherwise specified, documentation shall be prepared in accordance with recognized industry standards for such documentation as approved by VTA.
- D. Record documents shall be delivered neatly and efficiently filed and packaged in appropriate file boxes, 12 inches by 16 inches in size. Record ("as-built") drawings shall be folded correctly, with title block clearly visible on top, to fit neatly in the 12-inch by 16-inch boxes.
- E. Submission of project record documents shall be accompanied with a transmittal letter, in triplicate, containing the following information:
1. Date of submission.
 2. Project title and number.
 3. Contractor's name and address.
 4. Title and number of each record document. (Shop Drawings may be grouped in basic categories or divisions of work and by box identification).
 5. Certification that each document as submitted is complete and accurate.
 6. Signature of Contractor, or its authorized representative.
- F. Upon review and acceptance of Contractor-submitted and stamped project record documents, the Resident shall sign and date the stamp on the cover sheets of the drawings and specifications and include the contract completion date and the contract numbers. Upon acceptance, the Resident shall deliver the accepted project record documents to the VTA Surveying Department.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 78 39

SECTION 02 10 10

MAINTENANCE OF EXISTING FACILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for maintaining, reconstructing, resetting and adjusting existing facilities, and related incidental work.

1.02 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for maintenance of existing facilities will be by the unit-price method as determined by the listing of the bid items for maintenance of existing facilities indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Measurement: Maintenance of Existing Facilities will be measured for payment by the unit each.
- C. Payment: The Contract price paid for maintenance of existing facilities shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing, storing, resetting, adjusting, and reconstructing facilities, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA.

1.03 DESCRIPTION

- A. The work includes maintenance of existing facilities including removal, storage, protection, restoration for reconstructing, resetting, and adjusting facilities that are to remain.
- B. Do not perform work on an existing facility until the facility is no longer needed.
- C. Reconstructed facilities must comply with the design of and be equal to the best parts of the existing facilities.
- D. Reconstruction work must comply with the specifications for new work of similar character.

1.04 SUBMITTALS

- A. Removal, Storage, Protection, and Construction Plan: Submit for review, a removal, storage, protection, and construction plan for facilities that are to be removed and reconstructed. Indicate methods to be employed for performing the work including sequence, equipment, procedures, protection. Also indicate location of temporary storage for facilities that are to be removed and reconstructed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide temporary or permanent materials as required for the proper execution of the Work in this Section.

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 RECONSTRUCT EXISTING FACILITIES

A. Reconstruction:

1. Remove, disassemble, store, and construct at the original or new location, as shown on the Contract Drawings.
2. Provide new parts or alteration to the existing facility as required to reconstruct.
3. Protect facilities removed and stored for reconstruction from damage during removal, disassembly and final reconstruction. Repair or replace any damaged facilities.

B. Existing facilities to be reconstructed:

1. Sign post
2. Trash receptacle
3. Emergency phone stanchion
4. Ticket vending machine
5. Information kiosk
6. Shelter bench
7. Translink CID
8. Plastic bollards Set

END OF SECTION 02 10 10

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Inspection
- B. Demolition
- C. Cutting
- D. Salvaging
- E. Disposal of debris
- F. Restoration of existing structures and facilities
- G. Field Quality Control

1.02 RELATED SECTIONS

- A. Temporary facilities, such as fences, barricades, warning lights, and other temporary safety measures, are specified in the various Division 01 – General Requirements Technical Specifications. Provide such additional temporary facilities as may be required to facilitate continuous station or building operations during transitional construction work.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for selective structure demolition will be by the lump-sum method as determined by the listing of the bid item selective structure demolition indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Lump Sum: If the Schedule of Quantities and Prices of Bid Form 1 indicates a lump-sum for selective structure demolition, then selective structure demolition will be measured for payment by lump sum, acceptably performed and completed.
 - 1. Payment:
 - a. Selective Structure Demolition (Platform): The lump sum price paid for performing selective structure demolition at the existing station platform to the limits shown on the Contract Drawings shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removal and disposal of existing station platform concrete, complete in place, as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.

1.04 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A10.6 Safety Requirements for Demolition Operations

**Hamilton Station Stabilization
C20046F**

1.05 REGULATORY REQUIREMENTS

- A. In addition to the foregoing referenced standards, the regulatory requirements which govern the work of this Section include the following governing codes:
1. California Code of Regulations (CCR), Title 8, Chapter 4, Subchapter 4, Construction Safety Orders.
 2. California Code of Regulations (CCR), Title 24, Part 2, California Building Code, Chapter 33, "Site Work, Demolition and Construction."

1.06 DESCRIPTION

- A. The station involved in this work will be in operation intermittently during the construction period. See Division 1 specifications for limits of station non-operation.
- B. The railroad will be in operation during the construction period expect as noted in Division 1 specifications.
- C. The work includes restoration of existing structures and facilities to remain in place during construction that are damaged by demolition and removal operations.

1.07 PERMITS:

- A. Contractor shall obtain all special permits and licenses and give all notices required for performance and completion of the selective demolition and removal work, hauling, and disposal of debris.

1.08 SUBMITTALS

- A. General: Submittals for selective structure demolition shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
1. Submittals shall be made to VTA for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Selective Demolition Plan: Submit a comprehensive selective demolition plan, describing the proposed sequence, methods, and equipment for demolition, removal, and disposal of structure(s); include salvage if required. Do not proceed with demolition work until VTA has approved the selective demolition plan.
- C. Permits: Submit copies of demolition, hauling, and debris disposal permits and notices for record purposes. Include description of proposed haul routes.
- D. Utility Severance Certificates: Provide certificates, issued by the utility owners, of severance of utility services for record purposes.
- E. Private Property Owner's Release: If material demolished and removed from the site will be deposited on private property, submit two copies of written release not more than 15 days before the start of work. Releases shall absolve VTA from responsibility in connection with the depositing of material on private property and shall be signed by the owners of such property on which the material will be deposited.
- F. Record Documents: Provide copies of all approved submittals, specified herein, for record purposes in accordance with the requirements of Section 01 78 39 - Project Record Documents.

**Hamilton Station Stabilization
C20046F**

1.09 SITE CONDITIONS

- A. Protection of Persons and Property: Erect and maintain temporary bracing, shoring, lights, barricades, baffles, curtains, signs, and other measures as necessary to protect the public, workers, and adjoining property from damage from demolition work, all in accordance with applicable codes and regulations.
- B. Protection of Utilities:
1. Protect active sewer, water, gas, electric, and other utilities; and drainage and irrigation lines indicated or, when not indicated, found or otherwise made known to Contractor before or during demolition work. If utility is damaged, immediately notify the utility owner for corrective action.
 2. Arrange with and perform work required by utility companies and municipal departments for discontinuance or interruption of utility services due to demolition work.
- C. Noise and Dust Abatement: Comply with the following:
1. Provide continuous noise and dust abatement as required to prevent disturbance and nuisance to the public and workers and to the occupants of adjacent premises and surrounding areas. Dampen or cover areas affected by demolition operations as necessary to prevent dust nuisance.
 2. When a certain level of noise is unavoidable because of the nature of the work or equipment involved, and such noise is objectionable to the occupants of adjacent premises, make arrangements with the authorities having jurisdiction to perform such work or operate such equipment at the most appropriate time periods of the day. Provide abatement measures to the extent feasible and practicable.
- D. Unknown Conditions:
1. The Contract Drawings and related documents may not represent all surface conditions at the site and adjoining areas. The known surface conditions are as indicated and shall be compared with actual conditions before commencement of work.
 2. Existing utilities and drainage systems are located from existing documents and from surface facilities such as manholes, valve boxes, area drains, and other such surface fixtures.
 3. If existing active services encountered are not indicated or otherwise made known to Contractor and interfere with the permanent facilities under construction, notify VTA in writing, requesting instructions on their disposition. Take immediate steps to ensure that the service provided is not interrupted, and do not proceed with the work until written instructions are received from VTA.

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, AND FACILITIES

- A. Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities, and services as required for performing the selective demolition and removal work.
- B. Materials forming portions of the structure indicated to be removed shall become Contractor's property, and Contractor shall be responsible for their removal from the site.

PART 3 EXECUTION

3.01 INSPECTION

- A. Prior to starting selective demolition operations, perform a thorough inspection of the premises, and report to VTA any defects and structural weaknesses of existing construction and of improvements to remain.

**Hamilton Station Stabilization
C20046F**

- B. Examine areas affected by the Work of this Section and verify the following conditions:
 - 1. Disconnection of utilities as required.
 - 2. That utilities serving occupied portions of adjacent or surrounding facilities will not be disturbed, except as otherwise indicated.
- C. If unsatisfactory conditions exist, notify VTA, and do not begin demotion operations until such conditions have been corrected.

3.02 PREPARATION

- A. The limits of the site are shown on the Contract Drawings. Contractor shall confine its operations within the site limits indicated.
- B. Lay out cutting work at the site and coordinate with related Work for which cutting is required.
- C. Review the proposed layout with VTA prior to performing cutting operations.

3.03 DEMOLITION

- A. Operational Procedures and Methods:
 - 1. Perform demolition and removal work in accordance with the approved Selective Demolition Plan. Perform demolition work in accordance with ANSI A10.6 and the California Code of Regulations, Title 8 and Title 24, as applicable.
 - 2. Operational procedures shall be optional with Contractor insofar as procedures do not infringe on the approved work schedule or salvage requirements. Conduct demolition and removal work in a manner that will minimize the spread of dust and flying particles.
 - 3. Remove items indicated for demolition within the limits of the Work and as required to complete the Work of this Contract. Do not remove anything beyond the limits of Work indicated without prior written approval of VTA. If in doubt whether to remove an item, obtain written approval of VTA prior to proceeding.
 - 4. Remove materials carefully, to the extent indicated and as required, providing for neat and orderly junctions between existing and new materials.
 - 5. Protect existing structures, facilities, and landscaping from damage. Items damaged as a result of demolition operations shall be repaired or replaced, as required, at no increase in the Contract Price.
 - 6. Perform work so as to provide the least interference and most protection to existing facilities and improvements to remain.
 - 7. Demolish concrete in small sections. Perform demolition with small tools as much as possible. Blasting will not be permitted.
- B. Jackhammering:
 - 1. Jackhammering will be permitted only to a limited degree with prior approval of VTA.
 - 2. Do not jackhammer within 2 inches of reinforcing or structural steel to remain. Remove final 2 inches of material with a chipping gun.

**Hamilton Station Stabilization
C20046F**

3.04 CUTTING

- A. Cut new openings neat, as close as possible to profiles indicated.
- B. Do not cut or alter structural members without the prior written approval of VTA.
- C. Remove concrete whenever possible by saw cutting or similar approved method.

3.05 SALVAGING

- A. Certain items, as indicated, shall be salvaged and reused in the Work or delivered to a District storage facility as directed.
- B. Where salvaging is required, procedures shall be such that the maximum amount of salvage will result.
- C. Coordinate the Work of this section closely with the Work of other sections of these Specifications requiring salvage and reuse of materials.
- D. Refer to other Divisions for mechanical and electrical equipment removal and salvage requirements.

3.06 DISPOSAL OF DEBRIS

- A. Dispose of removed materials, waste, trash, and debris in a safe, acceptable manner, in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction.
- B. Burying of trash and debris on the site will not be permitted. Burning of trash and debris at the site will not be permitted.
- C. Remove trash and debris from the site at frequent intervals so that their presence will not delay the progress of the work.
- D. Removed materials, trash, and debris shall become the property of Contractor and shall be removed from the project site and disposed of in a legal manner. Location of disposal site and length of haul shall be Contractor's responsibility.

3.07 RESTORATION OF EXISTING STRUCTURES AND FACILITIES

- A. RESERVED.

3.08 FIELD QUALITY CONTROL

- A. Following performance of the Work, perform an inspection of the premises and report defects and structural weaknesses of structures partially demolished, cut, or removed; of adjacent structures; and of improvements remaining.
- B. The Resident will accompany Contractor before and after performance of the Work to confirm the physical condition of the structures and improvements involved.

END OF SECTION 02 41 19

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 03 05 15

PORTLAND CEMENT CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Portland cement.
- B. Aggregates.
- C. Drying shrinkage of concrete.
- D. Concrete admixtures and cementitious materials.
- E. Tests and analysis of materials.
- F. Mix designs.
- G. Batching, mixing, and transporting.
- H. Inspection and Testing.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement: Portland cement concrete will not be measured separately for payment. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain, and no separate payment will be made, therefor.
- B. Payment: Portland cement concrete will be paid for as part of the indicated Contract unit prices for the associated concrete work as indicated in the Schedule of Quantities and Prices of Bid Form 1.
 - 1. Full compensation for furnishing and incorporating admixtures required by these Technical Specifications is included in the Contract prices paid for the concrete involved and no additional compensation will be allowed therefor.
 - 2. Full compensation for sampling, testing and inspections required by these Technical Specifications is included in the Contract prices paid for the concrete involved and no additional compensation will be allowed therefor.
 - 3. Should Contractor use admixtures in conformance with the provisions in Article 2.1D, "Concrete Admixtures and Cementitious Materials," or should Contractor request and obtain permission to use other admixtures for Contractor's benefit, Contractor shall furnish those admixtures and incorporate them into the concrete at Contractor's expense and no additional compensation will be allowed therefor.

1.03 CLASSES OF CONCRETE

- A. Classes of concrete are designated by numerical symbol indicating the minimum 28-day compressive strength, in pounds per square inch as determined by ASTM C39, and the maximum permissible size of coarse aggregate.

**Hamilton Station Stabilization
C20046F**

- B. Each class of concrete may consist of one or more mixes determined by the maximum size of aggregate, cement factor, and types of admixtures or special aggregates used.
- C. Each mix within a Class shall be considered a specific type, requiring acceptance of the mix design.
- D. The various classes of concrete are listed in Table 03 05 15-A at the end of this Section.
- E. Minimum Strength of concrete shall be 4000 PSI at 28 days.
- F. The walers shall be lightweight, high early strength concrete, 4000 PSI at 28 days. Class 4000 LW-HES.
- G. The platform concrete slab shall be lightweight, high early strength concrete, 4000 PSI at 28 days. Class 4000 LW-HES.

1.04 DEFINITIONS

- A. The word "concrete" followed only by a class designation (that is, Concrete Class 4000-1-inch) indicates normal weight aggregate concrete, such as concrete having a 28- day compressive strength of 4,000 psi, a maximum coarse aggregate size of 1 inch, and a minimum unit weight of 145 pounds per cubic foot (without reinforcement) at 28 days.
- B. Except for the foregoing definitions, the words and terms used in these Specifications conform to the definitions given in ACI 116R.
- C. The term "high volume fly ash concrete" (HVFAC) indicates concrete using a mix that replaces 25 percent or more of weight of Portland cement with specified fly ash.
- D. The term "lightweight concrete" indicates lightweight structural concrete which has a maximum unit weight of 120 pounds per cubic foot at 28 days.

1.05 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 116R Cement and Concrete Terminology
 - 2. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
 - 3. ACI 211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete
 - 4. ACI 301 Standard Specifications for Structural Concrete
 - 5. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete
 - 6. ACI 304.2R Placing Concrete by Pumping Methods
 - 7. ACI 305R Hot-Weather Concreting
 - 8. ACI 306.1 Standard Specification for Cold Weather Concreting
 - 9. ACI 318 Building Code Requirements for Structural Concrete

**Hamilton Station Stabilization
C20046F**

B. American Society for Testing and Materials (ASTM):

1. ASTM C31 Standard Practice for Making and Curing Concrete Test specimens in the Field
2. ASTM C123 Standard Test Method for Lightweight Particles in Aggregate
3. ASTM C127 Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
4. ASTM C128 Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
5. ASTM C131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
6. ASTM C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates
7. ASTM C142 Test Method for Clay Lumps and Friable Particles in Aggregates
8. ASTM C143 Test Method for Slump of Hydraulic Cement Concrete
9. ASTM C150 Specification for Portland Cement
10. ASTM C157 Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
11. ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete
12. ASTM C289 Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
13. ASTM C330 Specification for Lightweight Aggregates for Structural Concrete
14. ASTM C470 Specification for Molds for Forming Concrete Test Cylinders Vertically
15. ASTM C490 Standard Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete
16. ASTM C494 Specification for Chemical Admixtures for Concrete
17. ASTM C535 Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
18. ASTM C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
19. ASTM C979 Specification for Pigments for Integrally Colored Concrete
20. ASTM C1017 Specification for Chemical Admixtures for Use in Producing Flowing Concrete
21. ASTM E329 Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

**Hamilton Station Stabilization
C20046F**

1.06 DESCRIPTION

- A. Portland cement concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, and water, with or without admixtures as approved by the Resident, proportioned and mixed as specified herein.
- B. Determine the mix proportions for concrete in conformance with these Technical Specifications.

1.07 SUBMITTALS

- A. General: Submittals for portland cement concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Concrete Mix Designs: Submit mix designs as herein specified in Article 2.3. Include laboratory test reports of trial strength and shrinkage tests.
 - 1. Submit HVFAC concrete mix designs and laboratory test reports of trial strength and shrinkage tests at least 10 working days before placing concrete.
- C. Product Data: Submit manufacturer's product data for proposed concrete admixtures.
- D. Samples: If requested by the Resident, furnish and deliver samples of cement and aggregates as selected by the Resident for testing and analysis.
- E. Affidavits/Certificates: For each shipment of materials, submit evidence of compliance with Specification requirements for cement, aggregate, and admixtures. Mill tests and manufacturers' certification of compliance with ASTM Specifications will be accepted in lieu of testing of cement and analysis of aggregates. Certificates of Compliance shall be signed by the materials manufacturer and Contractor.
- F. Batch Tickets: Submit a delivery ticket with each batch of concrete delivered to the site in accordance with the requirements of ASTM C94.
- G. Quality Control Program: Submit quality program meeting requirements of Article 1.6C herein.
- H. Submit for the Resident's approval the name, address, and telephone number of the laboratory, agency, mill, or ready-mix plant which Contractor intends to engage to design the concrete mixes.
- I. Submit for the Resident's approval the name and qualifications of the proposed concrete technologist.

1.08 QUALITY ASSURANCE AND CONTROL

- A. Contractor shall select a qualified concrete supplier capable of meeting project requirements and the requirements of these Specifications.
- B. The concrete supplier shall be certified by the National Ready Mix Concrete Association and shall hold a valid certificate of conformance for concrete production facilities.
- C. In conformance with applicable requirements of Section 01 45 30, Structural Quality Control, Contractor shall provide a quality control plan to assure control and uniformity of materials, conformance with accepted mix designs, and prompt and proper delivery of concrete to the jobsite in accordance with applicable requirements of ASTM C94. Include in the plan all tests Contractor will perform to verify compliance with Specification requirements, and the independent laboratory Contractor intends to engage to perform the tests.

**Hamilton Station Stabilization
C20046F**

1.09 ENVIRONMENTAL REQUIREMENTS

A. Hot Weather Concreting:

1. Batching, mixing, and delivering of concrete in hot weather shall conform to the applicable requirements of ACI 305R.
2. Maximum ambient temperature for placing concrete shall be 90 degrees F. If the ambient temperature exceeds 90 degrees F, the mix shall be cooled by an appropriate method approved by the Resident, such as icing the mixing water. Maintain uniform concrete temperature of succeeding batches placed.

B. Cold Weather Concreting:

1. Batching, mixing, and delivering of concrete in cold weather shall conform to the applicable requirements of ACI 306.1.
2. When the ambient temperature drops below 35 degrees F, or is expected to drop below 35 degrees F during placement, the temperature of the mix shall be heated by adding hot water, not exceeding 120 degrees F, or by steam heating the aggregates, or both. Other methods of heating aggregates will not be permitted. Steam heating the aggregates may require an adjustment in the mixing water.
3. All concrete shall be protected against freezing for at least 36 hours after placing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type II, low alkali. Type III Portland cement may be used where high early strength concrete is a requirement as approved by the Resident.

B. Aggregates:

1. Coarse Aggregate: ASTM C33, clean and uniformly graded from 3/8 inch to maximum size indicated or specified. When not specified, provide 1 inch maximum size (ASTM C33, Size No. 57). Deleterious materials in aggregates must not exceed the limits specified in ASTM C33.
2. Fine Aggregate: ASTM C33, uniformly graded from 3/8-inch to fines, washed clean. Deleterious materials in fine aggregates must not exceed the limits specified in ASTM C33.
3. Lightweight Aggregates: ASTM C330, uniformly graded to maximum size indicated or specified. When not specified, provide 3/4-inch to No. 4 coarse aggregate combined with ASTM C33 graded fine aggregate.
4. Aggregate for Exposed Concrete: Aggregate for concrete which will be exposed to the public shall be obtained from one source for each type of aggregate required in order to produce a uniform color.

C. Special Aggregates for Reducing Shrinkage and Creep: Cast-in-place reinforced concrete used for station platform slabs shall be produced with special aggregates conforming to the following requirements:

1. Source of Aggregates: Aggregates shall be obtained from a selected aggregate source, known to produce aggregates complying with the specified requirements, as approved by the Resident.

**Hamilton Station Stabilization
C20046F**

2. Coarse Aggregate:

- a. Coarse aggregate shall consist of hard, dense, durable crushed or uncrushed gravel or crushed aggregate conforming to ASTM C33 and the herein specified requirements. Deleterious substances in aggregates must not exceed the following limits:

<u>Deleterious Material</u>	<u>Percent By Weight</u>
1) Material Passing No. 200 Sieve (ASTM C117):	
a) Nominal size range No. 4 to 3/4 inch:	0.5
b) Nominal size range 3/4 inch to 1-1/2 inch:	0.4
2) Shale (ASTM C123, specific gravity of heavy liquid 1.95):	1.0
3) Clay lumps (ASTM C142):	0.5
4) Other deleterious substances:	1.0
5) Total of all deleterious substances:	3.0

- b. Coarse aggregate shall conform to the following requirements when tested in accordance with the specified ASTM Test Methods:

- 1) Resistance to Abrasion (ASTM C131): The loss for aggregate size range 3/4 inch to 3/16 inch after 100 revolutions and 500 revolutions must not exceed 10 percent and 40 percent, respectively. The test sample shall consist of 7 parts of grading B and 3 parts of grading C.
- 2) Resistance to Abrasion (ASTM C535): The loss for aggregate size range 1-1/2 inch to 3/4 inch (grading 3) after 200 revolutions and 1000 revolutions must not exceed 10 percent and 40 percent, respectively.
- 3) Soundness (ASTM C88): Weighted average loss after 5 cycles must not exceed 12 percent when tested with sodium sulfate.
- 4) Specific Gravity (ASTM C127): Bulk specific gravity on the basis of saturated surface-dry aggregate shall be not less than 2.60.
- 5) Absorption (ASTM C127): Absorption must not exceed 3 percent.
- 6) Potential Reactivity (ASTM C33): Only aggregates considered innocuous in accordance with Appendix XI shall be used in the work.

3. Fine Aggregate:

- a. Fine aggregate shall consist of hard, dense, durable, stone or rock fragments conforming to ASTM C33 and the herein specified requirements. Deleterious substances in aggregate must not exceed the following:

**Hamilton Station Stabilization
C20046F**

<u>Deleterious Material</u>	<u>Percent By Weight</u>
1) Material Passing No. 200 Sieve (ASTM C117):	3.0
2) Shale (ASTM C123, specific gravity of heavy liquid 1.95):	1.0
3) Clay lumps (ASTM C142):	1.0
4) Total of other deleterious substances, (such as alkali, mica, coated grains, soft flaky particles, and loam):	2.0
5) Total of all deleterious substances:	5.0
b. Fine aggregate shall conform to the following requirements when tested in accordance with the specified ASTM Test Methods:	
1) Specific Gravity (ASTM C128): Not less than 2.60 on a saturated surface-dry basis.	
2) Organic Impurities (ASTM C40): Supernatant liquid must be lighter in color than the reference standard color solution.	
3) Soundness (ASTM C88): Loss in 5 cycles of sodium sulfate test must not exceed 12 percent.	
4) Potential Reactivity (ASTM C289): Only fine aggregate considered innocuous shall be used in the work.	
5) Fineness Modulus (ASTM C33): Fineness modulus shall be in the range of 2.30 to 3.00, however, the variation of the fineness modulus must not exceed 0.20.	
4. Drying Shrinkage of Concrete:	
a. A trial batch of the proposed (mix design) concrete shall be prepared using the aggregates, cement, and admixture proposed for this work. From the trial batch, three specimens (4 inches by 4 inches by 11 inches) for determining "Drying Shrinkage" shall be prepared, cured, dried, and measured as specified in ASTM C157 and ASTM C490, with the following modifications:	
1) Cast-in-place concrete shall be moist cured for 10 days.	
2) Precast, prestressed concrete shall be steam cured for 1 day.	
3) Measurements shall be made and reported for 7, 14, 21, and 28 days of drying after 9 days of moist curing and 1 day of steam curing. Measurements for HFVAC shall also be made and reported for 56 days of drying.	
b. Shrinkage of specimens for cast-in-place concrete must not exceed 0.040 percent when measured in accordance with ASTM C157 and ASTM C490 after 21 days of drying.	
c. Shrinkage of specimens for prestressed concrete must not exceed 0.035 percent when measured in accordance with ASTM C157 and ASTM C490 after 21 days of drying.	

**Hamilton Station Stabilization
C20046F**

- d. Shrinkage of HVFAC specimens shall not exceed 0.055 percent when measured in accordance with ASTM C157 after 28 days drying including minimum 7 days moist cure.
- D. Concrete Admixtures and Cementitious Materials: Contractor may include accepted concrete admixtures and cementitious materials in the mix to improve the water-cement ratio or water- cementitious ratio or workability of the concrete, providing the strengths specified and other desirable characteristics of the concrete can be achieved and maintained. Admixtures require the Resident's acceptance before they may be used, and shall be included in the design mix, introduced in solution form. Admixtures shall be added at the batch plant, except as otherwise noted herein.
 - 1. Chemical Admixtures, Water-Reducing: ASTM C494, Type A.
 - 2. Pozzolanic Admixtures: ASTM C618, Class N or F.
 - 3. Fly Ash: ASTM C618, Class F, with a maximum of 25 percent retained on the No. 325 mesh sieve and a loss on ignition of 1.0 percent maximum.
 - 4. Pigments for integrally colored concrete: ASTM C979, for synthetic or natural iron oxides (red).
 - 5. Chemical Admixtures, Plasticizing: ASTM C1017, or ASTM C494 Type F or Type G, high-range water-reducing admixtures.
 - 6. Prohibited Admixtures: Admixtures containing chlorides or sulfides are not acceptable.
- E. Water: Water for concrete mixes, curing, and cleaning shall be clean and potable, free of impurities detrimental to concrete.
- F. Reinforcement Fibers: Chopped strands of alkali-resistant polypropylene fibers added to the concrete mix for protection against shrinkage cracks where required.

2.01 TESTS AND ANALYSES OF MATERIALS

- A. Tests and Sample Analyses: Testing of cement and analysis of aggregates shall be performed by Contractor as specified herein. Mill tests and supplier's certification of compliance with ASTM Specifications will be accepted in lieu of testing of cement and analysis of aggregates. Tests and services shall consist of the following:
 - 1. Testing of Portland cement in accordance with ASTM C150 and ASTM C114.
 - 2. Analysis of aggregates in accordance with ASTM C33, and sieve analysis of fine and coarse aggregates in accordance with ASTM C136.
 - 3. Tests of special aggregates for reducing shrinkage and creep shall conform to the requirements herein specified under Article 2.01C.
- B. Samples: Furnish and deliver identified samples of materials required for tests and analysis in the amounts required by Contractor's employed independent testing laboratory without charge. Samples shall be selected at random by the testing laboratory. Deliver samples of cement and aggregates at least 30 days prior to use on the project.

2.03 MIX DESIGNS

- A. Design of concrete mixes, including recommended amounts of admixture and water to be used in the mixes, shall be obtained by Contractor from a qualified independent testing laboratory or agency, or from a mill or ready-mix plant, properly equipped to design concrete mixes. The design shall be performed and certified by a professional engineer currently registered as a civil or structural engineer in the State of California. The laboratory, agency, mill, or ready-mix plant shall meet applicable requirements of ASTM E329, and shall be approved by the Resident. Costs of obtaining the mix designs shall be paid by Contractor.

**Hamilton Station Stabilization
C20046F**

1. In addition to the requirements specified above, concrete mix designs for HVFAC shall be performed by a concrete technologist with documented experience in the design of HVFAC.
- B. Selection of mix proportions shall conform to the applicable requirements of ACI 211.1 and ACI 211.2. Concrete shall comply with ACI 301 and ACI 318, as applicable. Ensure that mix designs will produce concrete suited for proper placement and finishing.
- C. Mix design for HVFAC shall include replacement of 25 to 50 percent of Portland cement by weight with fly ash.
- D. Mix design for architectural concrete and formed concrete which will be exposed to the public in the finished work shall include 10 percent replacement of the cement with fly ash along with a plasticizing admixture, conforming with ASTM C1017, to provide a dense and plastic concrete mix which completely fills out the forms and form detail without air holes and rock pockets.
- E. Mix designs shall indicate brands, types, and quantities of admixtures included. If fly ash is proposed, it shall be identified as such (for example, "fly ash"), and the mix design shall identify the percentage of cement replacement and the locations in the structures where such mixes are proposed for use.
- F. Mix designs for integrally colored concrete shall indicate brand type of natural or synthetic metallic oxide or pigment, and quantity used, all prepared as specified in ASTM C979. Compensate for fly ash with additional pigment as applicable.
- G. If concrete is to be placed by pumping, concrete mixes shall be designed in accordance with the applicable requirements of ACI 304R and ACI 304.2R, and shall include strengths and slumps.
- H. Mix designs shall indicate location of each mix within the structure. Mix designs shall specify both coarse and fine aggregate sources.
- I. Upon receipt of acceptable mix designs from the prequalified testing laboratory or agency or concrete supplier, conforming with specified requirements, Contractor shall submit these accepted mix designs to the Resident for review, 20 days prior to batching or delivering any concrete.
- J. Concrete mixes shall contain the minimum number of 94-pound sacks of cement per cubic yard specified in Table 03305-A, regardless of the fact that the strengths specified may be obtained with lesser amounts of cement.
- K. The water-to-cement ratio shall not exceed 0.40 for concrete which may be exposed to underground water and for concrete in structures critical to continued main line track operations. Conversion to equivalent water-to-cementitious ratio shall be performed in accordance with applicable requirements of ACI 211.1.

2.04 BATCHING, MIXING, AND TRANSPORTING

- A. Batching, mixing, and transporting Portland-cement concrete shall conform to the applicable requirements of ACI 301 and ACI 304R.
- B. Concrete shall be central-mixed concrete from a central batch plant, to be transported to the jobsite in a truck mixer, in accordance with the requirements of ASTM C94. Equipment used in the manufacture of concrete shall be kept clean at all times.
- C. Mixers shall be equipped with automatic device for recording number of revolutions of drum prior to completion of mixing operation. Each transit mixer shall also be equipped with water measuring devices consisting of either accurately calibrated water tanks or water meters.
- D. Concrete in truck mixer shall be mixed continuously until discharged. The discharge time for concrete after the introduction of mixing water must not exceed 60 minutes. The discharge time for concrete after cement has been mixed with aggregate must not exceed 90 minutes. Delivery tickets shall show departure time from plants.

**Hamilton Station Stabilization
C20046F**

- E. Ready-mixed concrete shall be mixed for a period of not less than 10 minutes and at least 3 minutes of the mixing period shall be immediately prior to discharging at the job. The introduction of additional water into transit type mixers after leaving the plant will not be permitted.
1. If adjustment of HVFAC slump in field is necessary, it may be made by addition of high range water reducing admixture within the limitations prescribed by the concrete technologist.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Inspection and Testing Services:

1. Visual inspections and acceptance of concrete mix designs will be by the Resident. The Resident will observe concrete batching, mixing, and placing operations, and Contractor shall keep records of all concrete placed. Copies of such records shall be submitted to the Resident for record purposes.
2. Testing services for Contractor's quality control program, including concrete strength tests, shall be provided by an independent testing laboratory or agency, employed by Contractor and approved by the Resident, and shall be performed in accordance with the applicable requirements of ACI 301. If, as a result of these tests, it is determined that the specified concrete properties are not being obtained, the Resident will order such changes in proportions or materials, or both, as may be necessary to secure the specified properties.
 - a. Field tests shall be performed by personnel having ACI Level 1 Field Technician Certification.
3. Failure of the Resident to detect defective work or material does not prevent later rejection when such defect is discovered, nor shall it obligate the Resident for final acceptance.
4. Additional inspection and testing services required by the Resident because of changes in materials, sources, or proportions; or occasioned by failure of inspections and tests to meet specification requirements, shall be paid for by Contractor.
5. Provide materials, labor, and services for sampling and testing of concrete, including the following facilities and services:
 - a. Preparation, handling, storage, and delivery of concrete test specimens.
 - b. Suitable containers for the storage, curing, and delivery of concrete test specimens in accordance with ASTM C31 and ASTM C470.
 - c. Suitable storage for a supply of test cylinder molds, test specimens to be cured at the jobsite, and other items required for sampling and testing.

B. Methods of Sampling and Testing:

1. Sampling: Representative composite samples shall be taken by Contractor in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis.
2. Slump Tests: The above-specified Contractor-employed testing laboratory shall perform slump tests of concrete during placing of concrete, as required, in accordance with ASTM C143. At least one test shall be performed at the delivery trucks for each 25 cubic yards of concrete delivered.
3. Tests for Concrete Uniformity: The same testing laboratory shall perform tests for concrete uniformity in accordance with ASTM C94, Annex A1. Each batch of concrete shall be tested as specified in ASTM C94, Annex A1.

**Hamilton Station Stabilization
C20046F**

4. Tests for Concrete Temperature: Freshly mixed concrete shall be tested hourly when the ambient temperature is below 40 degrees F and above 80 degrees F, and each time compression test cylinders are made. The concrete temperature shall be recorded on all compression test cylinders made. Refer to Article 1.7 herein for hot and cold weather remedial requirements.
 5. Strength Tests:
 - a. Contractor shall prepare, cast, and deliver to the same independent testing laboratory, cylinders for laboratory-cured compression test samples. Cylinders shall be made and cured in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39.
 - b. The minimum number of test cylinders to be made for each class of concrete and for each placement shall be four cylinders for each 100 cubic yards or fraction thereof. When additional sets of test cylinders are required beyond the normal seven and 28-day tests, each set shall consist of a minimum of two test cylinders.
 - c. All cylinders in a set shall be marked with a unique number on one end. Contractor shall record this number on the record of concrete placed. All cylinders shall be cured by Contractor's independent testing laboratory.
 - d. From each set of cylinders cast, one cylinder shall be tested at seven days and two cylinders at 28 days in accordance with ASTM C39. If the 28-day tests are satisfactory, the fourth cylinder shall be discarded.
 - e. In the event the 28-day tests are below the specified strength requirements, the Laboratory shall then test the fourth cylinder at the age selected by the Resident.
 6. Strength Tests for HVFAC: In addition to the strength test requirements specified above the following provisions apply to HVFAC:
 - a. The minimum number of test cylinder to be made for HVFAC for each class and for each placement shall be six laboratory cured cylinders for each 50 cubic yards or fraction thereof.
 - b. When the ambient air temperature at time of placement of HVFAC is less than 50 degrees F, four additional cylinders shall be taken hourly and tested.
 - c. From each set of HVFAC laboratory cured cylinders cast, two each shall be tested at seven and 28 days. The two additional cylinders shall be saved until the Resident has evaluated and accepted the test results.
 7. Tests for Contractor's Benefit: Tests required to verify early form removal, or other reasons for Contractor's benefit, shall be performed at Contractor's expense as part of Contractor's quality control program.
- C. Evaluation and Acceptance of Tests:
1. Acceptance of Concrete: The strength of the concrete shall be considered satisfactory, provided the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day compressive strength, and no individual strength test result falls below the specified 28-day compressive strength by more than 500 psi.
 - a. Acceptance of HVFAC: The strength of HVFAC shall be considered satisfactory, provided the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day compressive strength, and no individual strength test result falls below the specified 28-day compressive strength by more than 500 psi.

**Hamilton Station Stabilization
C20046F**

2. Adjustments: Contractor's independent testing laboratory shall order adjustments to the mix proportions, increase in the minimum cement content, additional curing of the structure, or any combination of the above when strength tests acceptance criteria specified are not being met.
 3. Test Cores:
 - a. When laboratory test results indicate concrete to be more than 300 psi below the specified strength, or if there is a likelihood of low strength concrete, a significant reduction in load-carrying capacity, or absence of desired durability in the concrete, the Resident will require tests of cores to be drilled from the areas in question.
 - b. Test cores shall be obtained from each member or area of suspect strength, from locations designated by the Resident, and test specimens shall be prepared by Contractor in accordance with ASTM C42.
 - c. Three cores shall be taken for each determination of in-place strength. Concrete in the area represented by the core tests will be considered structurally adequate if the average of the three cores is equal to at least 85 percent of the specified design strength and no single core is less than 75 percent of the design strength. Locations represented by erratic core strengths shall be retested at the direction of the Resident.
 - d. Fill core holes in accordance with the requirements of Section 03 35 00, Concrete Finishing, for repair of surface defects.
 4. Rejection of Concrete; Repair and Replacement: The Engineer shall have authority to reject concrete work which does not meet specification requirements, and to require repair or replacement as necessary to complete the Work.
- D. Acceptance of Structure: Acceptance of the completed concrete work requires conformance with the dimensional tolerances, appearance, and strengths specified in these Specifications, in ACI 301, and in ACI 117.

**Hamilton Station Stabilization
C20046F**

3.02 SCHEDULES

**TABLE 03 05 15-A
PORTLAND CEMENT CONCRETE MIXES**

CLASSIFICATION		MINIMUM CEMENT CONTENT	
Compressive Strength (psi) at 28 days	Maximum Aggregate Size	94-Pound Sacks per cubic yard	
A.	Reinforced Concrete:		
	4000	3/8 inch	6.5
	4000	1 inch	6.0
	4000	1-1/2 inch	5.5
	4500	3/8 inch	7.0
	4500	1 inch	6.5
	4500	1-1/2 inch	6.0
	5000	3/8 inch	7.0
	5000	1 inch	6.5
	4000 LW-HES	3/8 inch	6.5
	4000 LW-HES	1 inch	6.0

END OF SECTION 03 05 15

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 03 11 00

CONCRETE FORMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Layout of formwork.
- B. Formwork construction.
- C. Embedded items and openings in concrete.
- D. Form release materials.
- E. Removal of forms.
- F. Field quality control.
- G. Detection of movement.
- H. Re-use of forms.

1.02 RELATED SECTIONS

- A. Finishes for formed surfaces are specified in Section 03 35 00 - Concrete Finishing.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement: Concrete Forming will not be measured separately for payment.
- B. Payment: Concrete Forming will be paid for as part of the Contract unit price for the associated concrete work as indicated in the Schedule of Quantities and Prices of Bid Form 1.

1.04 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials
 - 2. ACI 301 Standard Specifications for Structural Concrete
 - 3. ACI 318 Building Code Requirements for Structural Concrete
 - 4. ACI 347 Formwork for Concrete
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D1190 Specification for Concrete Joint Sealer, Hot-Applied Elastic Type
 - 2. ASTM D1621 Test Method for Compressive Properties of Rigid Cellular Plastics
 - 3. ASTM D1622 Test Method for Apparent Density of Rigid Cellular Plastics

**Hamilton Station Stabilization
C20046F**

4. ASTM D1751 Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
 5. ASTM D3405 Specification for Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements
 6. ASTM D3406 Specification for Joint Sealant, Hot-Applied, Elastomeric-type, for Portland Cement Concrete Pavements
 7. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials
- C. American Plywood Association (APA):
1. U.S. Product Standard PS 1 for Construction and Industrial Plywood
- D. West Coast Lumber Inspection Bureau (WCLB):
1. WCLB No. 17 Standard Grading Rules

1.05 SUBMITTALS

- A. General: Submittals for concrete forming shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Shop Drawings: Submit drawings that indicate and include the following details and requirements:
1. Forming system and method of erection with associated details.
 2. Locations of construction joints in plan and elevation views. Means of leakage prevention for concrete exposed to view in finished construction.
 3. Locations and sizes of conduits, openings, recesses, pipes, ducts, and other attached or embedded products.
 4. Beam intersections and other conditions where concrete casting by vertical drop may be restricted.
 5. Chamfer strips for corner treatment.
 6. Method and schedule for removing forms and shoring.
 7. Method for detecting formwork movement during concrete placement.
- C. Product Data: Submit manufacturers' product data for manufactured products. Include products proposed for leakage control.
- D. Samples: Submit form material, 12 inches by 12 inches or larger in size, for formed concrete which will be exposed in the finished work to public view. Such samples require approval of VTA before they may be used in the work.

**Hamilton Station Stabilization
C20046F**

1.06 QUALITY ASSURANCE AND CONTROL

- A. Formwork Standards: Unless otherwise indicated, design, construct, erect, maintain, and remove forms and related structures for concrete work in accordance with applicable requirements of ACI 301, ACI 318, and ACI 347.
1. Architectural Concrete: Forms for architectural concrete shall be designed and constructed in accordance with ACI 301.
 2. Deflection: Where dead and live loads on forms will be more than 20 percent greater than the weight of the concrete, provide framing lumber of required strength, and comply with ACI 301 and ACI 347 for design of framing members. Deflection shall be kept within the herein specified tolerances.
 3. Concrete Mix Design: Design of formwork shall be coordinated with the concrete mix design, as specified in Section 03 05 15 - Portland Cement Concrete, so that form materials, form surfaces, and formwork strength will produce the desired concrete tolerances and finishes.
- B. Formwork Surface Materials: Provide material and work quality which will produce clean and uniform finished surfaces within the allowable tolerances specified and which will conform with the following requirements:
1. Concrete Exposed to View: Provide material and work quality that will produce clean, smooth, and uniform concrete surfaces. Refer to Section 03 35 00 - Concrete Finishing, and ACI 301 for requirements.
 2. Concrete Concealed from View: Provide material and work quality that will produce aligned concrete surfaces free of fins, honeycomb, and stains.
- C. Special Formwork Sections: Provide openings, offsets, sinkages, keyways, recesses, moldings, rustication strips, chamfers, blocking, screeds, bulkheads, anchorages, embedded items, and other features. Select materials and provide workmanship that will ensure indicated finishes.
- D. Chamfered Corners: All external corners shall be chamfered, unless otherwise indicated.
- E. Removal Features: Design formwork to be readily removable without impact, shock, and damage to concrete surfaces and adjacent materials.
- F. Tolerances for Formed Surfaces: For buildings and similar structures, comply with the requirements of ACI 301, as applicable. For those items of work or parts of the structure not covered by ACI 301, comply with the requirements of ACI 117, as applicable. Coordinate with the requirements specified in Section 03 30 00 – Cast-In-Place Concrete.
1. The class of surface for offset between adjacent pieces of formwork facing material shall be Class A for surfaces permanently exposed to public view and Class C for surfaces that will be permanently concealed, unless otherwise specified.
- G. Abrupt and Gradual Irregularities Tolerances for Formed Surfaces: In addition to the tolerance requirements of ACI 301, surfaces permanently exposed to view shall conform to the abrupt and gradual irregularities tolerances specified herein. Abrupt irregularities shall be understood to mean offsets and fins resulting from displaced, mismatched, or misplaced forms, sheathing, or liners or from defects in forming materials are considered abrupt irregularities. Gradual irregularities shall be understood to mean those resulting from warping and similar uniform variations from planeness or true curvature. Gradual irregularities shall be checked with a straightedge for plane surfaces or a shaped template for curved or warped surfaces.
1. In measuring irregularities, the straightedge or template shall be placed in various places on the surface in various directions. Permitted abrupt or gradual irregularities in formed surfaces as measured within a 5-foot length with a straightedge shall be as follows:

**Hamilton Station Stabilization
C20046F**

Class of Surface	Maximum Abrupt or Gradual Irregularity
A	1/8 inch
B	1/4 inch
C	1/2 inch
D	1 inch

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Storage: Store form panels to prevent warpage. Protect panels from damage and contamination which could adversely affect concrete.
- B. Handling: Lift form panels by methods that will protect panels from damage and distortion.

1.08 JOB CONDITIONS

- A. Allow sufficient time between erection of forms and placing of concrete for the various trades to properly install concrete reinforcement, embedded items, sleeves, and blockouts.
- B. Do not apply superimposed loads to the structure until concrete has developed its specified 28-day compressive strength unless otherwise indicated on the Contract Drawings or Approved by the Resident.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Lumber: Boards and framing lumber shall be graded and grade-marked in accordance with WCLB No. 17. Provide framing lumber of required strength, conforming with the above-specified WCLB No. 17.
 - 1. Boards: Provide all West Coast Species, "Construction" or "Standard" Boards. Use dressed side of lumber for surface in contact with the concrete, and provide boards with dressed or tongue-and-groove edges to provide tight joints to prevent mortar leakage.
 - 2. Framing Lumber:
 - a. Light Framing: Provide all West Coast Species, "Construction" or "Standard" Light Framing, dressed or rough. Where loads are not a factor, "Utility" Light Framing will be acceptable.
 - b. Joists and Planks: Provide all West Coast Species, "No. 2" Structural Joists and Planks, dressed or rough.
 - c. Beams and Stringers: Provide all West Coast Species, "Standard" Beams and Stringers or "No. 2 Structural" Beams and Stringers, dressed or rough.
- B. Plywood (Plyform): Plywood shall be graded and grade-marked in accordance with U.S. Product Standard PS-1.
 - 1. B-B Plyform: Provide Class I, EXT-APA, sanded, APA trademarked.
 - 2. B-C Plyform: Provide Class I, EXT-APA, APA trademarked.
 - 3. High Density Overlay (HDO) Plyform: Provide A-A, 60-60, Class I, EXT-APA, APA trademarked.

**Hamilton Station Stabilization
C20046F**

4. Thickness: As required to maintain surface smoothness without deflection, but not thinner than 5/8 inch.
- C. Steel Forms: Proprietary, patented, or fabricated steel forms, using standard or commercial quality, uncoated steel sheet or plate, 3/16-inch minimum thickness, for panel facings. Provide surfaces that will not impart corrosion residue to concrete. Include panel framing, reinforcement, and erection accessories.
- D. Leakage Control Materials: Provide materials capable of producing flush, watertight, and nonabsorbent surfaces and joints, and compatible with forming material and concrete ingredients. Seal form edges with gasketing material or sealant placed in the joint in such a way that neither a fin nor groove is made in the face of the cast concrete.
- E. Form Release Agent: Commercial formulation, silicone-free form-release agent, designed for use on all types of forms, which will not bond with, stain, nor adversely affect concrete surfaces, and which will not impair subsequent treatment of concrete surfaces requiring bond or adhesion nor impede wetting of surfaces which will be cured with water, steam, or curing compounds.
- F. Plugged Cone Form Ties: Rod type, with ends or end fasteners which can be removed without spalling the concrete and which leave a hole equal in depth to the required reinforcement clearance. Form ties shall be of a design in which the hole left by the removed end or end fastener is easily filled to match the surface of the hardened concrete. Provide removable cones 1-1/4 inches in diameter by 1-1/2 inches deep. Provide preformed mortar plugs to match the color of the concrete, recessed 1/4 inch, adhered with an approved epoxy adhesive.
- G. Inserts: Cast stainless steel or welded stainless steel, Type 316 or similar 300 Series, complete with anchors to concrete and fittings such as bolts, wedges, and straps.
- H. Chamfer Strips: 3/4 inch by 3/4 inch triangular fillets milled from clear, straight-grain pine, surfaced each side, or extruded vinyl type with or without nailing flange.
- I. Miscellaneous Joint Strips: Preformed strips for reveals, rustications, and similar joints fabricated of wood, metal, or plastic.

2.02 FABRICATION

- A. Formwork - General: Fabricate forms in accordance with approved Shop Drawings. Maintain forms clean, smooth, and free from imperfections and distortion. Fabricate forms for architectural concrete in accordance with applicable requirements of ACI 301.
- B. Joints:
 1. Arrange form panels in symmetrical patterns conforming to general lines of the structure.
 2. Unless otherwise indicated, orient panels on vertical surfaces with long dimension horizontal, and make horizontal joints level and continuous.
 3. Align form panels on each side of the panel joint with fasteners common to both panels, and in a manner which will result in a continuous, unbroken concrete plane surface.
- C. Steel Forms: Use material which is clean, smooth, and free from warps, bends, kinks, rust, cracks, and matter which may stain concrete. Fabricate panels in accordance with approved Shop Drawings. Deflection between form supports from concrete placement must not exceed 1/240 of the span length.

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 LAYOUT OF FORMWORK

- A. Locate and stake out all forms and establish all lines, levels, and elevations.

3.02 CONSTRUCTION

- A. Formwork:

1. Construct formwork in accordance with the approved Shop Drawings, and in a manner that will produce finished concrete surfaces conforming to indicated design and within specified tolerances. Formwork for concrete not exposed to view in the finished work may be constructed of any material that will adequately support the weight of the concrete.
2. Make joints and seams mortar-tight. Install leakage control materials in accordance with the manufacturer's installation instructions, and in a manner that will maintain a smooth continuity of plane between abutting form panels and which will resist displacement by concreting operations.
3. Kerf wood inserts for forming keyways, reglets, and recesses in a manner that will prevent swelling and ensure ease of removal.
4. Maintain forms clean and free from indentations and warpage. Do not use rust-stained steel surfaces for forms in contact with concrete. Do not sandblast steel form surfaces to remove rust or mill scale; remove these imperfections by grinding.
5. Brace temporary closures to prevent warpage or displacement and set tightly against forms in a manner that will prevent loss of concrete mortar.
6. Support joints with extra studs or girts, and in a manner that will ensure true, square intersections.
7. Assemble forms in a manner that will facilitate their removal without damage to the concrete.
8. Construct molding shapes, recesses, and projections with smooth finish materials and install in forms with sealed joints.
9. Provide construction openings in forms where required for concrete pour pockets, vibrator access holes, and inspection openings to aid in proper placement and consolidation of concrete, and close up openings during placement of concrete as applicable.
10. Drill air escape holes in bottom members of blockouts.

- B. Edge Forms and Screeds for Slabs: Set edge forms or bulkheads and intermediate screeds for slabs to obtain required elevations and contours in the finished slab surface.

- C. Corner Treatment: Form chamfers with 3/4 inch on each leg, unless otherwise indicated, and accurately shape and surface in a manner which will produce uniformly straight lines and edge joints and which will prevent mortar runs. Extend terminal edges to limits, and miter chamfer strips at changes in direction.

- D. Construction Joints:

1. Locate joints as indicated. Support forms for joints in concrete so as to rigidly maintain their positions during placement, vibration, and curing of concrete. Install keys in all joints.
2. Locate and install construction joints, for which locations are not indicated, so as not to impair strength and appearance of the structure, and indicate such joints on Shop Drawings. Locations of construction joints require approval of the Resident.

**Hamilton Station Stabilization
C20046F**

3. Provide keyways as indicated in construction joints in walls and slabs, and between walls and footings unless otherwise indicated. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

3.03 EMBEDDED ITEMS AND OPENINGS IN CONCRETE

- A. Install conduit, pipe sleeves, metal ties, inserts, nailing strips, blocking, and other fastening devices required for anchorage or attachment of other work. Firmly secure products in position, located accurately as indicated, before beginning concrete placement.
- B. Provide openings in concrete for passage of ducts, and provide clearances therefor as indicated on approved Shop Drawings.

3.04 FORM RELEASE MATERIAL

- A. Coat form contact surfaces with approved form release material before reinforcement is placed. Do not allow excess form release material to accumulate in the forms or to come into contact with surfaces that are required to be bonded to fresh concrete such as concrete reinforcement and embedded items. Apply form release material in compliance with manufacturer's application instructions.
- B. Coat steel forms with non-staining, rust-preventive form release material or otherwise protect against rusting.
- C. Apply form release material to bolts and rods that are to be removed or that are to be free to move.

3.05 REMOVAL OF FORMS

- A. Remove forms by methods which will not injure, mar, gouge, or chip concrete surfaces, overstress concrete members, or distort formwork. Use air pressure or other approved methods. Do not pry against concrete. Cut off nails flush. Leave surfaces clean and unblemished.
 1. Where early form removal is not necessary and will not impact Contractor's schedule, leave forms in place at least 72 hours, unless otherwise approved by the Resident.
- B. When repair of surface defects or finishing is required at an early age, forms may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations and its own weight.
 1. Concrete work that is damaged by removal operations shall be repaired as specified in Section 03 35 00 - Concrete Finishing. Where exposed surfaces are damaged beyond acceptable repairing measures, the damaged concrete shall be removed and replaced with new concrete.
- C. Top forms on sloping surfaces of concrete may be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and shall be followed by the specified curing.
- D. Formwork for sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently so as not to be damaged by removal operations.
- E. Formwork for sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently so as not to be damaged by removal operations.

**Hamilton Station Stabilization
C20046F**

3.06 FIELD QUALITY CONTROL

- A. Before placing concrete, check lines and grades of erected formwork and positioning of embedded inserts, blockouts, and joints for correctness. Verify that embedded piping and conduit are free from obstructions. Make corrections or adjustments to ensure proper size and location of concrete members and stability of forming systems.
- B. While placing concrete, provide quality control to assure that formwork and related supports have not been displaced, that loss of cement paste through joints is prevented, and that completed work will be within specified tolerances.
- C. During form removal, verify that architectural features meet the form and texture requirements of the samples approved by VTA.

3.07 DETECTION OF MOVEMENT

- A. Check movement using methods, such as plumb lines, tell tales, and survey equipment, to detect movement of formwork during concrete placement.

3.08 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable. Remove such material from the site. Apply form release coating as specified for new formwork.
- B. Align and secure joints in a manner that will preclude offsets. Do not use patched forms for exposed concrete surfaces.

END OF SECTION 03 11 00

SECTION 03 15 00

CONCRETE ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Joint fillers.
- B. Joint sealing compound.
- C. Elastomeric joint seals.
- D. Plastic pads, spacers, and fillers.

1.02 RELATED SECTIONS

- A. Metal armor protection for concrete edges, metal anchors, inserts, sleeves, and various metal accessories related to cast-in-place concrete work are specified in Section 05 50 00 - Metal Fabrications.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement: Concrete Accessories will not be measured separately for payment.
- B. Payment: Concrete Accessories will be paid for as part of the Contract unit price for the associated concrete work as indicated in the Schedule of Quantities and Prices of Bid Form 1.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C272 Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
 - 2. ASTM C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - 3. ASTM C920 Specification for Elastomeric Joint Sealant
 - 4. ASTM D994 Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
 - 5. ASTM D1190 Specification for Concrete Joint Sealer, Hot-Applied Elastic Type
 - 6. ASTM D1621 Test Method for Compressive Properties of Rigid Cellular Plastics
 - 7. ASTM D1622 Test Method for Apparent Density of Rigid Cellular Plastics
 - 8. ASTM D1751 Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
 - 9. ASTM D3405 Specification for Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements

**Hamilton Station Stabilization
C20046F**

- 10. ASTM D3406 Specification for Joint Sealant, Hot-Applied, Elastomeric-type, for Portland Cement Concrete Pavements
- 11. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials

1.05 SUBMITTALS

- A. General: Submittals for concrete accessories shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Shop Drawings: Submit drawings showing locations of all joints to be filled and sealed.
- C. Product Data: Submit manufacturers' product data of joint fillers, sealing compounds, elastomeric joint seals, and plastic materials, verifying compliance with specified requirements.
- D. Samples: Submit 12-inch long sample of joint filler and elastomeric joint seals and one pint can of sealing compound.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Joint Filler: Premolded, of sizes and thickness indicated, conforming to ASTM D994 or ASTM D1751, as applicable.
- B. Joint Sealing Compound: Concrete joint sealant, conforming to ASTM C920 (Type S or M, Class 25, Use T), ASTM D1190, ASTM D3405, or ASTM D3406, as applicable, for sealing of expansion (isolation) and contraction (control) joints in slabs and at junctions of slabs and vertical surfaces.

Color of joint sealant shall be as selected by the Resident from manufacturer's standards.

 - 1. For concrete pavements, provide ASTM C920 or ASTM D3406 sealant.
- C. Plastic Pads, Spacers, and Fillers: Extruded closed-cell polystyrene rigid board meeting requirements of ASTM C578, Type V, with the following physical properties:
 - 1. Minimum weight and density when tested in accordance with ASTM D1622: 3.0 pounds per cubic foot.
 - 2. Minimum compressive strength when tested in accordance with ASTM D1621: 100 pounds per square inch.
 - 3. Maximum water absorption when tested in accordance with ASTM C272: 0.10 percent by volume.
 - 4. Maximum allowable flame spread when tested in accordance with ASTM E84: 10 flame- spread index (UBC Class I).

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 EXAMINATION

- A. Contractor must verify that joint surfaces are dry to the extent necessary for successful sealant application and long service life as recommended by the sealant manufacturer.
- B. Contractor must verify also that ambient and concrete-surface temperatures and humidity are within the ranges recommended by the manufacturer for successful sealant application.

3.02 PREPARATION

- A. Contractor must thoroughly clean joints free of dirt, debris, dust, and laitance.
- B. Contractor must prime joint surfaces, where required, as recommended by the manufacturer of the joint sealing compound or elastomeric joint seal, as applicable.
- C. Contractor must mix multi-component sealing compound as recommended by the manufacturer.

3.03 INSTALLATION

- A. Installation/Application Requirements: Joint fillers and sealing compounds shall be installed in accordance with the respective manufacturers' installation and application instructions. Comply also with ASTM D1190, ASTM D3405, Appendix XI., and ASTM D3406, Appendix XI., for application of sealants, as applicable. Coordinate the placement of joint fillers and securing them in position with the work of Section 03 11 00 - Concrete Forming.
- B. Expansion (Isolation) Joints:
 - 1. Contractor must provide premolded joint filler to full depth of slabs, less 1/2 inch. Install joint filler with top edge 1/2 inch below the surface, and tool adjacent concrete edges to a 1/4-inch radius. Use steel pins to hold material in place during placing and floating of concrete. Finished joints shall be tight and leakproof.
 - 2. After a minimum of 28 days after slabs have been placed and finished, fill expansion joints with joint sealing compound to 1/8 inch below surface of slabs. No traffic shall be permitted to travel over sealed joints until sealing compound has properly cured.
- C. Roadway and Bridge: Provide elastomeric joint seals as applicable to the conditions. Contractor must install as indicated and in accordance with the manufacturer's installation instructions and recommendations.
- D. Plastic Pads, Spacers, and Fillers: Install as indicated over or against clean surfaces. Contractor must apply adhesive where required to hold material in place.

END OF SECTION 03 15 00

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel reinforcing bars.
- B. Galvanized reinforcing bars.
- C. Epoxy-coated reinforcing bars.
- D. Wire and spiral reinforcement.
- E. Welded steel wire fabric.
- F. Tie wire.
- G. Accessories
- H. Welding Electrodes
- I. Exothermic Metal-filled Sleeve
- J. Mechanical Splice Coupler

1.02 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for concrete reinforcement will be by the unit-price method as determined by the listing of the bid item concrete reinforcing indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: If the Schedule of Quantities and Prices indicates a unit price for concrete reinforcement, the unit-price method of measurement and payment will be as follows:
 - 1. Measurement:
 - a. Reinforcing steel bars, including galvanized and epoxy-coated reinforcements, and wire reinforcement, of the various types listed in the Schedule of Quantities and Prices, will be measured for payment based on the unit of measure indicated in the Schedule of Quantities and Prices and the following:
 - 1) Weights will be determined from computations based on the nominal weights listed in ACI 318/318R, Appendix on Steel Reinforcement Information. For galvanized and epoxy-coated reinforcements, the weights of the zinc and epoxy coatings will not be included.
 - 2) Laps of bars for splices indicated will be measured for payment. Splices for Contractor's convenience will not be measured for payment. When bars are spliced by welding, the weight for payment will be as computed for lapped splices.
 - b. The following concrete reinforcement will be measured for payment under this Section:

**Hamilton Station Stabilization
C20046F**

- 1) All cast-in-place concrete structures, walers, and slabs as specified in Section 03 30 00 - Cast-In-Place Concrete, including cast-in-place concrete that at the Contractors option is replaced with precast structural concrete and cast-in-place colored concrete.
 - 2) All drill and bond dowels as specified in Section 03 30 00 - Cast-In-Place Concrete.
- c. The following concrete reinforcement will not be measured separately for payment, but will be included in the unit measurement of the associated concrete work:
- 1) Reinforcing steel for precast concrete as specified in Section 03 41 00 - Structural Precast Concrete.
- d. The following concrete reinforcement will not be measured separately for payment:
- 1) Clips, ties, bar supports, dowels, spacers, chairs, or other devices for holding reinforcing steel in place, including zinc and epoxy coatings.
 - 2) Additional reinforcing steel for splices permitted by VTA for Contractor's convenience.
 - 3) Reinforcing steel and accessories, including zinc and epoxy coatings, required for lump sum items.
2. Payment:
- a. Reinforcing steel bars, wire reinforcement, and welded wire fabric will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement methods specified above.
 - b. Payment for reinforcement and accessory items listed under Article 1.03.B.1 herein will be included in the Contract unit prices for the associated cast-in-place concrete work, and no separate payment will be allowed therefor.
 - c. The Contract price paid for the various types and classes of reinforcing steel shown on the Contract Drawings and listed in the Schedule of Quantities and Prices shall include full compensation for furnishing all labor, materials, tools, equipment and incidents, and for doing all the work involved in furnishing and placing the reinforcing steel and reinforcing wire, complete in place, as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.
 - d. Full compensation for cleaning reinforcing steel including reinforcing steel that has been exposed for extended periods in partially completed construction, is included in the Contract price paid for the reinforcing steel involved and no additional compensation will be allowed therefor.
 - e. Full compensation for sampling, testing and inspections required by these Technical Specifications is included in the Contract prices paid for the reinforcing steel involved and no additional compensation will be allowed therefor.
 - f. Full compensation for galvanizing reinforcing steel as specified is included in the Contract price paid for the galvanized reinforcing steel involved and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

- g. Full compensation for coating epoxy-coated reinforcing steel as specified is included in the Contract price paid for the epoxy-coated reinforcing steel involved and no additional compensation will be allowed therefor.

1.03 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 Specifications for Structural Concrete for Buildings
2. ACI 315 Details and Detailing of Concrete Reinforcement
3. ACI 318 Building Code Requirements for Structural Concrete

B. American Society for Testing and Materials (ASTM):

1. ASTM A82 Specification for Steel Wire, Plain, for Concrete Reinforcement
2. ASTM A185 Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement
3. ASTM A370 Test Methods and Definitions for Mechanical Testing of Steel Products
4. ASTM A496 Specification for Steel Wire, Deformed, for Concrete Reinforcement
5. ASTM A497 Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
6. ASTM A706 Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement
7. ASTM A767/A767M Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
8. ASTM A775/A775M Specification for Epoxy-Coated Reinforcing Steel Bars
9. ASTM A884/A884M Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement
10. ASTM D3963/D3963M Specification for Epoxy-Coated Reinforcing Steel
11. ASTM E8 Test Methods of Tension Testing of Metallic Materials
12. ASTM E165 Test Method for Liquid Penetrant Examination

C. American Welding Society (AWS):

1. AWS D1.4 Structural Welding Code - Reinforcing Steel

D. Concrete Reinforcing Steel Institute (CRSI):

1. CRSI Manual of Standard Practice
2. CRSI, Placing Reinforcing Bars

**Hamilton Station Stabilization
C20046F**

1.04 SUBMITTALS

- A. General: Submittals for concrete reinforcing shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions, the Special Conditions, and these Technical Specifications.
- B. Reinforcement Shop Drawings: Reinforcement Shop Drawings shall show diagrammatic elevations, plans, and details at a scale sufficiently large to show clearly the positions and erection marks of reinforcing bars, their dowels, and splices. Shop Drawings shall also show details for congested areas and connections. Shop Drawings used in field shall be reviewed copies.
1. Submit bar lists, bending diagrams and schedules, and placement plans and details for all reinforcing steel. Bar lists shall include weights.
 2. Indicate descriptions, details, dimensions, arrangements and assemblies, and locations of reinforcing steel. Include number of pieces, sizes, and markings of reinforcing steel, laps and splices, supporting devices and accessories, and any other information required for fabrication and placement. Indicate any adjustments required as specified in Article 1.6.B herein.
 3. Check the Contract Drawings for anchor bolt schedules and locations, anchors, hangers, inserts, conduits, sleeves, blockouts, and any other items to be cast in concrete for possible interference with reinforcing steel. Indicate required clearances on Shop Drawings.
 4. Detail reinforcing steel in accordance with requirements of the ACI 315. Indicate individual weight of each bar, total weight of each bar size, and total weight of all bars on the list. Base calculated weights upon nominal weights specified in ACI 318, Appendix on Steel Reinforcement Information.
- C. Product Data:
1. Submit manufacturers' product data and installation instructions for proprietary manufactured materials and reinforcement accessories.
 2. Submit manufacturers' product data and installation instructions for proprietary exothermic metal splicing systems and proprietary mechanical coupler splicing systems when such splicing methods are permitted.
 3. For exothermic metal splicing systems and mechanical splice couplers, furnish the following:
 - a. Certified test reports showing that the splicing systems and couplers meet all of the specified requirements.
 - b. Written assembly and installation instructions for each type, model and bar size for which the splicing system or coupler is designed. Installation instructions shall include typical installation sequence, recommended installation tools, guidelines for laboratory testing of splicing systems and couplers and size designations with corresponding range of bar sizes.
 - c. Reports showing the results of all tests.
- D. Samples:
1. When galvanized or epoxy-coated reinforcing bars are indicated, furnish two 12-inch long samples and two additional samples bent to minimum radius of the rebar from each size and lot shipped to the jobsite.
 2. Samples shall be representative of the materials furnished. These samples, as well as any additional random samples taken by VTA, may be tested for specification compliance.

**Hamilton Station Stabilization
C20046F**

3. Failure of any sample to meet specification requirements shall be cause for rejection of that lot.

E. Certificates:

1. For each lot or load of reinforcing steel delivered to the jobsite, furnish mill affidavits or test reports of compliance or similar certification, certifying the grades and physical and chemical properties of the reinforcing steel and conformance with applicable ASTM Specifications, including ASTM A370, Method A9.
2. For galvanized and epoxy-coated reinforcing bars, furnish certificates of compliance with ASTM A767/A767M for galvanized bars and with ASTM A775/A775M and D3963/D3963M for epoxy-coated bars.
3. For welders, furnish welding certificates, or other evidence acceptable to the VTA, attesting to the welders' qualifications to perform the indicated welding in accordance with applicable requirements of AWS D1.4.
4. For exothermic sleeve coupler splicing, furnish certificates or affidavits attesting to the crew's special qualifications to perform the splicing.
5. Mill Certificates shall include name of mill, date of rolling, date of shipping to fabricator and shall be signed by fabricator certifying that each material complies with or exceeds the specified requirements. A Mill Certificate shall be furnished with each lot of material delivered to the Project and the lot shall be clearly identified in the Certificate.
6. When Mill Certificates cannot be provided, hire a professional testing laboratory to verify compliance and provide laboratory test reports. Contractor shall pay for the cost of testing.

F. Laboratory Test Reports:

1. Laboratory test reports shall show the name of testing agency; date of testing, types of tests performed and shall be signed by a principal of the testing agency who is a registered civil engineer in the State of California.
2. When required by other portions of these Technical Specifications, laboratory test reports shall be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these Technical Specifications.

1.05 QUALITY CONTROL

A. Tolerances:

1. Fabrication: Fabricate bars to meet the following tolerances:
 - a. Sheared length: plus or minus 1 inch.
 - b. Depth of truss bars: plus 0, minus 1/2 inch.
 - c. Overall dimensions of stirrups, ties and spirals: plus or minus 1/2 inch.
 - d. All other bends: plus or minus 1 inch.
 - e. Fabrication tolerances not indicated on the Contract Drawings or specified above shall comply with the applicable requirements of ACI 301 and CRSI Manual of Standard Practice, Chapter 7.

**Hamilton Station Stabilization
C20046F**

2. Placement: Place bars to the following tolerances:
 - a. Clear distance to formed surfaces: plus or minus 1/4 inch.
 - b. Minimum spacing between bars: minus 1/4 inch.
 - c. Top bars in slabs and beams:
 - 1) Member 8 inches deep or less: plus or minus 1/4 inch.
 - 2) Member greater than 8 inches, but less than 2 feet deep: plus or minus 1/2 inch.
 - 3) Members 2 feet or more deep: plus or minus 1 inch.
 - d. Crosswise of members: spaced evenly within 2 inches.
 - e. Lengthwise of members: plus or minus 2 inches.
 - f. Placement tolerances not indicated on the Contract Drawings or specified above shall comply with the requirements of ACI 301, ACI 318, or CRSI Manual of Standard Practice, as applicable.

- B. Adjustments: Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or in excess of the above tolerances, the resulting arrangement of bars shall require the Resident's approval. Minimum spacings must not be decreased, and the required number of bars shall be placed. Bars moved to permit access for cleanup operations shall be properly replaced and secured before the start of concrete placement.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver reinforcing bars to the fabricator in bundles, limited to one size and length of bar, securely tied and identified with plastic tags in an exposed position indicating the mill, the melt or heat number, and the grade and size of bars.
- B. Deliver steel reinforcement to the jobsite, store, and cover in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease, oil, or other cause which might impair bond with concrete.
- C. Deliver steel reinforcement to the jobsite properly tagged and identified, as specified herein in Article 2.3, in accordance with approved Shop Drawings.
- D. Handle and store galvanized and epoxy-coated reinforcement in a manner which will prevent damage to the coatings. For epoxy-coated reinforcement, comply with the requirements of ASTM D3963/D3963M.
- E. Maintain identification of steel reinforcement after bundles are broken.
- F. Provide special facilities for the storage and handling of exothermic materials as recommended by the splicing system manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Reinforcing Bars:
 1. Low-Alloy Steel Deformed Bars: ASTM A706, Grade 60.

**Hamilton Station Stabilization
C20046F**

2. Weights of Bars: Refer to ACI 318, Appendix on Steel Reinforcement Information.
- B. Galvanized Reinforcing Bars: ASTM A706, galvanized in accordance with ASTM A767/A767M, Class I coating. Bars shall be cut and bent cold before galvanizing.
- C. Epoxy-coated Reinforcing Bars: ASTM A706, epoxy-coated in accordance with ASTM A775/A775M and ASTM D3963/D3963M. Coating material shall conform to ASTM A775/A775M and ASTM D3963/D3963M, Annex A1, green in color. Furnish acceptance test reports for each lot of epoxy-coated bars delivered to the site. Bars shall be cut and bent cold before applying coating material. All welding of reinforcement shall be complete prior to epoxy coating the reinforcement. Within areas where epoxy-coated reinforcement is required, tie wire and bar chairs or other metallic devices used to secure or support the reinforcement shall be plastic-coated or epoxy-coated to prevent corrosion of the devices or damage to the coated reinforcement.
- D. Wire and Spiral Reinforcement: ASTM A82 for plain wire and ASTM A496 for deformed wire.
- E. Welded Steel Wire Fabric - Plain Wire: ASTM A185, wire sizes and center-to-center spacings as indicated.
- F. Welded Steel Wire Fabric - Deformed Wire: ASTM A497, wire sizes and center-to-center spacings as indicated.
- G. Welded Steel Wire Fabric - Epoxy-Coated: ASTM A884/A884M, wire sizes and center-to-center spacings as indicated.
- H. Accessories: Provide reinforcement accessories, consisting of bar supports, spacers, hangers, chairs, ties, and similar items as required for spacing, assembling, and supporting reinforcement in place. Conform with CRSI referenced standards and the following requirements:
1. For footings, grade beams, and slabs on grade, provide supports with precast concrete or mortar bases or plates or horizontal runners where wetted base materials will not support chair legs.
 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms or are in close proximity to finish surfaces, provide supports with legs which are galvanized, plastic-protected, or stainless steel.
 3. For galvanized reinforcement, provide all galvanized accessories.
 4. For epoxy-coated reinforcement, provide accessories which are nylon-, epoxy-, or plastic-coated.
- I. Tie Wire: No. 16 gage or heavier, black or galvanized, soft or commercial grade steel tie wire. For galvanized reinforcement, provide zinc-coated wire. For epoxy-coated reinforcement, provide nylon-, epoxy-, or plastic-coated wire. Where tie wire is in close proximity to finish surfaces of exposed-to-view concrete, provide soft stainless steel wire.
- J. Welding Electrodes: E90XX low hydrogen electrodes (for shielded metal arc welding.)
- K. Exothermic Metal-Filled Sleeve Coupler:
1. System Description: Provide bar splicing connection, produced by a standard exothermic process whereby molten filler metal, contained by a high-strength steel sleeve of larger inside diameter than adjoining bars, is introduced into the annular space between the bars and the sleeve as well as between the ends of the bars. Splicing system shall produce complete fusion with 100 percent penetration of the joint.
 2. Spliced Strength in Tension: 125 percent of the yield strength of connected reinforcing bars.

**Hamilton Station Stabilization
C20046F**

L. Mechanical Splice Coupler:

1. System Description: Provide bar-splicing connections, produced by threaded reinforcing bar ends and threaded coupler, or by sleeves hydraulically pressed or forged onto butt- ended reinforcing bars, or by other proprietary mechanical splicing method as proposed by Contractor and approved by the Resident. Mechanical splice couplers shall be capable of being installed in the clear space indicated and to provide the required clearances.
2. Spliced Strength in Tension: Minimum 125 percent of the yield strength of connected reinforcing bars, unless otherwise indicated.

2.02 FABRICATION

- A. Fabrication Standards: Fabrication of steel reinforcement shall be in accordance with the Contract Drawings and approved Shop Drawings. Where specific details are not indicated, comply with applicable requirements of ACI 301, ACI 318, and CRSI Manual of Standard Practice.
- B. Cutting and Bending: Cutting and bending shall be performed at a central location, equipped and suitable for the purpose. Bars shall be accurately cut and bent as indicated. Bars shall be bent cold. Heating of bars for bending or straightening will not be permitted. Bars must not be bent or straightened in any manner which will injure the material. Label all bars in accordance with bending diagrams and schedules, and secure like pieces in bundles when appropriate.
- C. Welding:
1. Welding of reinforcement, where indicated and approved, including preparation of bars, shall conform with applicable requirements of AWS D1.4. Welders shall be prequalified in accordance with AWS D1.4, Chapter 6.
 2. Use full penetration butt welds by the electric-arc method unless otherwise indicated or approved. Weld splices shall develop 125 percent of the specified yield strength of the bars, or of the smaller bar in transition splices.
 3. Clean bars of oil, grease, dirt, and other foreign matter and flame-dry before welding. Preheat bars before welding in accordance with AWS D1.4, Chapter 5. Stagger splices in adjacent bars a minimum of 48 inches.
- D. Repair of Damaged Coatings: Bars for galvanized reinforcement shall be cut and bent cold before galvanizing. Galvanized and epoxy coatings damaged by shipping, handling, or cutting and bending shall be repaired as specified in ACI 301, and ASTM A767/A767M, ASTM A775/A775M, ASTM A884/A884M, and ASTM D3963/D3963M, as applicable.

2.03 IDENTIFICATION

- A. Reinforcing steel shall be bundled and tagged with grades and sizes, heat numbers, and suitable identification marks for checking, sorting, and placing. Sizes and mark numbers shall correspond to placing Shop Drawings and schedules. Tags and markings shall be water-resistant and must not be removed until steel reinforcement is placed in position.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that surfaces, over or against which concrete is to be placed, are clean and in proper condition for placing reinforcement.

**Hamilton Station Stabilization
C20046F**

- B. Verify that items to be embedded in concrete inserts, sleeves, and block-outs are secured in place as required.

3.02 PLACING

- A. Placing Standards: Reinforcing steel shall be placed in accordance with the Contract Drawings, approved Shop Drawings, and the applicable requirements of ACI 301, ACI 318, CRSI Manual of Standard Practice, and CRSI Placing Reinforcing Bars. Install reinforcement accurately and secure against movement, particularly under the weight of workers and the placement of concrete.
- B. Reinforcing Supports: Bars shall be supported on metal or plastic chairs, spacers, and hangers, accurately placed and securely fastened to steel reinforcement in place. Support legs of accessories in forms without embedding in the form surface. Hoops and stirrups shall be accurately spaced and wired to the reinforcement.
- C. Placing and Tying: Reinforcing steel shall be installed in place, spaced, and rigidly and securely tied or wired with tie wire at all splices and at crossing points and intersections in the positions indicated. It is not necessary to tie bars at every intersection. Comply with requirements of CRSI Placing Reinforcing Bars, Chapter 10. Snap ties are acceptable for intermediate intersections. Rebending of bars on the job to fit different conditions will not be permitted. Point ends of wire ties away from adjacent form surfaces.
- D. Spacing: Center-to-center distance between parallel bars shall be in accordance with the Contract Drawings or, where not indicated, the minimum clear spacing shall be in accordance with ACI 318.
- E. Longitudinal Location of Bends and Ends of Bar: A maximum of plus or minus 3 inches from the indicated location will be permitted, provided that specified protective concrete cover at ends of members is not reduced by more than 1/2 inch.
- F. Splices
1. Lapped Splices:
 - a. Laps of splices shall be securely tied together to maintain the alignment of the bars, to provide the required minimum clearances, and to transfer stress by bond. Lapped splices and development lengths not shown shall be detailed to develop Class B lapping lengths and development lengths in tension, respectively, in accordance with ACI 318.
 - b. Unless otherwise designated on the Contract Drawings, splices of alternate bars shall be staggered a minimum clear offset of 2 feet between splices or the minimum lap length of the bars to be spliced, whichever is longer. Splices shall be tied with tie wire, or splices may be lap welded in accordance with AWS D1.4. Lapped splices are not permitted for No. 14 and No. 18 bars, or when specifically excluded by Contract provisions regardless of size.
 2. Exothermic Metal-Filled Coupler Splices: Conform with the product manufacturer's installation instructions and recommendations and with applicable requirements of AWS D1.4 for exothermic welding.
 3. Mechanical Coupler Splices:
 - a. Perform installation of coupler and tightening of joint assembly in accordance with the coupler manufacturer's installation instructions and recommendations.
 - b. Reinforcing bars to be joined shall be shop threaded using special machinery to produce the required tapered threads. Where previously threaded bars must be cut or where threads are damaged, bars shall be replaced, or an alternate splicing system approved by the Resident shall be substituted. Bars must not be rethreaded, and damaged threads must not be repaired in the field.

**Hamilton Station Stabilization
C20046F**

- c. Prior to joining, inspect all threads and assure that they have been properly made and are clean.
 - d. Rotate coupler and bar initially by hand or wrench until snug (approximately 3-1/4 to 4 turns). Apply 24-inch minimum pipe wrench and turn coupler (or bar) until further turning is resisted with the application of a minimum torque of 200 foot- pounds. Suitably mark joint to indicate that tightening has been completed.
 - e. For proprietary mechanical splicing systems not specified herein, installation shall conform with the manufacturer's installation instructions.
- G. Dowels: Provide dowels where indicated or required for connecting construction and for maintaining structural and reinforcement continuity. Dowels shall be tied securely in place before concrete is deposited. Provide additional bars for proper support and anchorage where required. Do not bend dowels after embedment.
- H. Welded Wire Fabric:
- 1. Wire fabric shall be installed in lengths as long as practicable and shall be wire-tied at all laps and splices. End laps shall be offset in adjacent widths. Lap welded wire fabric in accordance with applicable requirements of ACI 318.
 - 2. Where required welded wire fabric shall be secured in position with suitable supports, accessories, and tie wire as indicated and required to ensure against movement from workers and placement of concrete lift fabric as concrete is placed to assure proper embedment at position indicated.

3.03 PROTECTIVE CONCRETE COVER

- A. Minimum concrete coverage for steel reinforcement shall be as specified in ACI 301, ACI 318, or CRSI Manual of Standard Practice. If there is a conflict between the standards specified, the thicker concrete coverage shall govern.

3.04 CLEANING:

- A. Reinforcement at time of depositing concrete shall be free of corrosion and coatings that may impair bond with concrete, such as form oil, mill scale, or loose deposits of rust and other corrosion.

3.05 FIELD QUALITY CONTROL

- A. Quality control inspections and tests to be performed by Contractor include the following:
 - 1. Placement of Reinforcing Steel: Visual inspection of reinforcing steel in place, including bar supports, tied laps and intersections, and welded wire fabric.
 - 2. Welds:
 - a. Visual inspection of reinforcing bar welds.
 - b. Tension tests of welded butt joints. Tests shall be performed on sample welds produced by Contractor in accordance with ASTM E8.
 - c. Nondestructive tests of installed welded butt joints shall be performed in accordance with ASTM E165.

**Hamilton Station Stabilization
C20046F**

- d. Inspections and tests shall be performed in accordance with the applicable requirements of AWS D1.4, Chapters 6 and 7.
 3. Exothermic/Coupler Splices:
 - a. Continuous visual inspection for the first eight hours, minimum, of the work as performed by any crew, and again by any replacement crew. All splices require visual inspection before concrete may be placed.
 - b. Visual inspection shall be performed in accordance with the product manufacturer's instructions and recommendations for such inspection.
 - c. Inspections shall measure and record all voids. Exothermic rebar splices shall be accepted, provided measured "void limits," per end, do not exceed manufacturer's specified "void limits."
 - d. Splices indicating improper fill, slag at tap hole, or blowouts shall be rejected.
 4. Mechanical Coupler Splices: Test 100 percent of the couplers, using a 24-inch click-type torque wrench calibrated to 200 foot-pounds. Minimum turning torque of 200 foot- pounds shall be applied to the extent that further turning is resisted. Where tests reveal failure of couplers to be properly tightened, couplers shall be removed and replaced.
- B. For exothermic/coupler splices, Contractor shall provide qualification splices for each position as follows:
1. One sister splice for the first 25 splices; thereafter, one sister splice for every 50 splices.
 2. Sister splices shall be laboratory tested by the Resident for strength in tension (125 percent of the yield strength of connecting bars).

END OF SECTION 03 20 00

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Conveying and placing concrete.
- B. Consolidation.
- C. Construction joints.
- D. Expansion and contraction joints.
- E. Curing and protection.

1.02 RELATED SECTIONS

- A. Portland cement concrete specified in Section 03 05 15 - Portland Cement Concrete.
- B. Section 03 11 00 - Concrete Forming.
- C. Section 03 15 00 - Concrete Accessories.
- D. Section 03 20 00 - Concrete Reinforcing.
- E. Finishing and curing of formed and unformed concrete surfaces, including repair and patching of surface defects including spalls at MSE wall panels, are specified in Section 03 35 00 - Concrete Finishing.
- F. Section 03 41 00 – Precast Structural Concrete.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for cast-in-place concrete will be by the unit-price method as determined by the listing of the bid item cast-in-place concrete indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: If the Schedule of Quantities and Prices indicates a unit price for cast-in-place concrete, the unit-price method of measurement and payment will be as follows:
 - 1. Measurement:
 - a. Except as specified otherwise in other Sections of these Technical Specifications, each class of concrete and type of placement of cast-in-place concrete will be measured for payment by the cubic yard, and quantities will be computed, based on the neat lines or pay lines, section profiles, and dimensions indicated on the Contract Drawings, without deduction for chamfers, reinforcing steel, and embedded items, and openings and recesses having an area of less than two square feet.
 - b. Additional concrete used to replace overcut or for overbreak, or to repair or replace defective work, will not be measured separately for payment.

**Hamilton Station Stabilization
C20046F**

2. Payment: cast-in-place concrete will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.2.B.1.
- a. The Contract prices paid per cubic yard for the various types and classes of concrete in structures shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the concrete work, complete in place, as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.
 - b. Dowels to be bonded into drilled holes will be paid for as reinforcing steel of the various types specified in the Schedule of Quantities and Prices of Bid Form 1.
 - c. Full compensation for drilling holes for dowels, including coring through reinforcement if required and approved by VTA, and for bonding and bonding (chemical adhesive) is included in the Contract price paid per cubic yard for the various types of concrete work including adjustment of existing guardrail panels, requiring dowels and no additional compensation will be allowed therefor.
 - d. Full compensation for preparing concrete placement schedules, coordinating the location of pipes, conduits, and other facilities, and modifying the proposed layout of pipes, conduits, reinforcement and the like, is included in the Contract prices paid for the various types of concrete involved and no additional compensation will be allowed therefor.
 - e. Full compensation for furnishing and placing miscellaneous materials, including neoprene, expanded polystyrene, expansion joint filler, hardboard and plastic pipe, at the locations shown on the Contract Drawings is included in the Contract prices paid per cubic yard for cast-in-place concrete and no additional compensation will be allowed therefor.
 - f. Full compensation for furnishing and installing joints and protective covers including surface preparation and bonding is included in the Contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.
 - g. Full compensation for cleaning and preparing the surfaces of concrete at construction joints, including joints that have been exposed for extended periods in partially completed construction, is included in the Contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.
 - h. Full compensation for sampling, testing and inspections required by these Technical Specifications is included in the Contract prices paid for the concrete work involved and no additional compensation will be allowed therefor.
 - i. Full compensation for roughening existing concrete surfaces to a full amplitude of approximately 1/4 inch, where shown on the Contract Drawings, is included in the Contract prices paid for the various items of work involved and no separate payment will be made therefor.

1.04 DEFINITIONS

- A. The words and terms used in these Specifications conform with the definitions given in ACI 116R.
- B. The term “high volume fly ash concrete” (HVFAC) indicates concrete using a mix that replaces 25 percent or more of weight of Portland cement with specified fly ash.

**Hamilton Station Stabilization
C20046F**

1.05 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 116 R Cement and Concrete Terminology
2. ACI 117 Standard Specification for Tolerances for Concrete Construction
3. ACI 301 Standard Specifications for Structural Concrete
4. ACI 308 Standard Practice for Curing Concrete
5. ACI 302.1R Guide for Concrete Floor and Slab Construction
6. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete
7. ACI 304.2R Placing Concrete by Pumping Methods
8. ACI 305R Hot Weather Concreting
9. ACI 306.1 Standard Specification for Cold Weather Concreting
10. ACI 309R Guide for Consolidation of Concrete
11. ACI 318 Building Code Requirements for Structural Concrete

B. American Society for Testing and Materials (ASTM):

1. ASTM C31 Standard Practice of Making and Curing Concrete Test Specimens in the Field
2. ASTM C94 Specification for Ready-Mixed Concrete

1.06 SUBMITTALS

A. General: Submittals for cast-in-place concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.

1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.

B. Shop Drawings: Submittals for cast-in-place concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.

1. Submit drawings that indicate the locations of all joints in concrete, including construction joints, expansion joints, isolation joints, and contraction joints. Coordinate with the requirements specified in Section 03 11 00 - Concrete Forming.
2. Submit drawings that indicate concrete placement schedule, method, sequence, location, and boundaries. Include each type and class of concrete, and quantity in cubic yards.

C. Product Data: Submit manufacturer's product data for epoxy adhesive.

**Hamilton Station Stabilization
C20046F**

- D. Records and Reports: Report the location in the finished work of each mix design, and the start and completion times of placement of each batch of concrete placed for each date concrete is placed.

1.07 QUALITY CONTROL

- A. Tolerances:

1. Concrete Tolerances: Comply with the requirements of ACI 117 as applicable. Coordinate with the requirements specified in Section 03 11 00 - Concrete Forming.
2. Tolerances for Slabs and Flatwork: Comply with the requirements specified in Section 03 35 00 - Concrete Finishing.

- B. Architectural Concrete: Where concrete is indicated as architectural concrete exposed to public view, such concrete shall be produced in accordance with applicable requirements of ACI 301 and ACI 303.1.

- C. Site Mock-ups:

1. Construct site mock-ups for all architectural concrete work and formed concrete that will be exposed to the public in the finished work, not less than 4 feet by 6 feet in surface area, for review and acceptance by VTA, before starting the placement of concrete.
2. Approved site mock-ups shall set the standard for the various architectural concrete features, formed finishes, and colors of the concrete. Provide as many mock-ups as required to show all the different features and formed surfaces of the concrete

- D. Cold Joints: Cold joints in concrete will not be permitted unless planned and treated properly as construction joints.

- E. Monitoring of Formwork: Provide monitoring of forms and embedded items to detect movement, or forms and embedded items out-of-alignment, from pressure of concrete placement.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Delivering and placing of concrete in hot weather and cold weather shall conform with applicable requirements of ACI 305R and ACI 306.1 and Section 03 05 15 - Portland Cement Concrete.

- B. Do not place concrete when the rate of evaporation of surface moisture from concrete exceeds 0.2 pounds per square foot per hour as indicated in Figure 2.1.5 of ACI 305R.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Formwork: Refer to Section 03 11 00 - Concrete Forming, for requirements.

- B. Joint Fillers and Sealers: Refer to Section 03 15 00 - Concrete Accessories for requirements.

- C. Reinforcing Steel: Refer to Section 03 20 00 - Concrete Reinforcing, for requirements.

- D. Portland Cement Concrete: Refer to Section 03 05 15 - Portland Cement Concrete, for mix designs and other requirements.

- E. Concrete Curing Materials: Refer to Section 03 35 00 - Concrete Finishing, for requirements.

- F. Epoxy Adhesive: ASTM C881, Type II for non-load-bearing concrete and Type V for load-bearing concrete, Grade and Class as determined by project conditions and requirements.

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect forms, reinforcement, and embedded items, and obtain the Resident's written approval before placing concrete. Complete and sign a pour card on the form supplied by the Resident. The Resident shall countersign the card prior to commencing the pour.

3.02 PREPARATION

- A. Place concrete under the observation of the Resident and with Contractor's Quality Control Representative present to document requirements and results of the placement.
- B. Do not place concrete until conditions and facilities for the storage, handling, and transportation of concrete test specimens are in compliance with the requirements of ASTM C31 and are approved by the Resident.

3.03 TRANSPORTING

- A. Concrete shall be central-mixed concrete from a central batch plant, transported to the jobsite in a truck mixer, in accordance with the requirements specified in Section 03 05 15- Portland Cement Concrete, and ASTM C94.
- B. Transport concrete to the jobsite in a manner that will assure efficient delivery of concrete to the point of placement without adversely altering specified properties with regard to water-cement ratio, slump, air entrainment, and homogeneity.

3.04 CONVEYING AND PLACING

- A. Placement Standards: Conveying and placing of concrete shall conform with applicable requirements of ACI 301, ACI 302.1R, ACI 304R, and ACI 318.
- B. Handling and Depositing:
 - 1. Concrete placing equipment shall have sufficient capacity to provide a placement rate that will preclude cold joints and that shall deposit the concrete without segregation or loss of ingredients.
 - 2. Concrete placement, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed.
 - 3. Concrete shall be handled as rapidly as practicable from the mixer to the place of final deposit by methods that prevent the separation or loss of ingredients. Concrete shall be deposited, as nearly as practicable, in its final horizontal position to avoid redistribution or flowing.
 - 4. Concrete must not be dropped freely where reinforcing will cause segregation, nor shall it be dropped freely more than 5 feet. Concrete shall be deposited to maintain a plastic surface approximately horizontal.
 - 5. Concrete that has partially hardened must not be deposited in the work. The discharge of concrete shall be started not later than 60 minutes after the introduction of mixing water. Placing of concrete shall be completed within 90 minutes after the first introduction of water into the mix.
- C. Pumping:
 - 1. Concrete may be placed by pumping if the maximum slump can be maintained and if accepted in writing by the Resident for the location proposed.

**Hamilton Station Stabilization
C20046F**

2. Placing concrete by pumping methods shall conform with applicable requirements of ACI 304R and ACI 304.2R.
3. Equipment for pumping shall be of such size and design as to ensure a continuous flow of concrete at the delivery end without separation of materials. Concrete from end of hose shall have a free fall of less than 5 feet. Pump hoses shall be supported on horses or similar devices so that reinforcement or post-tensioning ducts or tendons are not moved from their original position.
4. The concrete mix shall be designed to the same requirements as specified in Section 03 05 15 - Portland Cement Concrete, and may be altered for placement purposes with the prior approval of the Resident.

3.05 CONSOLIDATION

- A. Concrete shall be thoroughly consolidated and compacted by mechanical vibration during placement in accordance with the requirements of ACI 309R.
- B. The Resident will inspect concrete placement to confirm that proper placing methods are being employed, and that special techniques are being used in congested areas and around obstructions such as pipes and other embedded items. Check installation of embedded items for correct location and orientation during concrete placement.
- C. Conduct vibration in a systematic manner by competent, skilled, and experienced workers, with regularly maintained vibrators, and with sufficient back-up units at the jobsite. Use the largest and most powerful vibrator that can be effectively operated in the given work, with a minimum frequency of 8,000 vibrations or impulses per minute, and of sufficient amplitude to effectively consolidate the concrete.
- D. Insert and withdraw the vibrator vertically at uniform spacing over the entire area of the placement. Space the distance between insertions such that "spheres of influence" of each insertion overlap.
- E. Conduct vibration so as to produce concrete that is of uniform texture and appearance, free of honeycombing, air and rock pockets, streaking, cold joints, and visible lift lines.
- F. On vertical surfaces and on all architectural concrete where an as-cast finish is required, use additional vibration and spading as required to bring a full surface of mortar against the forms, so as to eliminate objectionable air voids, bug holes, and other surface defects. Additional procedures for vibrating concrete shall consist of the following:
 1. Reduce the distance between internal vibration insertions and increase the time for each insertion.
 2. Insert the vibrator as close to the face of the form as possible, without contacting the form.
 3. Use spading as a supplement to vibration at forms to provide fully filled out form surfaces without air holes and rock pockets.
 4. Provide vibration of forms only if approved by the Resident for the location.

3.06 CONSTRUCTION JOINTS

- A. Construction joints will be permitted only where indicated or approved by the Resident.
- B. Provide and prepare construction joints and install waterstops in accordance with the applicable requirements of ACI 301 and ACI 304R.

**Hamilton Station Stabilization
C20046F**

- C. Make construction joints straight and as inconspicuous as possible, and in exact vertical and horizontal alignment with the structure, as the case may be.
- D. Use approved key, at least 1-1/2 inches in depth, at joints unless otherwise indicated or approved by the Resident.
- E. Thoroughly clean the surface of the concrete at construction joints and remove laitance, loose or defective concrete, coatings, sand, sealing compound and other foreign material. Prepare surfaces of joints by sandblasting or other approved methods to remove laitance and expose aggregate uniformly.
- F. Immediately before new concrete is placed, wet the joint surfaces and remove standing water. To allow for shrinkage, do not place new concrete against the hardened concrete side of a construction joint for a minimum of 72 hours.
- G. Locate joints that are not indicated so that the strength of the structure is not impaired. Joint types and their locations are subject to prior approval of the Resident.
- H. Ensure that reinforcement is continuous across construction joints.
- I. Place waterstops in construction joints where indicated or required by the Resident.
- J. Where bonding of the joint is required, provide epoxy adhesive hereinbefore specified and apply in accordance with ACI 503.2.
- K. Retighten forms and dampen concrete surfaces before concrete placing is continued.
- L. Allow at least 72 hours to elapse before continuing concrete placement at a construction joint unless approved by the Resident. Approval for accelerating the minimum time elapsing between adjacent placements will be based on tests and methods that confirm that a minimum moisture loss at a relatively constant temperature will be maintained for the period as necessary to control the heat of hydration and hardening of concrete, and to prevent shrinkage and thermal cracking.

3.07 EXPANSION AND CONTRACTION JOINTS

- A. Refer to Section 03 11 00 - Concrete Forming, for slab screeds and for formwork where expansion and contraction joints are indicated as architectural features, such as reveals or rustications.
- B. Refer to Section 03 15 00 - Concrete Accessories, for expansion joint filler material and joint sealing compound.

3.08 CURING AND PROTECTION

- A. Curing of concrete shall conform with applicable requirements of ACI 301 and ACI 308, except that the curing duration shall be a minimum period of ten days. HVFAC shall be cured a minimum of 28 days including an initial 10 days of moist curing. Curing with earth, sand, sawdust, straw, and hay will not be permitted.
- B. Keep concrete in a moist condition from the time it is placed until it has cured for at least ten days. Keep forms damp and cool until removal of forms.
- C. Immediately upon removal of forms, exposed concrete surfaces shall be kept moist by applying an approved curing compound or by covering with damp curing materials as specified in ACI 308.
- D. Concrete must not be permitted to dry during the curing period because of finishing operations.
- E. Protect fresh concrete from hot sun, drying winds, rain, damage, or soiling. Fog spray freshly placed slabs after bleed water dissipates and after finishing operations commence. Allow no slabs to become dry at any time until finishing operations are complete.

**Hamilton Station Stabilization
C20046F**

- F. Finishing and curing of slabs:
 - 1. Finishing of formed concrete surfaces shall conform to applicable requirements of ACI 301.
 - 2. Finishes for slabs and flatwork shall conform to applicable requirements of ACI 301.
 - 3. Curing: Conform to requirements of ACI 301 and ACI 308, as applicable.
- G. Protect concrete from injurious action of the elements and defacement of any kind. Protect exposed concrete corners from traffic or use that will damage them in any way.
- H. Protect concrete during the curing period from mechanical and physical stresses that may be caused by heavy equipment movement, subjecting the concrete to load stress, load shock, or excessive vibration.

3.09 REPAIR OF SURFACE DEFECTS

- A. Refer to Section 03 35 00 - Concrete Finishing, for requirements.

END OF SECTION 03 30 00

SECTION 03 30 53

POLYESTER CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Polyester Concrete.
- B. High-Molecular-Weight Methacrylate (HMWM.)

1.02 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for polyester concrete will be by the unit-price method as determined by the listing of the bid item polyester concrete indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: The unit-price method of measurement and payment for polyester concrete will be as follows:
 - 1. Measurement:
 - a. Placement of polyester concrete will be measured for payment by the cubic feet, and quantities will be computed, based on the neat lines or pay lines, section profiles, and dimensions indicated on the Contract Drawings, without deduction for chamfers, reinforcing steel, embedded items, and openings and recesses having an area of less than two square feet.
 - b. Additional concrete used to replace overcut or for overbreak, or to repair or replace defective work, will not be measured separately for payment.
 - 2. Payment: Polyester concrete will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.2.B.1.
 - a. The Contract price paid per cubic feet for polyester concrete shall include full compensation for furnishing all labor, materials (including high-molecular-weight methacrylate,) tools, equipment and incidentals, and for doing all the work involved in constructing the concrete work, complete in place, as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.
 - b. Full compensation for preparing polyester concrete placement schedules, coordinating the location of embedded items and other facilities, and modifying the proposed layout of embedded items, reinforcement and the like, is included in the Contract price paid for polyester concrete involved and no additional compensation will be allowed therefor.
 - c. Full compensation for furnishing and placing miscellaneous materials, including neoprene, expanded polystyrene, expansion joint filler, hardboard and plastic pipe, at the locations shown on the Contract Drawings is included in the Contract prices paid per cubic feet for polyester concrete and no additional compensation will be allowed therefor.
 - d. Full compensation for furnishing and installing joints and protective covers including surface preparation and bonding is included in the Contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.
 - e. Full compensation for cleaning and preparing the surfaces of new and existing concrete, and application of high-molecular-weight methacrylate, is included in the Contract prices paid for polyester concrete and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

- f. Full compensation for sampling, testing and inspections required by these Technical Specifications is included in the Contract prices paid for polyester concrete work involved and no additional compensation will be allowed therefor.

1.03 DEFINITIONS

- A. The term “polyester concrete” indicates a composite material which is composed of polyester resin binder and dry aggregate.
- B. The term “high-molecular-weight methacrylate” (HMWM) is a material that consists of compatible resin, promoter, and initiator.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
 - 2. ASTM D323 Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)
 - 3. ASTM D618 Standard Practice for Conditioning Plastics for Testing
 - 4. ASTM D638 Standard Test Method for Tensile Properties of Plastics
 - 5. ASTM D1475 Standard Test Method For Density of Liquid Coatings, Inks, and Related Products
 - 6. ASTM D2196 Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational Viscometer
 - 7. ASTM D2396 Standard Test Methods for Powder-Mix Time of Poly(Vinyl Chloride) (PVC) Resins Using a Torque Rheometer
 - 8. ASTM D3268 Standard Test Method for Separation and Collection of Particulate and Gaseous Fluorides in the Atmosphere (Sodium Bicarbonate-Coated Glass Tube and Particulate Filter Method)
- B. State of California, Department of Transportation, Standard Specifications (Caltrans):
 - 1. Section 90 Portland Cement Concrete
- C. State of California, Department of Transportation, Test Methods (Caltrans):
 - 1. 202 Method of Test for Sieve Analysis of Fine and Coarse Aggregates
 - 2. 205 Method of Test for Determining Percentage of Crushed Particles
 - 3. 206 Method of Test for Specific Gravity and Absorption of Coarse Aggregate
 - 4. 207 Method of Test for Specific Gravity and Absorption of Fine Aggregate
 - 5. 226 Method of Test for Determination of Moisture Content of Soils and Aggregates by Oven Drying
 - 6. 551 Method of Test for Determining Suitability of Materials for Overlayment and Repair of Portland Cement Concrete Pavements and Structures

**Hamilton Station Stabilization
C20046F**

1.05 SUBMITTALS

- A. General: Submittals for portland cement concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Polyester Concrete: Submit manufacturer's instructions, safety data sheets, testing data, and certificates of compliances indicating that the supplied products meet the material and strength requirements of the Technical Specification. Certificates of Compliance shall be signed by the materials manufacturer and Contractor.
- C. HMWM: Submit manufacturer's instructions, safety data sheets, testing data, and certificates of compliances indicating that the supplied products meet the material and strength requirements of the Technical Specification. Certificates of Compliance shall be signed by the materials manufacturer and Contractor.
- D. Aggregate and Sand Affidavits/Certificates: Submit evidence of compliance with Specification requirements for aggregate. Mill tests and manufacturers' certification of compliance with Caltrans and ASTM Specifications will be accepted in lieu of analysis of aggregates and sand. Certificates of Compliance shall be signed by the materials manufacturer and Contractor.
- E. HMWM Public Safety Plan. The plan shall include the following:
1. Identify the materials, equipment, and construction methods to be used.
 2. Submit safety data sheets for each component and details for shipping, storage, handling, and disposal of HMWM and containers.
 3. Provide an airborne emissions monitoring plan prepared by a Certified Industrial Hygienist (CIH) certified in comprehensive practice by the American Board of Industrial Hygiene. Submit a copy of the CIH's certification. The CIH must monitor the emissions at a minimum of 4 points including the mixing point, the application point, and the point of nearest public contact. At work completion, submit a report by the CIH with results of the airborne emissions monitoring plan.
 4. Revise and resubmit rejected plans.
- F. HMWM Application Plan. The plan shall include the following:
1. Description of equipment for applying HMWM.
 2. Description of equipment for applying sand.
 3. Gel time range and final cure time for resin.
 4. Revise and resubmit rejected plans.

1.06 QUALITY ASSURANCE AND CONTROL

- A. Before using polyester concrete, arrange for a representative from the manufacturer to provide training for:
1. Cleaning and preparing the area.
 2. Mixing and applying the bonding agent.
 3. Mixing, placing, and curing polyester concrete.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyester Concrete: Polyester concrete consists of polyester resin binder and dry aggregate. The polyester resin binder must be an unsaturated isophthalic polyester-styrene copolymer:

1. Polyester resin binder must comply with the requirements shown in the following table:

Polyester Resin Binder Requirements

Quality characteristic	Test method	Requirement
Viscosity ^a (Pa·s) RVT, No. 1 spindle, 20 RPM at 25 °C	ASTM D2196	0.075–0.200
Specific gravity ^a (25 °C)	ASTM D1475	1.05–1.10
Elongation (min, %) Type I specimen, 6.3±0.76 mm (0.25 ± 0.03 inch) thick Speed of testing = 11.4 mm/min (0.45 inch/minute) Condition 18/25/50+5/70: T—23/50	ASTM D638 ASTM D618	35
Tensile strength (min, MPa) Type I specimen, 6.3±0.76 mm (0.25 ± 0.03 inch) thick Speed of testing = 11.4 mm/min (0.45 inch/minute) Condition 18/25/50+5/70: T—23/50	ASTM D638 ASTM D618	17.24 (2,500 psi)
Styrene content ^a (% , by weight)	ASTM D2369	40–50
Silane coupler (min, %, by weight of polyester resin binder)	--	1.0
PCC saturated surface-dry bond strength at 24 hours and 70 ± 2 °F (min, psi)	California Test 551	500
Static volatile emissions ^a (max, g/sq m)	South Coast Air Quality Management District, Method 309-91	60

^aPerform the test before adding initiator.

2. Silane coupler must be an organosilane ester, gamma-methacryloxypropyltrimethoxysilane. Promoter must be compatible with suitable methyl ethyl ketone peroxide and cumene hydroperoxide initiators.
3. Aggregate for polyester concrete must comply with Caltrans 2015 Standard Specifications Sections 90-1.02C(1), 90-1.02C(2), and 90-1.02C(3). The combined aggregate gradation must comply with one of the gradations shown in the following table. You may submit an alternative gradation or request to use manufactured sand as fine aggregate but 100 percent of the combined gradation must pass the 3/8 inch sieve. Allow 21 days for review.:

Combined Aggregate Gradation

Sieve size	Percentage passing		
	A	B	C
1/2"	100	100	100
3/8"	83–100	100	100
No. 4	65–82	62–85	45–80
No. 8	45–64	45–67	35–67
No. 16	27–48	29–50	25–50
No. 30	12–30	16–36	15–36
No. 50	6–17	5–20	5–20
No. 100	0–7	0–7	0–9
No. 200	0–3	0–3	0–6

**Hamilton Station Stabilization
C20046F**

4. Aggregate retained on the no. 8 sieve must have a maximum of 45 percent crushed particles under California Test 205. Fine aggregate must be natural sand. The weighted average absorption must not exceed 1 percent when tested under California Tests 206 and 207.
 5. Contractor may submit an alternative gradation or request to use manufactured sand as fine aggregate but 100 percent of the combined gradation must pass the 3/8 inch sieve. Allow 28 days for review.
 6. Polyester concrete must have a minimum compressive strength of 1250 psi at 3 hours and 30 minutes under California Test 551 or ASTM C109
- B. Bonding Agent: Bonding agent must comply with the concrete manufacturer’s instructions.
- C. High-Molecular-Weight Methacrylate (HMWM): HMWM consists of compatible resin, promoter, and initiator:
1. HMWM resin may be prepromoted by mixing promoter and resin together before filling containers. Identify prepromoted resin on the container label.
 2. Adjust the gel time to compensate for temperature changes throughout the application.
 3. The quality characteristics of HMWM resin must comply with the requirements shown in the following table:

High-Molecular-Weight Methacrylate Quality Characteristics

Quality characteristic	Test method	Requirement
Viscosity ^a (max, cP, Brookfield RVT with UL adapter, 50 RPM at 25 °C)	ASTM D2196	25
Specific gravity ^a (min, at 25 °C)	ASTM D1475	0.90
Flash point ^a (min, °C)	ASTM D3278	82.2
Vapor pressure ^a (max, mm Hg, at 25 °C)	ASTM D323	1.0
Tack-free time (max, minutes at 77 °F)	Specimen prepared under California Test 551	400
Volatile content ^a (max, %)	ASTM D2369	30
PCC saturated surface-dry bond strength (min, psi, at 24 hours and 77 ± 2 °F)	California Test 551	500

^aPerform the test before adding initiator.

4. Sand must be commercial quality dry blast sand. At least 95 percent of the sand must pass the no. 8 sieve and at least 95 percent must be retained on the no. 20 sieve when tested under California Test 202.

PART 3 EXECUTION

3.01 GENERAL

- A. Construct only the portion of the work that will be completed during the same track closure.
- B. HMWM:
1. Before applying HMWM, clean the existing concrete surface by abrasive blasting and blow loose material from visible cracks with high-pressure air. Remove concrete curing seals from the concrete to be treated. The concrete must be dry when blast cleaning is performed. If the concrete surface becomes contaminated before applying the HMWM, clean the concrete surface by abrasive blasting.
 2. Protect existing facilities from HMWM. Contractor shall repair or replace existing facilities contaminated with HMWM at own expense.

**Hamilton Station Stabilization
C20046F**

3. HMWM may be applied manually to prevent overspray onto adjacent traffic. If applying resin manually, limit the batch quantity of HMWM to 5 gallons.
 4. Apply HMWM at a rate of 90 sq ft/gal. The prepared area must be dry and the surface temperature must be from 50 to 100 degrees F while applying HMWM. Do not apply HMWM if the ambient relative humidity is more than 90 percent.
 5. Apply HMWM within 5 minutes after complete mixing. Mixed HMWM viscosity must not increase. Redistribute excess material with squeegees or brooms within 10 minutes of application.
- C. Polyester Concrete:
1. **Mixing and Applying Bonding Agent:** Mix and apply the bonding agent at the job site under the manufacturer's instructions and in small quantities. Apply bonding agent after cleaning the surface and before placing concrete. Apply a thin, even coat of bonding agent with a stiff bristle brush until the entire work surface is scrubbed and coated with bonding agent.
 2. **Mixing Concrete:**
 - a. Mix concrete under the manufacturer's instructions. The quantity of aggregate filler, water, and liquid activator must comply with the manufacturer's instructions. Use the minimum amount of water to produce workable concrete and comply with the manufacturer's instructions.
 - b. When mixing with resin, the moisture content of the combined aggregate must not exceed 1/2 of the average aggregate absorption when tested under California Test 226. Proportion the polyester resin and aggregate to produce a mixture with suitable workability for the intended work. Only a minimal amount of resin may rise to the surface after finishing.
 3. **Placing Concrete:** Surface temperature must be at least 40 degrees F before placing concrete. You may propose methods to heat the surfaces. Place polyester concrete on surfaces treated with a HMWM bonding agent while the agent is still tacky. Do not retemper concrete. Use dry finishing tools cleaned with water before working the concrete.
 4. **Curing Concrete:** Cure concrete under the manufacturer's instructions. When curing compound is used, comply with Caltrans 2015 Standard Specifications Section 90-1.03B for curing compound no. 1 or 2.

END OF SECTION 03 30 53

SECTION 03 35 00

CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Repair of surface defects and spalls at retaining walls.
- B. Finishing of formed surfaces.
- C. Slabs and flatwork.
- D. Curing.

1.02 RELATED SECTIONS

- A. Concrete formwork is specified in Section 03 11 00 - Concrete Forming.
- B. Cast-in-place concrete is specified in Section 03 30 00 - Cast-In-Place Concrete.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for repair of spalls at retaining walls will be by the lump-sum method as determined by the listing of the bid item repair of spalls indicated in the Schedule of Quantities and Prices of Bid Form 1. Concrete Finishing will not be measured separately for payment.
- B. Payment: Concrete Finishing will be paid for as part of the Contract unit price for the associated concrete work as indicated in the Schedule of Quantities and Prices of Bid Form 1.
- C. Lump Sum: Repair of Spalls at Retaining Walls will be measured for payment by lump sum, acceptably performed and completed.
 - 1. Payment:
 - a. Repair of Spalls at Retaining Walls: The lump sum price paid for repairing spalls at the retaining wall locations shown on the Contract Drawings shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in repairing the spalls, complete in place, as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.

1.04 REFERENCES

- A. Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M182 Burlap Cloth Made from Jute or Kenaf
- B. Association Concrete Institute (ACI):
 - 1. ACI 117 Standard Specification for Tolerances for Concrete Construction and Materials
 - 2. ACI 301 Standard Specifications for Structural Concrete
 - 3. ACI 308 Standard Practice for Curing Concrete

**Hamilton Station Stabilization
C20046F**

- 4. ACI 503.4 Standard Specification for Repairing Concrete with Epoxy Mortars
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM C33 Specification for Concrete Aggregates
 - 2. ASTM C150 Specification for Portland Cement
 - 3. ASTM C171 Specifications for Sheet Materials for Curing Concrete
 - 4. ASTM C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 - 5. ASTM C881 Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - 6. ASTM E1155 Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers
- D. State of California, Department of Transportation (CalTrans) Standard Specifications Section 51 Concrete Structures

1.05 SUBMITTALS

- A. General: Submittals for concrete finishing shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submittals shall be made to VTA for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Shop Drawings: Submit drawings, or diagrams to scale, that indicate the location in plan and elevation of all concrete finishes.
- C. Product Data: Submit manufacturers' product data for manufactured products.
- D. Samples:
 - 1. Submit 1/2-pint sample container of aluminum oxide and silicon carbide abrasive grit for review and acceptance where "non-slip finish" is indicated.
 - 2. Submit samples not less than 12 inches by 12 inches in size of each type of sand blast finish, indicating materials and methods used to produce the sand blast finishes. Review by VTA will be for color and texture only. Approved samples will become VTA's control samples.

1.06 QUALITY ASSURANCE AND CONTROL

- A. Finishes:
 - 1. Finishing of formed concrete surfaces shall conform to applicable requirements of ACI 301.
 - 2. Finishes for slabs and flatwork shall conform to applicable requirements of ACI 301.
 - 3. Special architectural finishes for formed concrete surfaces shall conform with applicable requirements of ACI 301.

**Hamilton Station Stabilization
C20046F**

- B. Curing: Conform to requirements of ACI 301 and ACI 308, as applicable, and requirements specified herein.
- C. Site Mock-Ups: Provide site mock-ups, at least 3 feet by 4 feet in size, of finishes of formed surfaces in exposed locations and of exposed slab finishes for the Resident's review and approval.
- D. Site Mock-ups of Architectural Concrete: Provide site mock-ups of architectural concrete showing finish color, texture and pattern of exposed formed concrete surfaces.
 - 1. Size of mock-up shall be a minimum of 8 feet by 10 feet, unless otherwise approved by the Resident to be smaller.
 - 2. The number of mock-up panels required shall be the number necessary to obtain the Engineer's approval of color, pattern and texture of panel.
 - 3. Approved mock-up shall be used as the standard for the aesthetic quality of the surface finish of architectural concrete.
- E. Requirements of Regulatory Agencies: Comply with air pollution regulations of governing authorities for sand-blasting activities and operations.

PART 2 PRODUCTS

2.01 TOOLS AND EQUIPMENT

- A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required concrete-finishing work.

2.02 REPAIR AND FINISHING MATERIALS

- A. Portland Cement: ASTM C150, Type II, of same brand as used in the work. Furnish white portland cement where required to produce color matching color of surrounding concrete.
- B. Aggregate:
 - 1. For Bonding Grout: ASTM C33, washed clean sand passing a No. 30 sieve.
 - 2. For Patching Mortar: ASTM C33, washed clean, graded fine aggregate of suitable size for areas to be repaired. Clean coarse aggregate up to Size No. 8 may be added for repair of larger pockets and voids.
- C. Commercial Patching Mortar: A structural repair mortar may be furnished if appropriate for the use and approved by the Resident.
- D. Epoxy Patching Mortar: As specified in ACI 503.4 for Epoxy Mortar.
- E. Epoxy Adhesive: ASTM C881, Type II or Type V, epoxy-based bonding agent.
- F. Anti-Slip Abrasive Grit: Virgin grain Aluminum Oxide or Silicon Carbide particles, or a mixture of the two.

2.03 CURING MATERIALS

- A. Damp Curing Materials:
 - 1. Waterproof Sheet Materials: ASTM C171, waterproof paper with white paper face, polyethylene film pigmented white, or white burlap-polyethylene sheeting.
 - 2. Burlap: AASHTO M182, of class or weight suitable for the use and location. Do not use burlap where concrete is exposed to direct sunlight.

**Hamilton Station Stabilization
C20046F**

- B. Curing Compound: ASTM C309, liquid membrane-forming curing compound, Type 1, Class A or B as appropriate for the use or location.
1. Where concrete surfaces will receive architectural finishes, membrane-forming curing compound must not leave a coating or residue that will impair bond of adhesives, paints, and coatings with concrete.

PART 3 EXECUTION

3.01 REPAIR OF SURFACE DEFECTS AND SPALLS

- A. Repair Standards: Repair of surface defects and spalls shall conform with applicable requirements of ACI 301. When using epoxy mortar, conform with applicable requirements of ACI 503.4.
- B. Surface Defects:
1. Repair of surface defects shall begin immediately after form removal. For repair with epoxy mortar, concrete shall be dry.
 2. Surface defects are defined to include: form-tie holes, air voids or pockets, bug holes with a nominal diameter or depth greater than 1/4-inch, honeycombed areas, rock pockets, visible construction joints, fins and burrs.
 3. Repair of surface defects shall be tightly bonded and shall result in concrete surfaces of uniform color and texture, matching adjacent surfaces, and free of shrinkage cracks.
- C. Repair Work:
1. Remove honeycombed and other defective concrete down to sound concrete. Saw-cut the edges perpendicular to the surface or slightly undercut. Feather-edges will not be permitted. Dampen the area to be patched and an area at least 6 inches wide surrounding it to prevent absorption of water from the patching mortar.
 2. Where rock pockets or similar defects or voids expose steel reinforcement, cutout to solid surface behind the reinforcing steel to provide suitable key-lock for patching mortar. Patching mortar shall envelope the exposed reinforcing bar.
 3. Bond patching mortar to concrete with bonding grout or epoxy adhesive. Bonding grout shall consist of 1 part portland cement to 1 part No. 30 mesh sand, mixed to the consistency of a thick cream, and then well brushed onto the concrete. Bond commercial patching mortar to concrete in accordance with the manufacturer's instructions.
 4. Make the patching mortar of the same materials and of approximately the same proportions as used for the concrete, except omit the coarse aggregate. Use not more than 1 part portland cement to 2-1/2 parts sand by damp loose volume, and substitute white portland cement for a portion of the regular gray portland cement to produce patching mix matching the surrounding concrete in color when dry. Determine the proportion of white portland cement by trial mixes and test areas, prior to repair of actual defective areas.
 5. After surface water has evaporated from the area to be patched, brush the bond coat well into the surface. When the bond coat begins to lose the water sheen, apply the patching mortar. Compact the mortar into place and strike off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, leave the patch undisturbed for at least 1 hour before being finally finished. Keep the patched area damp for 7 days.

**Hamilton Station Stabilization
C20046F**

6. Neatly finish patched surfaces to match adjacent surrounding surface texture of concrete. Grind or fill surfaces to produce level and plumb, true planes.
7. Patching of honeycombed areas or rock pockets that are too large and unsatisfactory for mortar patching shall be cut out to solid surface, keyed, and packed solid with matching concrete to produce firm bond and flush surface. Patching shall match texture of adjacent surfaces where exposed in the finished work.
8. Repair work in exposed locations that does not match the texture and color of surrounding adjacent surfaces or that was not well performed shall be removed and performed again until the repair work conforms with Specification requirements.
9. Completed repairs shall be cured as herein specified under Article 3.4, Curing.

3.02 FINISHING OF FORMED SURFACES

A. Unexposed Surfaces:

1. Concrete that will not be exposed in the completed structure shall be any form finish as specified in Section 03 11 00 - Concrete Forming, and ACI 301 for "rough form finish."
2. Concrete to receive membrane waterproofing shall receive a "smooth form finish" in accordance with ACI 301.

B. Exposed Surfaces: Unless indicated otherwise, concrete that will be exposed in the completed structure shall receive the following finishes as indicated:

1. Smooth Form Finish: Conform to ACI 301.
2. Smooth Rubbed Finish: Conform to ACI 301.
3. Grout Cleaned Finish: Conform to ACI 301.
4. Unspecified Finish: When finish is not indicated, provide "smooth form finish" as specified above.

C. Sand Blast Finish:

1. Blasting Operations and Requirements:
 - a. Apply sandblasted finish to exposed concrete surfaces where indicated.
 - b. Perform sand blasting at least 72 hours after placement of concrete. Coordinate with formwork construction, concrete placement schedule, and formwork removal to ensure that surfaces to be blast finished are blasted at the same age for uniform results.
 - c. Determine type of nozzle, nozzle pressure, and blasting techniques required to match VTA's control samples.
 - d. Abrasive blast corners and edge of patterns carefully, using back-up boards, to maintain uniform corner or edge line.
2. Depths of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surface to match VTA's control samples as follows:

**Hamilton Station Stabilization
C20046F**

- a. Brush Sand Blast Finish: Remove cement matrix to expose face of fine aggregate; no reveal.
 - b. Light Sand Blast Finish: Expose fine aggregate with occasional exposure of coarse aggregate; maximum 1/16-inch reveal.
 - c. Medium Sand Blast Finish: Generally expose coarse aggregate; 3/16-inch to 1/4inch reveal.
3. Surface Continuity: Perform sand blast finishing in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work. Maintain patterns of variances in depths of cuts as indicated.
 4. Construction Joints: Use technique acceptable to VTA to achieve uniform treatment of construction joints.
 5. Protection and Repair:
 - a. Protect adjacent materials and finishes from dust, dirt, and other surface or physical damage during abrasive blast finishing operations. Provide protection as required and remove from site at completion of the work.
 - b. Repair or replace other work damaged by finishing operations.
 6. Clean-up: Maintain control of concrete chips, dust, and debris in each area of the work. Clean up and remove such material at the completion of each day of operation. Prevent migration of airborne materials by use of tarpaulins, wind breaks, and similar containing devices.

3.03 SLABS AND FLATWORK

- A. Placement and Finishing Standards: Slabs and flatwork shall be placed, consolidated, and finished in accordance with applicable requirements of ACI 301. Coordinate with Section 03 30 00 - Cast-In-Place Concrete, as applicable.
 1. High volume fly ash concrete (HVFAC) exhibits little or no bleed water. Commence finishing as soon as power screeding is complete, and commence initial curing as soon as finishing has been completed.
- B. Placement:
 1. Slabs and flatwork shall be placed and finished monolithically. Strike off and screed slabs to true, plane surfaces at required elevations, and thoroughly compact concrete with vibrators, floats, and tampers to force coarse aggregate below the surface. Finish slab within four hours of concrete placement.
 2. Whether indicated or not, in areas where drains occur, slope finished slab to drains. Slope shall be a minimum of 1/8-inch per foot unless otherwise indicated.
- C. Slab Finishes: Unless indicated otherwise, slabs and flatwork shall receive the following finishes as indicated:
 1. Troweled Finish: Conform to ACI 301. Provide "troweled finish" for interior slabs and flatwork to be exposed in the completed structure, for slabs to receive resilient floor coverings, and for flatwork to receive elastomeric bearing pads.
 2. Broom Finish: Conform to ACI 301. Exact texture and coarseness of the broom finish shall match the approved site mock-up. Provide fine or medium-coarse "broom finish" as indicated for exterior sidewalks and paving, and exterior ramps.

**Hamilton Station Stabilization
C20046F**

3. Nonslip Finish: Conform to ACI 301. Nonslip materials shall be aluminum oxide and silicone carbide grit particles. Provide "nonslip finish" for interior pedestrian ramps, walkways, and other floor areas where indicated.
 4. Unspecified Finish: When finish is not indicated or specified, provide finishes as specified in ACI 301.
- D. Surface Tolerances: As specified herein:
1. Flat Tolerance: Slabs and flatwork with "troweled finish" and with "nonslip finish."
 2. Straightedge Tolerance: Slabs and flatwork with fine "broom finish" or medium-coarse "broom finish."
- E. Bullfloated Tolerance: Slabs and flatwork with coarse "broom finish."
- F. Joints:
1. Construction, expansion, and contraction joints shall be located as indicated. Construction joints shall act as contraction joints. Where additional contraction joints are required to prevent shrinkage cracks, saw-cut such joints. All joints shall be straight and true to line. Saw-cut joints not less than twelve hours nor more than twenty-four hours after placing concrete, unless otherwise approved by the Resident.
 2. Mark-off lines or edges at formed construction and expansion joints shall be finished with 1/4-inch radius curved edging tool, neat and true to line, uniform throughout.

3.04 CURING

- A. Curing Standards: Curing of concrete shall conform with applicable requirements of ACI 301 and ACI 308, except that the duration of the curing period shall be ten days. Curing with earth, sand, sawdust, straw, and hay will not be permitted.
- B. Curing Requirements:
1. Concrete shall be cured with waterproof sheet materials, damp burlap, or curing compounds.
 2. Curing compounds must not be used on surfaces exposed to ballast and on surfaces when their use may be detrimental to bonding of concrete, mortar, caulking and sealants, adhesives, , paint, or the specified surface finish or coating.
- C. Damp Curing:
1. Vertical surfaces shall be cured by keeping the forms wet at all times and by leaving the forms in place as long as possible as specified in Section 03 11 00 - Concrete Forming. After removal of forms, concrete shall be kept continuously damp by fog spraying or otherwise washing down the concrete in an accepted manner until ten days after placing. Protect exposed surfaces by covering with sheet materials or burlap kept continuously moist.
 2. Horizontal surfaces shall be cured and protected by covering the finished surfaces with waterproof sheet materials or damp burlap, left in place for a minimum of ten days and kept continuously moist.
 3. Fog spray freshly placed slabs until finishing operations commence. Allow no slabs to become dry until finishing operations are complete.

**Hamilton Station Stabilization
C20046F**

- D. Curing HVFAC: Initiate damp curing as soon as finishing has been completed. Damp cure for a minimum of ten days. Continue curing for a total of 28 days. Curing after initial ten days may be by damp curing or using membrane-forming curing compound. Use evaporation reducer between finish operations, as necessary, to protect concrete from rapid drying
- E. Curing Compound: Application of curing compound shall conform to applicable requirements of ACI 308.

3.05 PROTECTION

- A. Protect exposed concrete surfaces, including flatwork, as required to prevent damage from impact or strains.
- B. Protect fresh concrete from drying winds, rain, damage, or soiling.
- C. Refer to Section 03 30 00 - Cast-In-Place Concrete, Article 3.8, for additional requirements.

3.06 TOLERANCES

- A. Formed Surfaces: Conform with applicable requirements of ACI 117.
 - 1. The finished plane must not vary more than 1/8-inch from the elevation indicated.
- B. Slabs and Flatwork: Conform to applicable classification requirements of ASTM E1155, as follows:
 - 1. Very Flat Tolerance: FF 50, FL30. True plane with maximum variation of 1/8-inch in 10 feet when measured with a 10-foot straightedge placed anywhere on the slab in any direction.
 - 2. Flat Tolerance: FF 30, FL20. True plane with maximum variation of 3/16-inch in 10 feet when measured with a 10-foot straightedge placed anywhere on the slab in any direction.
 - 3. Straightedge Tolerance: FF 20, FL 15. True plane with maximum variation of 5/16-inch in 10 feet when measured with a 10-foot straightedge placed anywhere on the slab in any direction.

END OF SECTION 03 35 00

SECTION 03 41 00

PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vertical joint cover.

1.02 RELATED SECTIONS

- A. Section 03 20 00 - Concrete Reinforcing
- B. Section 03 30 00 - Cast-In-Place Concrete

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment will be by the unit-price method as determined by the listing of the bid items indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: The measurement and payment for precast structural concrete vertical joint cover is by the unit-price method, and will be as follows:
 - 1. Measurement: Precast structural concrete vertical joint cover will be measured by each.
 - 2. Payment: Precast structural concrete vertical joint cover will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.3.B.1, "Measurement," herein.
 - a. The Contract price paid for precast structural concrete vertical joint cover shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the precast structural concrete vertical joint cover, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA
 - b. Full compensation for furnishing and installing closed cell polyethylene backing rod, and performing grinding and removal of concrete at panel face, is included in the Contract prices paid per each for precast structural concrete vertical joint cover and no additional compensation will be allowed therefor.
 - c. Full compensation for furnishing and installing dowels to be bonded in drilled holes, and for drilling holes for dowels, including coring through reinforcement if required and approved by VTA, and for bonding and bonding (chemical adhesive) is included in the Contract price paid per each for precast structural concrete vertical joint cover and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

1.04 REFERENCES

- A. ACI 318-14 Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
- B. PCI MNL-116 Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; Precast/Prestressed Concrete Institute.
- C. PCI MNL-135 Tolerance Manual for Precast and Prestressed Concrete Construction; Precast/Prestressed Concrete Institute.

1.05 SUBMITTALS

- A. See Section 01 33 23 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Product Data:
 - 1. Indicate standard component configurations.
- C. Shop Drawings:
 - 1. Detail fabrication and installation of precast structural concrete units including connections to each adjoining member.
 - 2. Indicate location of each structural precast concrete member by same identification mark placed on unit.
- D. Mix Designs:
 - 1. Mix designs shall be submitted and shall show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job.

1.06 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 318
 - 2. PCI MNL 116
- B. Sampling, Testing and Inspection:
 - 1. General:
 - a. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - b. Testing agencies shall meet the requirements of ASTM C1077 and ASTM E329. Testing agencies shall be accepted by the Architect/Engineer before performing any work.
- C. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS

2.01 MATERIALS

A. Form Materials:

1. Forms: Rigid, dimensionally stable, nonabsorptive material, warp and buckle free, that will provide precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required surface finishes.
2. Form-Release Agent: Commercially produced form-release agent that will not bond with, stain or affect hardening of precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

B. Concrete Materials and Mix Designs:

1. Concrete: Provide concrete materials in accordance with Section 03 30 00 - Cast-in-Place Concrete. Color shall match existing concrete.
2. Mix Design: As specified in Section 03 30 00 - Cast-in-Place Concrete.

C. Reinforcement:

1. Reinforcing Steel: As specified in Section 03 20 00 - Concrete Reinforcing.

2.02 FABRICATION

A. Conform to fabrication procedures specified in PCI MNL-116.

B. Ensure reinforcing steel located as indicated on shop drawings.

C. Reinforcement: Comply with recommendations in PCI MNL-116 for fabricating, placing, and supporting reinforcement except where more stringent requirements are specified at Section 03 20 00 - Concrete Reinforcing.

D. Comply with requirements in PCI MNL 116 and Section 03 30 00 - Cast-in-Place Concrete for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

E. Comply with PCI MNL 116 procedures for hot and cold-weather concrete placement. Cure concrete, according to requirements in PCI MNL 116.

2.03 FINISHES

A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.

B. Grade A Finish: Repair all surface blemishes and fill all air holes with the exception of air holes 1/16 inch in width or smaller and form marks where the surface deviation is less than 1/16 inch. Float-apply a neat cement-paste coating to exposed surfaces. Rub dried paste coat with burlap to remove loose particles. Discoloration is permitted at form joints. Grind smooth all form joints.

2.04 FABRICATION TOLERANCES

A. Conform to fabrication tolerances specified in PCI MNL-135.

**Hamilton Station Stabilization
C20046F**

2.05 FABRICATION TOLERANCES

- A. Strength of precast concrete members will be considered deficient if units fail to comply with ACI 318 concrete strength requirements.
- B. Acceptability: Structural precast concrete members that do not comply with acceptability requirements in PCI MNL 116, including concrete strength, and manufacturing tolerances, are unacceptable. Chipped, spalled or cracked members may be repaired. Replace unacceptable units with precast concrete members that comply with requirements.

PART 3 EXECUTION

3.01 ERECTION

- A. Maintain horizontal and vertical joint alignment and uniform joint width to match existing as erection progresses.

END OF SECTION 03 41 00

SECTION 03 61 30

BACKFILL GROUTING

PART 1 GENERAL

1.01 DEFINITIONS

- A. Backfill grouting: A process where a flowable, high slump, cement mortar grout is injected under pressure through a grout pipe into the embankment backfill at various elevations in stages to fill existing voids behind MSE panels.

1.02 SUBMITTALS

- A. Submit a grouting plan outlining the proposed work for backfill grouting. The plan must include:
1. A list of personnel to be used on the project outlining their experience in backfill grouting
 2. Grout mix design including material specifications. Preconstruction 3x6 cylinder of grout for density measurement.
 3. Equipment and methods for measuring and recording stroke and back pressures, including pressure surges at the top of the injection point
 4. Equipment and methods for measuring and recording pumping rates and grout volumes with calibration procedures and certification of the equipment
 5. Description of:
 - a. The materials and equipment, including size and type
 - b. Methods to be used in each grouting operation, including inclination and depth of grout pipes, and increments in which the grout pipes will be withdrawn
 6. Detailed description of the proposed monitoring program for wall panel movement
- B. VTA has 7 days to review the grouting plan. If revisions are required, resubmit 3 copies of the grouting plan. VTA has 7 days to review the revised plan.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for Backfill Grouting will be by the unit-price method.
- B. Unit Prices: The unit-price method of measurement and payment will be as follows:
1. Measurement: Backfill Grouting will be measured by the cubic foot.
 2. Payment: Backfill Grouting will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.03.B.1, "Measurement," herein.
 - a. The Contract price paid for Backfill Grouting shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in grouting the backfill, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS

2.01 MATERIALS

A. Grout:

1. Grout must be a combination of Portland cement, fine aggregate, and water. A flowable high slump grout mix must be used. Materials must be thoroughly mixed and agitated to provide grout of uniform consistency. The grout must have a 28-day compressive strength for 50 psi to 200 psi. Water must be added to the grout mix in an amount to provide a slump of 6-8 inches under ASTM C 143. Dry density of the grout must not exceed 110 pcf.

B. Cement:

1. Portland cement must be Type I or II.
2. Comply with ASTM C 1107.

C. Fine Aggregate:

1. Fine aggregate must be natural or manufactured sand or crushed gravel. Fine aggregate must be well graded and have between 10 and 30 percent passing the no. 200 sieve and a minimum of 85 percent of content passing the no 8 sieve. Fine aggregate must be graded to eliminate sand blocking at the grout working pressures.

D. Water:

1. Water for mixing must not contain:

a. Oil

- b. Impurities at concentrations that cause either of the following results when compared to the same test using distilled or deionized water:

- 1). Change of more than 25 percent in the setting time of cement when tested under ASTM C 191 or ASTM C 266
- 2). Reduction by more than 5 percent in the mortar compressive strength at 14 days when tested under ASTM C 109

- c. Chlorides as Cl or sulfates as SO₄ in excess of the values shown in the following table:

Type of concrete work	Maximum chloride as Cl ^a	Maximum sulfate as SO ₄ ^b
Nonreinforced	2,000 ppm	Reduction by more than 5 percent in the mortar compressive strength at 14 days when tested under ASTM C 109 1,500 ppm

^aWhen tested under California Test 422

^bWhen tested under California Test 417

2. Water for mixing must not contain:

a. More than 1,000 parts per million of chlorides as CL

b. More than 1,300 parts per million of sulfates as SO₄

c. Impurities that cause concrete discoloration of surface etching

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Equipment used to mix and pump compaction grout must be specifically designed for that purpose.
- B. The mixer must be batch type and equipped with suitable water meters. Sufficient mixer power must be provided to blend the ingredients into zero slump consistencies.
- C. The pump must be capable of maintaining pressures with rates of displacement as low as 0.3 cfm. Controls must be provided to enable the operator to vary the rate of displacement over its entire range uniformly while continuously pumping. Pressure must not exceed 5 psi.
- D. The pumping system must be equipped with suitable automatic recording devices that continuously measure and record grout pressures including stroke, back, and surge at the top injection point; pumping rates and grout take for each hole; and total grout take per work shift. Calibrate the instruments for measuring pressures, pumping rates, and volume. Submit 2 copies of the automatic records as informational submittals at the end of each workday.
- E. Existing panel joints must be temporarily sealed to prevent grout leakage. Grouting must be done in lifts to limit grout pressure at the panel back face and to limit final panel outward movement to no more than 1/8". Push the grout pipe to 24 inches past the face of panel. Grout voids as the pipe is slowly withdrawn.
- F. Lifts must not exceed 2 feet with a minimum of 4 hours between lifts.
- G. During the grouting operation, monitor the existing panels for indications of movement or distress.
- H. Submit a survey of wall panel corner measurements (of those panels identified for back grouting) prior to grouting and measurements after each 4-foot increment of wall height is grouted.

END OF SECTION 03 61 30

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 05 05 22

METAL WELDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Welding Rod/Electrodes
- B. Shop Welding
- C. Inspections and Tests by Contractor
- D. Inspections and Tests by VTA

1.02 RELATED SECTIONS

- A. Welding of reinforcing steel for concrete is specified in Section 03 20 00 - Concrete Reinforcing.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement: Welding and welds will not be measured separately for payment.
- B. Payment: Welding and welds, including inspections and tests to be performed by Contractor, will be paid for as part of the indicated Contract unit prices for the associated steel and metal work, and tieback assemblies, as indicated in the Schedule of Quantities and Prices of Bid Form 1.

1.04 REFERENCES

- A. American Society for Nondestructive Testing (ASNT):
 - 1. SNT-TC-1A Recommended Practice
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM E94 Guide for Radiographic Testing
 - 2. ASTM E142 Method for Controlling Quality of Radiographic Testing
 - 3. ASTM E164 Practice for Ultrasonic Contact Examination of Weldments
 - 4. ASTM E165 Test Method for Liquid Penetrant Inspection Method
 - 5. ASTM E709 Guide for Magnetic Particle Examination
 - 6. ASTM E1032 Method for Radiographic Examination of Weldments
- C. American Welding Society (AWS):
 - 1. AWS A5 Welding Rods, Electrodes, and Filler Metals Series
 - 2. AWS B1.10 Guide for the Nondestructive Inspection of Welds
 - 3. AWS D1.1 Structural Welding Code Steel

**Hamilton Station Stabilization
C20046F**

- | | | |
|----|-----------|---|
| 4. | AWS D1.4 | Structural Welding Code Reinforcing Steel |
| 5. | AWS D1.5 | Bridge Welding Code |
| 6. | AWS D10.4 | Recommended Practices for Welding Austenitic Chromium- Nickel Stainless Steel Piping and Tubing |
| 7. | AWS D10.9 | Specification for Qualification of Welding Procedures and Welders for Piping and Tubing |
| 8. | AWS QC 1 | Standard for AWS Certification of Welding Inspectors |

1.05 SUBMITTALS

- A. General: Submittals for metal welding shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
1. Submittals shall be made to VTA for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Welder Qualifications: Submit copies of qualification test records for each welder, welding operator, and tack welder to be employed in the work. Comply with requirements of AWS D1.1. For bridgework, comply with requirements of AWS D1.5. For pipe and tube, comply with requirements of AWS D10.4.
1. Submit welders' identification marks (I.D.) for each welder along with qualifications.
- C. Welding Procedure Specifications (WPS): Prior to commencement of welding, submit the procedure specifications that will be used for welding. The WPS shall contain all data indicated in AWS D1.1 Annex IV, and any other information necessary to produce welded joints in compliance with this specification. For procedures other than those prequalified in accordance with AWS D1.1 and D1.5, submit a copy of procedure qualification test records in accordance with the qualification requirements of AWS D1.1 and AWS D1.5, as applicable. WPS shall also include the mitigation of corrosion of welds, including heat treatment and chemical compatibility, as applicable.
- D. Welding Records and Data:
1. Submit all radiographs upon completion of fabrication.
2. Submit certifications that magnetic particle and dye-penetrant inspections have been satisfactorily completed.
3. Submit records of ultrasonic testing upon completion.
4. If field welding is permitted, submit descriptive data for field welding equipment.
- E. Mill Certificates: Submit mill certificates and certified copy of reports for analyses and tests required by referenced ASTM and AWS specifications.

1.06 QUALITY CONTROL

- A. Qualifications of Welders and Welding Procedures: Welders, welding operators, tack welders, and welding procedures shall be prequalified or qualified in accordance with the following AWS Welding Codes and Standards:

**Hamilton Station Stabilization
C20046F**

1. Structural Steel: AWS D1.1, Section 4, Qualification. Includes steel for miscellaneous metalwork, steel stairs, and railings.
 2. Concrete Reinforcing Steel: AWS D1.4, Section 6, Qualification. Coordinate with requirements specified in Section 03 20 00 - Concrete Reinforcing.
 3. Steel for Bridges: AWS D1.5, Section 5, Qualification.
 4. Pipe and Tube: AWS D10.9
- B. Qualifications of Welding Inspector: Welds to be inspected by Contractor shall be inspected and certified by a Contractor-employed AWS Certified Welding Inspector (CWI), certified in accordance with AWS QC 1.
- C. Qualification of Personnel Performing Nondestructive Testing: Personnel performing nondestructive testing, who are Contractor-employed, shall be qualified and certified in accordance with SNT-TC-1A. Only persons certified for NDT Level I and working under a NDT Level II person or persons certified for NDT Level II may perform nondestructive testing.

PART 2 PRODUCTS

2.01 WELDING ROD/ELECTRODES

- A. Electrodes for structural plate, shapes, pipe, tubes, and bars shall conform with AWS A5 Series Standards and shall be coated rods or wire of size and classification number as recommended by their manufacturers for the positions and other conditions of actual use. Matching filler metal requirements shall conform with AWS D1.1 and AWS D1.5, as applicable.

2.02 SHOP WELDING

- A. Perform shop welding as indicated in accordance with the AWS D1.1 and D1.5, as applicable to the work.
- B. Welders shall mark adjacent to completed welds their welder I.D., using metal stamp, metal engraving, keel, paint stick, or other appropriate marking material.

2.03 INSPECTIONS AND TESTS BY THE CONTRACTOR

- A. Visual Inspection: All welds shall be visibly examined in accordance with AWS D1.1 and AWS D1.5, as applicable. Quality of welds and standards of acceptance shall be in accordance with AWS D1.1 and AWS D1.5.
- B. Nondestructive Testing: Nondestructive testing shall conform with AWS B1.10.
- C. Radiographic Testing: Radiographic testing of welds shall conform with AWS D1.1, AWS D1.5 and ASTM E94, ASTM E142 and ASTM E1032, as applicable. Complete joint penetration groove welds shall be tested as follows:
1. 10 percent with thickness equal to or less than 3/4 inch.
 2. 50 percent with thickness greater than 3/4 inch and equal to or less than 1-1/2 inches.
 3. 100 percent for thickness greater than 1-1/2 inches.
- D. Ultrasonic Testing: Ultrasonic testing of welds shall conform with AWS D1.1, AWS D1.5 and ASTM E164, as applicable. Complete joint penetration groove welds not accessible for radiographic testing shall, with Engineer's approval, be subjected to ultrasonic testing. The extent shall be the same as specified for radiographic testing.

**Hamilton Station Stabilization
C20046F**

- E. Magnetic Particle Inspection: Magnetic particle inspection of welds shall conform with ASTM E709. Complete and partial joint penetration groove welds and fillet welds shall be inspected as follows:
 - 1. 20 percent of complete joint penetration groove welds of tee and corner joints.
 - 2. 10 percent of partial joint penetration groove welds and fillet welds.
- F. Liquid Penetrant Inspection: Liquid dye penetrant inspection of welds shall conform with ASTM E165. Liquid penetrant inspection shall be used for detecting discontinuities that are open to the surface.
- G. Test Results: Test result information shall be forwarded to VTA immediately after test results are available, stating the acceptance or rejection of fabricated components, so that repairs and reinspection or testing may be performed as soon as possible.
- H. Repairs: Unacceptable welds shall be repaired in accordance with AWS D1.1, and AWS D1.5, as applicable. Repaired or corrected welds shall be reinspected or retested as specified for the original weld.

2.04 INSPECTIONS AND TESTS BY THE RESIDENT

- A. All welds are subject to inspections and tests by the Resident as specified herein. Welds to be inspected and tested by the Resident will be selected at random.
- B. The Resident will make test results available to the Contractor.

PART 3 EXECUTION

3.01 FIELD WELDING

- A. Field welding, where indicated or permitted by the Engineer, shall be performed as herein specified for shop welding. Contractor shall identify a risk for fire damage and maintain a fire watch during the work as approved by VTA.

3.02 INSPECTIONS AND TESTS

- A. Contractor shall perform inspections and tests of field welds as herein specified for shop welds.
- B. The Resident reserves the right to perform inspections and tests of field welds as herein specified for shop welds.

END OF SECTION 05 05 22

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Angles, Tubes, Pipes, Plates and Shapes
- B. Anchors and Bolts
- C. Galvanizing of Steel and Ferrous Metal Items

1.02 RELATED SECTIONS

- A. Tiebacks, anchorages for tiebacks, and threaded rods for tiebacks are specified in Section 31 32 26 - Tieback Assembly.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and Payment for metal fabrications will be by the unit-price method as determined by the listing of the bid item metal fabrications indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: If the Schedule of Quantities and Prices indicates a unit price for metal fabrications, the unit-price method of measurement and payment will be as follows:
 - 1. Measurement:
 - a. Measurement: Metal fabrications and miscellaneous metal items will be measured for payment by the pound, acceptably fabricated and installed, as indicated in the Schedule of Quantities and Prices of Bid Form 1.
 - 2. Payment: Metal fabrications will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.3.B.1.
 - a. The Contract price paid per pound for metal fabrication shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing, fabricating and delivering metal fabrications to the job site, ready for installation, including furnishing all bolts, nuts and washers, welding materials, or other materials required for the installation of the metal fabrication; galvanizing the metal fabrication when galvanizing is required by the Technical Specifications or Contract Drawings; and conforming to the qualification and testing requirements associated with fabrication; as shown on the Contract Drawings, and as specified in these Technical Specifications, and as directed by VTA.
 - b. Full compensation for furnishing and installing anchorages, threaded rods, and other miscellaneous metal items required for tieback assemblies is included in the Contract prices paid per each for tiebacks and no additional compensation will be allowed therefor.
 - c. Full compensation for furnishing and installing splice plates, bolts, and other miscellaneous metal items required for performing soil reinforcing strip tightening is included in the Contract price paid per cubic yard for structural excavation (waler and tieback assembly) and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A27 Specification for Steel Castings, Carbon, for General Application
2. ASTM A47 Specification for Ferritic Malleable Iron Castings
3. ASTM A48 Specification for Gray Iron Castings
4. ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
5. ASTM A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6. ASTM A143 Recommended Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
7. ASTM A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
8. ASTM A307 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile
9. ASTM A384 Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
10. ASTM A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
11. ASTM A449 Specification for Quenched and Tempered Steel Bolts and Studs
12. ASTM A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
13. ASTM A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
14. ASTM A536 Specifications for Ductile Iron Castings
15. ASTM A563 Specification for Carbon and Alloy Steel Nuts
16. ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
17. ASTM A668 Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use
18. ASTM A780 Practice for Repair of Damaged Hot-Dip Galvanized Coatings
19. ASTM F436 Specification for Hardened Steel Washers
20. ASTM F436 Specification for Hardened Steel Washers

1.05 SUBMITTALS

A. General: Submittals for metal fabrications concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.

**Hamilton Station Stabilization
C20046F**

1. Submittals shall be made to VTA for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Shop Drawings: Submit fully detailed Shop Drawings of metal fabrications and miscellaneous metalwork, showing sizes, details of fabrication and construction, methods of assembly, locations of hardware, anchors, and accessories, and installation details.
 1. Shop Drawings shall include welding technique, connections, holes, fasteners, type of finish, paint system, weights of members, and critical clearances.
 2. Welds shall be indicated by standard welding symbols of AWS A2.4.
 3. Items to be galvanized in accordance with applicable requirements of ASTM A384 and ASTM A385.
- C. Product Data: Submit manufacturers' product data of all manufactured items and products.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Manufactured steel clips and angles will be accepted where such will meet the requirements of the Contract Drawings and are shown on approved Shop Drawings.
- B. Steel Materials:
 1. Shapes: Standard structural sections, shapes, plates, and bars, as indicated, conforming with ASTM A572 Grade 50.
 2. Tubing: Steel tubing, conforming with ASTM A500 or ASTM A501, of size and shape indicated.
 3. Pipe: Steel pipe or round tubing, conforming to ASTM A53, Type E or S, Grade A, of diameters and sizes indicated. Pipe for sleeves and exterior locations shall be galvanized pipe as specified in ASTM A53.
- C. Welding Rods/Electrodes: Refer to Section 05 05 22 - Metal Welding, for requirements.
- D. Castings: ASTM A27, A47, A48, or A536, as applicable to the work.
- E. Forgings: ASTM A668, of Class indicated or required.
- F. Anchors and Bolts: ASTM A307, A449, A563, and F436, as applicable. Bolts and studs, nuts, and washers shall be hot-dip galvanized in accordance with ASTM A153.
- G. Fasteners and Accessories: Furnish anchors and fasteners, washers, straps, and accessories as required for a complete and finished installation. Fasteners shall be stainless steel or galvanized steel as appropriate and approved for the location.
- H. Concrete and Masonry Anchors: Where anchors are not cast into the concrete or masonry construction, provide hot-dip galvanized expansion type anchors with matching hot-dip galvanized steel bolts or studs with nuts, of sizes as indicated or required. Provide washers under all bolt heads and nuts.

2.02 FABRICATION

**Hamilton Station Stabilization
C20046F**

- A. Welded connections shall be made in accordance with requirements of Section 05 05 22 - Metal Welding. Welds where exposed to view shall be ground and dressed smooth, so that the shape and profile of the item welded is maintained.
- B. Metal fabrications shall be prefabricated and preassembled in the factory or shop as far as practicable.
- C. Form and fabricate the work to meet installation conditions. Include anchors, fasteners, and accessories to secure the work in place, as indicated.

2.03 GALVANIZING

- A. Steel and ferrous metal items exposed to the weather and moisture, and items specifically indicated, shall be galvanized after fabrication by the hot-dip process in accordance with ASTM A123. Weight of the zinc coating shall conform to the requirements specified under "Weight of Coating" in ASTM A123.
 - 1. Seal-weld Overlapping Surfaces: Remove all weld flux. Plug vents provided in seal-welded overlapping surfaces to prevent entry of pickling acids. Remove such plugs before galvanizing.
- B. Safeguarding against steel embrittlement shall conform to the applicable requirements of ASTM A143.
- C. Shop galvanized metalwork necessitating field welding which in any manner removes original galvanizing shall be restored by field galvanizing repair in accordance with ASTM A780.
- D. Bolts and screws for attachment of galvanized items shall be galvanized in accordance with ASTM A153.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install metal fabrications in accordance with the approved Shop Drawings, using workers skilled and experienced in the installation of the type of work involved.
- B. Install metal fabrications with all installation accessories furnished by the fabricator as required for complete and finished installations.

3.2 GALVANIZING REPAIR

- A. Galvanized surfaces which have become damaged from welding, handling, or installation shall be repaired immediately after installation with galvanizing repair material in accordance with ASTM A780.

END OF SECTION 05 50 00

SECTION 09 65 00

TACTILE WARNING BAND

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tactile Warning Band.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement: Tactile Warning Band will not be measured separately for payment.
- B. Payment: Tactile Warning Band will be paid for as part of the Contract unit price for the associated concrete work as indicated in the Schedule of Quantities and Prices of Bid Form 1.

1.03 REFERENCES

- A. ADA (Americans with Disability Act) Standards for Accessible Design, latest version
- B. American Society for Testing and Materials (ASTM):
1. ASTM B117 Practice for Operating Salt Spray (Fog) Apparatus
 2. ASTM C501 Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
 3. ASTM C1028 Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
 4. ASTM D570 Test Method for Water Absorption of Plastics
 5. ASTM D638 Test Method for Tensile Properties of Plastics
 6. ASTM D695 Test Method for Compressive Properties of Rigid Plastics
 7. ASTM D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 8. ASTM D1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
 9. ASTM D5420 Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)
 10. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials
 11. ASTM G155 Practice for Operating Xenon-Arc Light Apparatus for Exposure of Non Metallic Materials

**Hamilton Station Stabilization
C20046F**

1.04 DESCRIPTION

- A. Section includes specifications for tactile warning band panels for installation at the station platform edge.
- B. The tactile panels shall be surface install for installation only on concrete surface.

1.05 SUBMITTALS

- A. General: Submittals for cast-in-place concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submittals shall be made to VTA for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Shop Drawings: Showing fabrication details; panel surface profile; fastener locations; plans of panel placement including joints, and material to be used as well as outlining installation materials and procedure. Include procedures for containment and disposal of milling and sawcutting wastewater.
- C. Product Data: Submit manufacturer's literature describing products and installation procedures. Include product data for adhesives and sealants.
- D. Samples:
 - 1. Samples of panels measuring at least 12 inches x 12 inches. Panel sampled shall include longitudinal edge with integral flange and transverse ship-lap edges.
 - 2. Samples of panels and sealant for verification of color match.
- E. Maintenance Instructions: Manufacturer's specified maintenance practices for each type of panel and accessory as required.
- F. Quality Assurance Submittals:
 - 1. Material Test Reports: Test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties specified in this Section. Tests which indicate performance for the panels shall have been performed within three (3) years of the Invitation to Bid.
 - 2. Submit list of projects in California that successfully demonstrate the proposed products' durability and weatherability.

1.06 QUALITY ASSURANCE

- A. Panels and accessories, including panel adhesive, fasteners, and sealants, shall be from a single source. Products shall have been in successful service for a period of five (5) years.
- B. Installer's Qualifications: Engage an experienced Installer certified in writing by panel manufacturer as qualified for installation, who has successfully completed panel installations similar in material, design, and extent to that indicated for Project. Only persons who are thoroughly trained and experience in the installation of the panels shall perform the work.
- C. Provide services of manufacturer's field representative who shall be present at all times during installation.

**Hamilton Station Stabilization
C20046F**

1.07 DELIVERY, STORAGE AND HANDLING

- A. Panel type shall be identified by part number on packages.

1.08 WARRANTY

- A. Panels shall be covered by a written warranty for a period of five (5) years from date of final completion. The warranty includes defective work, breakage, deformation, delamination, fading and chalking of finishes, and loosening of panels. Warranty shall include furnishing new materials, removal of existing panels, and installation of new panels.

1.09 EXTRA STOCK

- A. Furnish four (4) additional panels of each type of installed panels and corresponding fasteners. Deliver extra stock to location designated by the Resident. Furnish extra stock materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification.

PART 2 PRODUCTS

2.01 PANELS

- A. Manufacturers: Subject to conformance with the requirements of this Section, use products fabricated by the following manufacturers may be acceptable, or other Resident approved equal:
1. ADA Solutions, Inc.
 2. Transit-Tile
 3. Armor-Tile by Engineered Plastics, Inc.
- B. Panels shall be homogenous glass and carbon reinforced composite or an epoxy polymer composition which is color and UV stable. Color shall be Federal Safety Yellow (FS 33538) and homogenous throughout the panel thickness.
- C. Truncated Dome Geometry:
1. Truncated dome surface shall comply with ADA and ABA guidelines, 705, Detectable Warnings. (Title 49 CFR Transportation, Part 37.9 Standards for Accessible Transportation Facilities, Appendix A, Section 4.29.2 – Detectable Warnings on Walking Surfaces).
 2. Truncated Dome Description:
 - a. Staggered Dome and In-Line Patterns (nominal dimensions): The truncated dome shall measure 0.45 inch diameter at the top of the dome, 0.90 inch diameter at the base of the dome, 0.20 inch high, and 1.6 inch on center (staggered pattern) and 2.35 inch on center (in-line pattern).
 - b. In order to ensure a uniform appearance of the detectable warning surface throughout the system, equivalent facilitation findings or alternate patterns will not be acceptable.
 3. Truncated dome pattern shall align properly from Panel to Panel.
- D. Panel Configuration:
1. Panel thickness: 3/8 inches minimum, solid thickness for all type of panels.

**Hamilton Station Stabilization
C20046F**

- 2. Butt Joint, Staggered Truncated Domes:
 - a. For station platform edge (staggered pattern): Nominal 24 inches x 48 inches with a 7/16-inch thick deep flange along both long sides. The perimeter of the standard panel features a chamfer (no 90 degree return.)
- E. Fastener Holes in the Panel:
 - 1. Holes for fasteners shall be formed in the factory. The holes shall be located only at the centers of the truncated domes.
- F. Performance characteristics: Panels shall meet the following standards:

Property	ASTM Test Method	Nominal Value
Accelerated Weathering (2,000 hours)	G155	Delta E: 5.0 max
Chemical Resistance	D1308	No Stain or Discoloration
Flexural Strength	D790	25,000psi min
Compressive Strength	D695	20,000psi min
Tensile Strength	D638	10,000psi min
Gardner Impact Test	D5420	110 in-lb min
Flame Spread	E84	FSI: 25 max SDI: 150 max
Slip Resistance	C1028	Friction Coeff: 0.80 min (wet or dry)
Wear Resistance	C501	500 min
Water Absorption (2 weeks)	D570	0.20% max
Salt Spray (120 hours)	B117	No Change

2.02 ACCESSORIES

- A. Fasteners for Concrete: Color matched nylon expansion sleeves with 1/4-inch diameter by 1-1/2 inches long stainless steel drive pins or as recommended by panel manufacturer for specific job conditions and accepted by the Resident.
- B. Adhesive: Type approved by the panel manufacturer.
- C. Sealant: Urethane sealant of type approved by the panel manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Apply adhesives, sealants and mechanical fasteners in accordance with the guidelines provided by their respective manufacturers.
- B. Utilize manufacturer-provided template to lay out area to receive panels.
- C. Form recess for panels by either milling with diamond blade head or casting recess in place (at new paving) so that installed panel will still flush relative to adjacent surface. Grind or form to the depth and width required by the approved shop drawings and manufacturer's instructions. Finish cast-in-place recess with equivalent of a light broom finish. When milled, substrate shall have a light ribbed finish.

**Hamilton Station Stabilization
C20046F**

- D. Contain and remove slurry resulting from concrete milling and sawcutting. Do not wash slurry into track bed area. Slurry contaminates and stains track structure and impedes drainage.
- E. For Panels with Recessed Flanges:
 - 1. Utilize diamond bladed double headed wet saw to achieve parallel grooves to receive panels. Both sawcuts shall be made simultaneously from the same machine. Sawcut parallel to platform edge.
 - 2. After sawcutting, vacuum and power wash surface with clean clear water, free from all dirt and debris. Visually inspect surface for obtrusions or foreign matter. If obtrusions are present, remove by grinding. Remove foreign matter by grinding or further washing, as appropriate.
- F. Immediately prior to application of the setting adhesive, inspect surfaces to receive panel to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oils, grease, sealers, and other contaminants. Verify that surfaces are structurally sound and that concrete has cured a minimum of 30 days. Obtain panel manufacturer's representative's and Resident's approval of surface preparation before installing panels.
- G. Air entrapment: Apply generous amount of adhesives to eliminate air entrapment between the panels and the concrete surfaces.
- H. Set panels and install fasteners in accordance with panel manufacturer's instructions and as follows:
 - 1. Wherever possible, install full size (uncut) panels. Do not install panel sections measuring less than 24 inches in length. Only cut panels where absolutely necessary.
 - 2. Maintain gap between panels for expansion and contraction in accordance with manufacturer's instructions.
 - 3. At platform expansion joints, cut panels on their short sides, finish cut edges smoothly, and lay panels with cut edges aligned with the edges of the substrate along the joints. Install fasteners on either side of the expansion joint at the time of initial installation. After a minimum of 4 hours, make a sawcut measuring 5/16 inch wide across the composite detectable warning surface panel and fill with sealant. Make sawcut in the zone between truncated domes.
 - 4. Cutting through panel domes shall be kept to a minimum. Where less than half of the truncated dome remains, grind off balance of dome; where over half of the truncated dome remains, feather dome so as not to present a tripping hazard.
- I. Install sealant in accordance with manufacturer recommendations.

3.02 CLEANING AND PROTECTING

- A. After the area has been fully tiled and sealant system applied, clean panel surface, following the manufacturer recommended maintenance and cleaning procedures.
- B. Protect sealant and panels against damage during construction period. Comply with panel and sealant manufacturers' recommendations.
- C. Protect panels against damage from rolling loads following installation by covering with plywood or hardwood.
- D. Clean panel by method specified by the manufacturer.

END OF SECTION 09 65 00

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 09 90 00

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specifications for paints and coatings.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement: Paints and coatings will not be measured separately for payment.
- B. Payment: Paints and coatings will be paid for as part of the Contract unit price for the associated work as indicated in the Schedule of Quantities and Prices of Bid Form 1.

1.03 DEFINITIONS

- A. Paint: As used herein, means coating systems materials including primers, emulsions, epoxies, enamels, sealers, fillers, and other applied materials whether used as primer, intermediate, or finish coats.

1.04 EXCLUDED WORK

- A. Do not paint metal surfaces of anodized aluminum, stainless steel, and similar finished materials, unless otherwise noted on the Contract Documents.
- B. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
- C. Do not paint glass, concrete with sealer, nor other finished surfaces, unless otherwise noted on the Contract Documents.

1.05 SUBMITTALS

- A. General: Submittals for cast-in-place concrete shall be made in accordance with the provisions in Section 7.43, "Submittal of Shop Drawings, Product Data and Samples," of the General Conditions and these Technical Specifications.
 - 1. Submittals shall be made to the Resident for review by VTA. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and approved by VTA.
- B. Product Data: A complete list of materials proposed for use, together with manufacturer product specifications.
- C. Samples:
 - 1. Five 8.5 inches by 11 inches samples of each color and each gloss for each material on which the finish is specified to be applied for review and approval of the Resident.
 - 2. Revise and resubmit each sample until the required gloss, color, and texture is achieved. Samples approved by the Resident will become standards of color and finish for accepting or rejecting the work of this Section.

**Hamilton Station Stabilization
C20046F**

- 3. Final approval of gloss, color, and texture shall be made through approval of mockups, if required by the Resident.
- D. Certificates of Compliance: Certificates of compliance from manufacturer certifying that proposed materials comply with the specified requirements and are the manufacturer's best-quality grade materials.
- E. Manufacturers' Review: Record of paint manufacturer's review as specified herein.

1.06 QUALITY ASSURANCE

- A. Regulations: In case of conflict between regulatory requirements and specified materials, submit alternative materials to the Resident for approval.
- B. Manufacturer's Standards: Comply with manufacturer's recommendations and standards.
- C. Personnel: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts; and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- D. Paint Coordination:
 - 1. Provide finish coats that are compatible with the prime coats actually used.
 - 2. Review the Contract Documents, verify the prime coats to be used, and ensure compatibility of the total coating system for the various substrata.
- E. Paint Manufacturer's Review: Before purchasing paint materials, review the proposed paint systems, materials, and substrates with qualified representatives of the proposed paint product manufacturers. Obtain manufacturer's concurrence of the proposed paint systems, or any recommended changes thereto, before providing product data, samples, and mock-ups specified herein.
- F. Mockups:
 - 1. Do not apply final coats until the colors and textures have been approved by the Resident. To accomplish this, if requested by the Resident, paint a sample panel of approximately 24 square feet of the colors and textures selected on every type of surface to be painted. Notify the Resident at least three days in advance of when sample panels will be ready for review and approval.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job in original packages and containers bearing name of manufacturer; containers shall be new and unopened and shall clearly show manufacturer's best-grade certification on each container; store appropriately and provide fire protection.
- B. When materials are not in use, store in hermetically covered containers.
- C. Maintain containers used in storage, mixing and application of paint in a clean condition, free from deleterious materials and residue.

1.08 SITE CONDITIONS

- A. Environmental conditions specified herein are minimum parameters. Comply with manufacturer's requirements.

**Hamilton Station Stabilization
C20046F**

- B. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees F unless otherwise permitted by the manufacturer's published instructions.
- C. Weather Conditions:
 - 1. Do not apply paint when the relative humidity exceeds 85 percent; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's published instructions.
 - 2. Do not apply paint when dust is blowing.

PART 2 PRODUCTS

2.01 PAINT MATERIALS AND COLORS

- A. Quality: Best quality grade of specified types as regularly manufactured by recognized paint and varnish manufacturers; materials not bearing manufacturer's identification as standard best grade product of regular line are not acceptable.
- B. Undercoats and Thinners:
 - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
 - 2. Use only the thinners recommended by the paint manufacturer and use only to the recommended limits.
 - 3. Undercoat, finish coat, thinner material, and related elements shall be components of a unified paint finish system.

2.02 MATERIAL LIST

- A. Metal Treatment and Primers:
 - 1. Rust Inhibitive Primer: Compatible formulation with shop applied primer and subsequent coats.
- B. Exterior Prime Coats:
 - 1. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
 - a. ICI Dulux Paints; 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish: Applied at a dry film thickness 2.2 mils minimum.
 - b. Kelly-Moore; 1725 Kel-Guard Acrylic Metal Primer: Applied at a dry film thickness of 1.5 to 2.0 mils.
 - c. Kelly-Moore; 5725 DTM-Acrylic Metal Primer: Applied at a dry film thickness 1.5 to 2.0 mils, under full-gloss acrylic-enamel coatings.
 - d. Sherwin-Williams; Pro-Cryl Universal Metal Primer B66: Applied at a dry film thickness 3.0 mils minimum.
 - e. Or Resident approved equal.
 - 2. Exterior Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.

**Hamilton Station Stabilization
C20046F**

- a. ICI Dulux Paints; 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish: Applied at a dry film thickness 2.2 mils minimum.
 - b. Kelly-Moore; 1725 Kel-Guard Acrylic Metal Primer: Applied at a dry film thickness of 1.5 to 2.0 mils.
 - c. Sherwin-Williams; Pro-Cryl Universal Metal Primer B66: Applied at a dry film thickness 2.0 mils minimum, under full-gloss acrylic-enamel finishes.
 - d. Or Resident approved equal.
- C. Exterior Finish Coats:
- 1. Exterior Semigloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application.
 - 2. ICI Dulux Paints; 4216 Lifemaster Pro High Performance Waterborne Acrylic Semi-Gloss Finish: Applied at a dry film thickness 1.3 mils minimum.
 - 3. Kelly-Moore; 1250 Acry-Lustre Exterior Semi-Gloss Acrylic Finish: Applied at a dry film thickness 1.3 mils minimum.
 - 4. Sherwin-Williams; A-100 Latex Gloss A8 Series: Applied at a dry film thickness 1.3 mils minimum.
 - 5. Or Resident approved equal.
- D. Heavy Duty Exterior Prime Coats: Exterior Metal Primer for Urethane: Factory- formulated metal primer for exterior application. For shop primed or galvanized ferrous metal:
- 1. Ameron Amercoat 240, 4-12 mils dry film thickness, each coat.
 - 2. ICI Dulux Paints: 203, Devan Universal Epoxy Primer, 2 to 4 mils dry film thickness, each coat.
 - 3. Sherwin-Williams: Pro-Cryl Universal Metal Primer B66: 3 – 4 mils dry film thickness, each coat.
 - 4. Or Resident approved equal.
- E. Heavy Duty Exterior Finish Coats: Exterior Gloss Urethane, factory-formulated gloss urethane for exterior application. The dry film thickness shall meet that recommended in manufacturer's product data.
- 1. Ameron Amercoat 450HSG, 2-3 mils dry film thickness, each coat
 - 2. ICI Dulux Paints: Devthane 378 UVA Aliphatic Urethane Gloss Enamel, 2-3 mils dry film thickness, each coat.
 - 3. Kelly-Moore: KM-375 High Build Gloss Polyurethane Enamel, 2 to 5 mils dry film thickness, each coat.
 - 4. Sherwin-Williams: Hi-Solids Polyurethane, B65-300 Series Polyurethane, 3-4 mils dry film thickness, each coat.
 - 5. Or Resident approved equal.

**Hamilton Station Stabilization
C20046F**

- F. Miscellaneous:
 - 1. Caulking Compound: Acrylic latex type.
- G. Provide other materials not specified but required for a complete and proper application, as selected by Contractor for approval by the Resident.

2.03 APPLICATION EQUIPMENT

- A. Spray and Roller Equipment: Proper type for work, subject to the approval of the Resident.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 MATERIALS PREPARATION

- A. General:
 - 1. Mix and prepare paint materials in accordance with the manufacturer's published instructions.
- B. Stirring:
 - 1. Stir materials before application producing a mixture of uniform density.
 - 2. Do not stir film, which may form on the surface into the material. Remove the film and strain or filter the material appropriately before using.

3.03 SURFACE PREPARATION

- A. General:
 - 1. Cure concrete for a minimum of three (3) weeks prior to applying paint.
 - 2. Moisten concrete surface prior to applying paint to prevent concrete from absorbing water out of paint.
 - 3. Concrete: Remove efflorescence, chalk, form release agent, and other materials from surface of concrete which will inhibit adherence and coverage of paint. Brush concrete or apply primer coat of low viscosity penetrant paint to prepare walls and ceiling to receive top coats.
 - 4. Protect all adjacent finish surfaces from paint including colored concrete pavement, rolling grille, signage, light fixtures, switches and switch boxes, and other finished surfaces.
 - 5. Perform preparation and cleaning procedures in accordance with the paint manufacturer's published instructions and as approved by the Resident. Clean concrete and metal surfaces free of all mill rust, form release agents, and efflorescence and prime metals.
 - 6. Remove removable items, which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.

**Hamilton Station Stabilization
C20046F**

7. Following completion of painting in each space or area, reinstall the removed items by using workers who are skilled in the appropriate trades.
 8. Clean each surface to be painted prior to applying paint or surface treatment.
 9. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F prior to start of mechanical cleaning.
 10. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto or affect wet newly painted surfaces.
- B. Preparation of Metal Surfaces:
1. Thoroughly clean surfaces until free from dirt, oil, grease and the like.
 2. On galvanized surfaces, use solvent for the initial cleaning and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
 3. Allow to appropriately dry before application of paint.

3.04 PAINT APPLICATION

- A. General:
1. The dry film thickness must be at least that recommended in manufacturer's product data. The specified number of coats is the minimum acceptable. If full coverage or required dry film thickness is not attained with specified number of coats, apply additional coats as necessary to achieve coverage and required thickness.
 2. Apply material evenly without runs, sags, crawls, holidays, or other defects. For brush work, brush out smooth and leave a minimum of brush marks. Where paint is rolled on, use fine nap roller so that a nearly flat or orange peel texture is obtained.
 3. Touch-up shop-applied prime coats, which have been damaged and touch-up bare areas prior to start of finish coats application.
 4. Do not apply additional coats until the completed coat has been inspected and approved by the Resident.
 5. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
 6. Sand and clean dust and other debris between coats to remove defects visible to the unaided eye from a distance of 5 feet.
- B. Drying and Re-Coat Window:
1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit weather conditions.
 2. Comply with manufacturer's re-coat timing restrictions.
- C. Spray Application:
1. Confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.

**Hamilton Station Stabilization
C20046F**

2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- D. Completed work shall match the samples approved by the Resident as to texture, color, and coverage.

3.05 FIELD QUALITY CONTROL

- A. Testing: Measure thickness of paint on metal with magnetic dry mil thickness gauge to verify that manufacturer designated thickness has been attained and supply the Resident with a certificate of compliance that said thickness has been attained.

3.06 PROTECTION AND CLEANUP

- A. Protection: Protect building elements and components, paving, landscaping, and vehicles from damage, staining, overspray, marking, soiling, and the like. Leave work clean, whole, and as new. Correct damage by cleaning, repairing, replacing, or repainting.
- B. Hardware, Fixture Canopies, Outlet Covers, Switch Plates and Similar Items: Remove or loosen and replace as required for painting work. New hardware except for hinges must not be installed until painting and finishing work is completed; mask and protect hinges from paint or damage.
- C. Cleanup: During progress of work clean up discarded paint materials debris cans, rags and the like; remove from the project site. Implement applicable safety methods in control or disposal of flammable materials.

END OF SECTION 09 90 00

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Staking and grades
- B. Existing utilities
- C. Earthwork general requirements
- D. Subsurface extraction
- E. Rough grading and filling
- F. Excavation
- G. Subgrade preparation
- H. Foundation preparation
- I. Subgrade filling/raising grade
- J. Compaction
- K. Backfilling
- L. Finish grading
- M. Field quality control

1.02 RELATED SECTIONS

- A. **RESERVED.**

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 2. ASTM C136 Test Method for Sieve Analysis of Fine Coarse Aggregates
 - 3. ASTM C535 Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 4. ASTM D422 Method for Particle-Size Analysis of Soils
 - 5. ASTM D653 Terminology Related to Soil, Rods, and Contained Fluids
 - 6. ASTM D1140 Test Method for Amount of Material in Soils Finer Than the 200 (75- μ m) Sieve

**Hamilton Station Stabilization
C20046F**

7. ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil- Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
8. ASTM D2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
9. ASTM D2487 Test Method for Classification of Soils for Engineering Purposes
10. ASTM D2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
11. ASTM D2974 Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Materials
12. ASTM D3017 Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
13. ASTM D4253 Test Methods for Maximum Index Density of Soils Using a Vibratory Table
14. ASTM D4254 Test Methods for Minimum Index Density of Soils and Calculation of Relative Density
15. ASTM D4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. State of California, Department of Transportation (Caltrans), Standard Test Methods:

1. Calif. Test 217 Method of Test for Sand Equivalent

1.04 DEFINITIONS

- A. Earthwork Terminology: Terms used in this Section and not defined herein shall be interpreted in accordance with the definitions given in ASTM D653.
- B. Soil Classification: Soil classification is based on the Unified Soil Classification system given in ASTM D2487. Group symbols, when used, conform with the symbols of ASTM D2487.
- C. Fill: Soil or soil-rock material placed to raise the subgrade or natural grade of the site.
- D. Backfill: Soil or soil-rock material used to backfill excavations and to backfill excavated spaces around foundation walls, building walls, retaining walls, head walls, and abutments.
- E. Embankment: Soil or soil-rock material for embankment construction. Embankment construction includes constructing embankments and dikes, including the preparation of the areas upon which they are to be placed; and the construction of temporary surcharge embankment above the grading plane.
- F. Borrow: Soil or soil-rock material used for fill, backfill, embankment, or other construction that is excavated from an off-site location and hauled in.
- G. Unsuitable Material: Excavated material or material below the natural ground surface in embankment areas or below sub grade elevation in excavated areas, which is unsuitable for its planned use as determined by VTA. Unsuitable material is further defined as material determined by VTA to be:
 1. Of such unstable nature as to be incapable of being compacted to specified density using ordinary methods at optimum moisture content; or

**Hamilton Station Stabilization
C20046F**

2. Too wet to be properly compacted and circumstances prevent suitable drying prior to incorporation into the work; or
3. Otherwise unsuitable for the planned use.

The presence of excessive moisture in a material is not, by itself, sufficient cause for determining that the material is unsuitable. The existence of unsuitable material may be indicated in the Contract Documents or may be determined by VTA during the progress of the work.

- H. Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of material as compacted in the field to the maximum dry density of the same material as determined by laboratory test ASTM D1557.
- I. Optimum Moisture Content: The water content at which a soil can be compacted to a maximum dry unit weight by a given compactive effort.
- J. Relative Density: Mass per unit volume as specified in ASTM D4253 and ASTM D4254, as applicable to the soil and test method employed.

1.05 CLASSIFICATION OF EARTHWORK

- A. For specification purposes, earthwork shall be classified as follows:
 1. Excavation-Common: All excavation involved in grading and construction of the trackway, parking areas, landscaped areas, walkways, roads, driveways, and connections thereto; and any other excavation classified or indicated as common excavation.
 2. Fill for Raising Grade: Includes raising of subgrade or grade to indicated elevation with structural fill, including moisture-conditioning and compaction of placed fill material. Structural fill material includes borrow excavation and material when required.
 3. Pervious Backfill: Includes furnishing, placing, and compacting pervious backfill material behind abutments, wingwalls, and retaining walls, as indicated.
 4. Common Embankment: Used only for embankment construction, above surrounding grade, below 2.5 feet of the finished embankment grade or subgrade, and where there are no foundation-bearing concrete structures above. Common embankment includes borrow excavation material when required.
 5. Select Embankment: Used only for embankment construction, above surrounding grade, within 2.5 feet of the finished embankment grade or sub grade. Select embankment includes borrow excavation material when required.
 6. Subsurface Extraction: Includes removal of abandoned utilities, tanks, walls, foundations, and other miscellaneous subsurface man-made structures that interfere with new construction and are designated to be removed, and the cleaning of such items if they are indicated to be salvaged.
 7. Salvaging Topsoil: Salvaging topsoil is the removal of topsoil to the depth indicated, stockpiling the material on-site, and maintaining the stockpile until the material is reused in the work. Salvaging of topsoil shall be classified the same as the excavation with which it is associated, but if no such classification can be made, it shall be classified as Excavation - Common.

**Hamilton Station Stabilization
C20046F**

1.06 DESCRIPTION

- A. Provide excavation for trackway and pavement; excavation and placement of compacted fill and backfill for structures, and subsurface and surface drainage; placement of pervious backfill; construction of embankments; subgrade and foundation preparation; subsurface extraction of miscellaneous structures and facilities indicated or required to be removed; and finish grading.

1.07 SUBMITTALS

- A. Test Reports: Tests and observations will be performed by VTA's representative with copies to Contractor. These will include field density reports for fills and backfills; testing reports on borrow material, including mechanical analysis, moisture-density curve and plasticity index; one optimum moisture-maximum density curve for each soil type encountered; verification of each footing subgrade; and tabular summary of the CIDH pile installation.
- B. Samples: Furnish and deliver samples of fill and backfill materials as selected by VTA for testing and analysis.
- C. Delivery Tickets: Submit a delivery ticket with each load of imported borrow material delivered to the site, stating the type of fill material and the quantity.
- D. Calculations and Shop Drawings: Contractor shall submit all design calculations and shop drawings for any excavation stabilization methods proposed to be used at the site. This includes, but is not limited to, any shoring, bracing, or underpinning. The calculations shall be prepared and signed by a Civil Engineer registered in the State of California.

1.08 REGULATORY REQUIREMENTS

- A. Regulatory requirements that govern the work of this Section include the following governing codes:
1. California Code of Regulations, Title 8, Chapter 4, Subchapter 4 — Construction Safety Orders, and Subchapter 19 — Trench Construction Safety Orders.
 2. California Code of Regulations, Title 24, Part 2, California Building Code, Chapter 33 and Appendix Chapter 33, and Structural Chapters 18 and 18A.

1.09 QUALITY CONTROL AND QUALITY ASSURANCE

- A. Quality Plan: Contractor shall submit a Quality Plan, conforming to the requirements of the Special Conditions, covering all earthwork operations and the field quality control to be performed by Contractor.
- B. Quality Control: The Geotechnical Engineer will be VTA's Representative to observe the grading operations both during preparation of the site and the compaction of engineered fill. Visits to the site will be made to become generally familiar with the progress and quality of the work. Field observations and tests will be made to enable the Geotechnical Engineer to form an opinion regarding the adequacy of the site preparation, the acceptability of fill materials and the extent to which the earthwork construction and the relative compaction comply with the specification requirements. The Geotechnical Engineer also will observe all footing and CIDH pile construction, to confirm the design intent is met.
- C. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

**Hamilton Station Stabilization
C20046F**

D. Tolerances:

1. Construct finished surfaces to plus or minus 1/2-inch of the elevations indicated.
2. Complete embankment slopes to plus or minus 6 inches of the slope line indicated. Do not encroach on the trackway bed or roadbed.
3. Maintain the moisture content of fill material as it is being placed within plus or minus two percent of the recommended moisture content of the material.

1.10 SITE CONDITIONS

A. Unfavorable Weather Conditions:

1. Excavating, filling, backfilling, and grading work must not be performed during weather conditions which might damage or be detrimental to the condition of existing ground, in-progress work, or completed work. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not resume until the site and soil condition (moisture content) are suitable for compaction.
2. Subgrade shall be free from mud, snow, ice, and deleterious material when work is resumed.
3. Soil material that is too wet for compaction shall be left to drain, to be aerated and dried until the moisture content of the area is uniform and within the specified limits.

B. Prevention of Erosion: Comply with requirements specified as follows:

1. Prevent erosion of stockpiles, ditches, embankments, filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.
2. Perform "protective grading" to provide positive drainage and to minimize ponding of surface water.

C. Additional soil borings and other exploratory operations may be made by Contractor at no cost to VTA.

D. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for direction. Cooperate with VTA and utility companies to keep utilities in operation. Repair damaged utilities to satisfaction of the utility owner.

E. Do not interrupt existing utilities serving facilities occupied and used by VTA or others, except when permitted in writing by VTA and then only after acceptable temporary utility services have been provided.

F. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

G. Use of explosives is not permitted.

H. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

I. Protect structures, utilities, sidewalks, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

**Hamilton Station Stabilization
C20046F**

- J. Contractor is required to maintain adjacent streets free of dirt accumulation arising out of work of this section. Use suitable means to clean equipment, streets or both and to meet requirements of authorities having jurisdiction.

1.11 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 FILL AND BACKFILL MATERIALS - GENERAL REQUIREMENTS

- A. Soil materials, whether from sources on or off site must be approved by the Geotechnical Engineer as suitable for intended use and specifically for required location or purpose.
- B. General Fill: General fill material shall be a soil or soil-rock mixture free of organic matter or other deleterious substances. The fill material must not contain rocks or lumps over 6 inches in maximum dimension and not more than 15% larger than 2½ inches. Materials from the site, if free of organic matter, rubble or other deleterious substances, are suitable for use in general fills. Excavated material that is suitable for fill, backfill, and embankment construction shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks exceeding 6 inches in largest dimension and deleterious material shall be removed from the site and disposed of as specified herein under Disposal of Surplus Material.
- C. Select Material or Structural Fill: In addition to the above requirements for general fill, select material shall be a low plasticity, non-expansive soil or soil-rock mixture having a plasticity index not greater than 15.
- D. Imported Material: All imported material shall be of select quality. All imported material, including pipe bedding, shall have a pH between 6 and 8. Contractor shall give at least 4 days of notice prior to bringing imported material to the site to enable the Geotechnical Engineer to sample and test the material.
- E. Impervious Backfill: Backfill consisting of onsite native, cohesive soil as approved by the Geotechnical Engineer.
- F. Aggregate Base: Aggregate base for use beneath pavements, steps and walks shall conform to the requirements of Class 2 aggregate base, ¾ inch maximum size as defined in Section 26 of the Caltrans Standard Specifications.
- G. Unclassified Backfill: Satisfactory off-site soil materials or on-site materials acceptable to Geotechnical Engineer, free of rock or gravel larger than 2 inches in any dimension, debris, waste, vegetable and other deleterious matter.
- H. Class 2 Permeable Material: Class 2 Permeable Material Type A, (maximum size 1 inch) as defined in Section 68-1.025 of the Caltrans Standard Specifications.
- I. Stabilization Fabric: Type 600X by TC Mirafi, or approved equal.
- J. Bridging Material:

**Hamilton Station Stabilization
C20046F**

1. Bridging material for use in stabilizing soft subgrade soil conditions shall consist of a reasonably well graded mixture of angular gravel and cobble size rock fragments conforming to the following gradation:

Sieve Size (inches)	Percentage Passing
6	100
2	0-50
3/4	0-10

2. In addition to the gradation requirements presented above, Bridging Material shall have a minimum Durability Index = 40.

2.02 SOURCE QUALITY CONTROL

- A. Fill, backfill, and embankment materials proposed to be used in the work shall be tested in the laboratory for compliance with specified requirements as follows:
 1. Moisture-Density Relationship: ASTM D1557.
 2. Moisture Content: ASTM D2216.
 3. Liquid Limit: ASTM D4318.
 4. Plastic Limit and Plasticity Index: ASTM D4318.
 5. Percentage of Wear: ASTM C131 or C535 as applicable.
 6. Sieve Analysis: ASTM D422, and ASTM C136, as applicable.
 7. Percent Passing No. 200 sieve: ASTM D1140.
 8. Sand Equivalent: California Test 217.
 9. Organic Content of Soils: ASTM D2974.
- B. Where classification of soils is necessary to meet specified requirements, perform laboratory tests in accordance with ASTM D2487.
- C. Submit certified test reports of all tests as herein specified under Submittals.
- D. Provide samples as requested by VTA for preparing checklists. Provide three samples of each type of material proposed for use from locations selected by VTA.

PART 3 EXECUTION

3.01 STAKING AND GRADES

- A. Layout the work, establish all necessary markers, benchmarks, grading stakes, and other stakes as required, in accordance with the requirements specified in Section 01 71 23 - Field Engineering.

**Hamilton Station Stabilization
C20046F**

3.02 EXISTING UTILITIES

- A. Verify on site the location and depth (elevation) of all existing utilities and services before performing any excavation work. Refer to Section 33 05 25 - Support and Protection of Utilities, for additional requirements. Excavation within 3 feet of an active utility line shall be performed by hand.
- B. Abandoned sewers, piping, and other utilities encountered in the progress of the excavating shall be removed and the ends plugged.
- C. Active utility lines encountered, which are not indicated in the Contract Documents, shall be reported immediately to VTA and utility owners involved. VTA and utility owners shall be permitted free access to determine the measures deemed necessary to repair, relocate, or remove the utility.

3.03 EARTHWORK GENERAL REQUIREMENTS

- A. Dust Control:
 - 1. Perform dust control in accordance with the approved Erosion and Sedimentation Control Action Plan Element (ESCAPE) as applicable. During the progress of the work, Contractor shall keep the entire worksite free of dust. Spillage resulting from hauling operations along or across existing streets, roads, paths or access routes shall be removed immediately by Contractor.
 - 2. Contractor shall govern operations and constructions methods at all times so as to prevent any dust problems within the area of work, along haul routes, and along adjacent properties. Contractor shall provide the water wagons, water, labor, or any material or equipment required to provide adequate control of dust to the complete satisfaction of VTA.
 - 3. Dust problems is defined as any visible airborne particles, within the Worksites and project haul routes that are result of Contractor's activities.
 - 4. When airborne particles are visible and VTA orders a dust control application, such work shall be performed within the same day. If the dust control application is not performed when requested by VTA, the work will be done by VTA forces and the costs deducted from Contractor's payment.
 - 5. Street sweepers with wet dust control systems will be allowed as an alternative for dust control on paved approaches to the project. Power brooms or other similar devices without wet dust control systems will not be allowed.
 - 6. Any damage, and the cost of such damage, resulting from dust caused by Contractor's activities, shall be the complete and sole responsibility of Contractor.
- B. Erosion Protection: Prevent erosion of the site at all times. Construct temporary berms and dikes and cut temporary swales to promote natural drainage of site.
- C. Construction Traffic: Disperse travel paths of traffic and construction equipment over entire width of compacted surfaces so as to aid in obtaining uniform compaction. Protect exposed soil layers with high moisture content from excessive wheel loads.
- D. On-Site Excavation or Borrow Pits: Do not excavate or remove any material from the Worksites or right-of-way which is not within the designated excavation, as indicated by the slope and grade lines, without written authorization from VTA.
- E. Salvaging Topsoil:
 - 1. Salvage topsoil from stripped and excavated areas, and stockpile on the site at appropriate locations. Prevent topsoil from contamination by other materials, and provide adequate drainage and erosion protection.

**Hamilton Station Stabilization
C20046F**

2. Place stockpiled topsoil in areas to be landscaped as indicated on the Contract Drawings.

F. Stockpiling of Fill and Backfill Material:

1. Excavate and separately stockpile suitable fill and backfill material, as indicated, during the progress of the excavation work. Save sufficient suitable excavated material, if available, for later filling, backfilling, and embankment construction.
2. Store materials from required excavations that are suitable for fill, backfill, and embankment as excavated, in stockpiles segregated by type.
3. Establish excavated material stockpiles on site only in locations where they will not interfere with the progress of the work. Offsite stockpiling, if necessary, shall be the responsibility of Contractor.

G. Disposal of Surplus Material:

1. Excess earth materials, unsuitable materials, and debris shall become the property of Contractor and shall be removed from the site and disposed of in a legal manner.
2. Location of disposal site and length of haul shall be Contractor's responsibility.

H. Maintenance of Excavations, Slopes, and Embankments:

1. Excavate and remove material outside the limits of the excavation which is unstable and constitutes potential slides, and material which comes into excavations for any reason
2. Maintain slopes and embankments until substantial completion and acceptance of the work. Promptly repair slides, slipouts, washouts, settlements, and subsidences that occur for any reason, and refinish the slope or embankment to the indicated lines and grades.

- I. Safeguarding of Structure Walls:** No heavy equipment and rollers shall be operated within 5 feet of existing structure walls.

3.04 SUBSURFACE EXTRACTION

- A. Remove subsurface facilities and obstructions to the extent indicated.
- B. When subsurface facilities are encountered during excavation which interfere with new construction, and such facilities are not indicated, notify the Engineer promptly for corrective determination.

3.05 ROUGH GRADING AND FILLING

- A. Prior to commencement of earthwork, perform such soil and rock removal and filling as may be required to facilitate the progress of the work and bring all elevations to the rough grading lines indicated on the Contract Drawings. Grading shall be performed by blading or as herein specified under Article 3.08.
- B. Fill or backfill test pits or holes which will not be completely removed by excavation, with lean concrete or clean structural fill, and compact as herein specified in layers not exceeding 8 inches in uncompacted thickness where heavy equipment is used. Maximum thickness of the layers shall be 4 inches where light, hand operated equipment is used.
- C. Fill or backfill holes, swales, and low points that will not otherwise be removed in the course of the work to the indicated grades.

**Hamilton Station Stabilization
C20046F**

3.06 EXCAVATION

A. General Excavation Requirements:

1. Perform excavating as indicated and required for trackway and roadway beds, for concrete footings, foundations, retaining walls, exterior paving, floor slabs, concrete walks, and for site levels and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required.
2. Comply with applicable requirements of CCR, Title 8, Trench Construction Safety Orders.
3. The bottoms of excavations shall be level, firm, undisturbed earth, clean and free from loose material, debris, and foreign matter. When an excavation has reached required subgrade elevation, notify the Geotechnical Engineer to observe the conditions. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as required by the Geotechnical Engineer.
4. Excavate to the lines and grades indicated on the Contract Drawings.
5. Excavations shall be supported and maintained by providing structural support of earth walls, so that sides are stable and will not move. Excavations may be maintained by sloping cut faces where space permits, if calculations, sealed and signed by a civil or structural engineer currently registered in the State of California, show that the slopes are safe. Calculations shall consider all existing conditions, including adjacent traffic, construction loading, and other local effects.
6. Limits of excavations shall allow for adequate working space for installing forms, wall waterproofing, and as required for safety of personnel. Cut excavations accurately to the lines indicated on the Contract Drawings, or to the width of the ductbank or concrete encasement.
7. Dewater excavation. Construct berms around excavations as required to prevent surface water and runoff from entering the excavation.
8. Remove unstable bottom material. Remove large stones, debris, and compressible soils from excavation bottoms to a minimum depth of 12 inches or as required by the Geotechnical Engineer. Remove loose and unsuitable material.
9. Where an excavation is carried below the indicated grade, backfill to the indicated grade as herein specified.
10. Excavations for convenience of the Contractor require approval by VTA.
11. Place excavated material at a sufficient distance from edge of excavation so as not to cause cave-ins or bank slides, but in no case closer than 3 feet from the edge of excavations.
12. Unauthorized over excavations for footings and foundations shall be filled with lean concrete to indicated elevations.
13. Excavated earth material that is suitable for fill, backfill, or embankment shall be conditioned for re-use and properly stockpiled for later filling and backfilling operations as herein specified. Test, screen, and mix as necessary to meet specified requirements.

3.07 SUBGRADE PREPARATION

- A. Perform all cutting, blading, and shaping as required to cut and shape the subgrade to the grades and elevations indicated.

**Hamilton Station Stabilization
C20046F**

- B. Subgrade preparation includes fine grading, reworking as necessary, and preparation of cut, fill, or embankment upon which the structure and equipment foundations, pipe, subballast, subbase, base, and pavement will be placed. Remove unsuitable subgrade material, such as weak or compressible soils. Condition scarified subgrade to 1 to 2 percent above optimum moisture content. If subgrade stabilization material is required, incorporate it into the subgrade at this time.
- C. After the material has been thoroughly mixed and moisture-conditioned, accurately construct and fine grade the subgrade to indicated line, grade, and contour with high and low spots eliminated. Compact for full width to the specified density. Remove soft spots developed during working, fill with approved material, and re-compact.
- D. Finish subgrade to straightedge or template within specified tolerances with the finished surface bladed to a uniform, dense, smooth texture.

3.08 FOUNDATION PREPARATION

- A. Complete construction of the excavation support and dewatering systems prior to construction of structure and equipment foundations.
- B. Avoid disturbing bottom of excavation. If bottom is disturbed, restore and stabilize the bearing foundation with engineered fill and/or bridging material as specified herein.
- C. Where unsuitable material is encountered at the elevations indicated for foundations, all soft, loose, or unsuitable material shall be removed. The area shall be scarified to a minimum depth of 12 inches, and the planned elevation shall be re-established by backfilling with structural backfill, moisture-conditioning, and compacting to a minimum dry density of 95 percent of the maximum laboratory dry density as determined in accordance with ASTM D1557. Where the exposed foundation consists of competent, undisturbed in-place soils, scarifying may be omitted.

3.09 SUBGRADE FILLING/RAISING GRADE

- A. Compacted fill for raising of subgrade to indicated elevation shall be constructed by approved methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness where heavy equipment is used. If lightweight handheld compaction equipment is used, maximum uncompacted lift thickness shall be 4 inches. Fill material that does not contain sufficient moisture to compact properly shall be sprinkled with water; if it contains excess moisture it shall be aerated or permitted to dry to the proper water content. Fill material and water shall then be thoroughly mixed before being compacted. Each layer of spread fill material shall be compacted to the specified density.
- B. Control of fill shall consist of field inspection and testing to determine that each layer has been compacted to the required density and to ensure that optimum moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be scarified and re- compacted until the required compaction is obtained.
- C. Spreading and compacting shall be performed as required to produce the required density and a uniform surface smooth and true to grade.

3.10 COMPACTION

- A. Compaction Density: Compact each layer of embankment, fill, and backfill material to not less than the indicated or specified compaction. Required compactions are defined as Class I and Class II, as follows:
 - 1. Class I Compaction: 90 percent relative compaction as determined by ASTM D1557.
 - 2. Class II Compaction: 95 percent relative compaction as determined by ASTM D1557.

**Hamilton Station Stabilization
C20046F**

B. Required Compactions:

1. Embankment or Fill where the Surface will be Bearing Foundation: Class II for full depth. Where embankment construction exceeds 5 feet in depth, provide minimum Class I compaction below the top 2.5 feet.
2. Fill below Trackways and Pavements: Class II for full depth. Where fill exceeds 3 feet in depth, provide minimum Class I compaction below the top 3 feet.
3. Backfill around Structures: Class I under top 12 inches; Class II for top 12 inches.
4. Cut-and-Cover Backfill: Class I to 36 inches above structure or utility; Class II for balance, with a minimum of Class II for top 12 inches.
5. Original Ground or Cut Subgrade: Except as specified in Articles 3.08 and 3.09 where original ground or cut subgrade, or fill less than 1 foot thick, will be subgrade or bearing foundation, scarify the surfaces and provide Class II compaction for at least 8 inches in depth. Include the following additional requirements:
 - a. Provide Class II compaction for original ground when such original ground is within 3.5 feet of top of rail profile or within 2.5 feet of finished pavement grade, for full width of trackway and pavement plus three feet on each side thereof.
 - b. Provide Class II compaction for top 6 inches of undisturbed original ground upon which embankments are to be constructed.
6. Where not otherwise indicated or specified and where structures are not involved, provide Class I compaction to minimize settlement.

3.11 BACKFILLING

- A. Use materials removed from site excavations if such material meets specified requirements.
- B. Backfilling is required around all substructures. Fill all abandoned vaults, shafts and airways.
- C. Place backfill in layers not to exceed eight inches of loose material, and compact each layer to specified density before the next layer is placed to a newly placed structure or portion of structure, utility, or pipeline. Where light weight compaction equipment is used, the maximum lift thickness shall be 4 inches. Do not backfill around portions of structures requiring backfill on only one side or on less than all sides, until the concrete has reached the specified 28-day strength to withstand the earth pressures on structures.
- E. When placing material for backfill around waterproofed structures, protect such structures and the waterproofing thereof with a shield when necessary to prevent displacement or injury by stones or other hard substances in the backfill.
- F. Do not backfill on or against structural concrete until the specified 28-day concrete strength has been attained.
- G. Do not use compaction equipment and methods that produce excessive horizontal or vertical earth pressures on structures. Excessive horizontal earth pressures are those in excess of active earth pressures. Excessive vertical earth pressures are those in excess of overburden pressures.
- H. No jetting or pumping of backfill material is permitted.

**Hamilton Station Stabilization
C20046F**

3.12 FINISH GRADING

- A. Finish grade all areas to elevations and grades indicated. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 7 to 8 inches below the grades and elevations indicated.
- B. Place and spread stockpiled topsoil to a uniform thickness of 6 inches (approximately) in areas to receive topsoil and landscape planting. Place and spread to a uniform thickness approximately 1 inch below finish grades indicated.

3.13 FIELD QUALITY CONTROL

- A. Regulatory Requirements: In compliance with the California Building Code, Chapter 33 and Appendix Chapter 33, Contractor's earthwork operations shall be performed under the observance of a Geotechnical Engineer currently registered in the State of California, as follows:
 - 1. Site preparation, cutting and shaping, excavating, filling, backfilling, and embankment construction shall be carried out under the observation of the Geotechnical Engineer, who will perform appropriate field and laboratory tests, as determined by the Geotechnical Engineer, to evaluate the suitability of fill and backfill material, the proper moisture content for compaction, and the degree of compaction achieved. Fill or backfill that does not meet the specified requirements shall be removed or recompacted until the requirements are satisfied.
 - 2. Cutting and shaping, excavating, conditioning, filling, backfilling, and compacting procedures require approval of the Geotechnical Engineer. Before approval is granted, deficiencies shall be corrected in an approved manner as required by the Geotechnical Engineer.
- B. Density Tests: Compacted fill, backfill, and embankment shall be tested to verify compliance with specified requirements in accordance with ASTM D2922. Frequency of tests shall be in accordance with Contractor's Quality Plan, but not less than the following:
 - 1. Expansive Horizontal Areas: One test per 100 cubic yards, or fraction thereof, of fill or backfill placed.
 - 2. Confined Areas and Embankments: One test per every second lift of fill, backfill, or embankment placed.
- C. Compaction Tests: Tests for compaction shall be performed in accordance with test procedures specified in ASTM D1557, Method D, as applicable. Field-testing of soils or compacted fill in place shall be performed in accordance with applicable requirements of ASTM D2922.
- D. Moisture Content Tests: Compacted fill, backfill, and embankment shall be tested to verify compliance with specified requirements in accordance with ASTM D3017. Minimum frequency of tests shall be as specified above for density tests.

END OF SECTION 31 00 00

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 31 23 16

STRUCTURAL EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavating for volume below grade, walers, tieback trenches, and panel adjustments.

1.02 RELATED REQUIREMENTS

- A. Section 31 23 23 - Structural Backfill: Fill materials, filling, and compacting.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
1. State of California, Department of Transportation Standard Specifications, current governing edition.
 2. CAL-OSHA the Division of Occupational Safety and Health.

1.04 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for Structural Excavation will be by the unit-price method.
- B. Unit Prices: The unit-price method of measurement and payment will be as follows:
1. Measurement: Structural Excavation will be measured by the cubic yard.
 2. Payment: Structural Excavation will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.03.B.1, "Measurement," herein.
- C. The Contract price paid for Structural Excavation (Waler and Tieback Assembly) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including shoring and for doing all the work involved in excavation, performing MSE wall panel realignment, performing existing guardrail panel adjustment, shortening and tightening soil reinforcement including steel plates and bolts, and sawcutting panel joints, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA.

PART 2 PRODUCTS - NOT USED

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 PREPARATION

- A. Structure excavation must be done in accordance with the requirements of Section 19-3, "Structure Excavation and Backfill," of the Caltrans Standard Specifications.
- B. Identify required lines, levels, contours, and datum locations.
- C. Locate, identify, and protect utilities that remain and protect from damage. All contractors must call 811/1(800)227-2600, 48 hours before digging. Excavation for underground facilities must not be permitted prior to underground service alert's identification of existing utilities.
- D. Notify utility company to remove and relocate utilities.
- E. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and rail traffic.
- F. Adjoining public and private property must be protected from damage during construction, remodeling and demolition work. Provide written notice to the owners of adjoining buildings advising them that the excavation is to be made and that the adjoining buildings will be protected. Notification must be delivered not less than 10 days prior to the scheduled starting date of the excavation.

3.02 EXCAVATING

- A. Underpin adjacent structures that could be damaged by excavating work.
- B. Excavate to accommodate new structures and construction operations.
- C. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- E. Do not interfere with 45 degree bearing splay of foundations.
- F. Cut utility trenches wide enough to allow inspection of installed utilities.
- G. Hand trim excavations. Remove loose matter.
- H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23.
- I. Grade top perimeter of excavation to prevent surface water from draining into excavation.

END OF SECTION 31 23 16

SECTION 31 23 23

STRUCTURAL BACKFILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for building volume below grade, around walers, tiebacks, and panels.
- B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.

1.03 SUBMITTALS

- A. Site location for earthwork materials: Contractor must submit a list of sites and location of each, proposed to be used by contractor to provide each of the following materials:
 - 1. Imported Borrow
 - 2. Structure Backfill
 - 3. Pervious Backfill Material

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. State of California, Department of Transportation Standard Specifications, current governing edition.
- B. Testing and Inspection
 - 1. Contractor:
 - a. Contractor will cooperate with and notify Owner's agent at least 48 hours in advance of inspections required.
 - b. Should the materials at the site proposed by Contractor fail to meet the specified requirements, Contractor must propose another site to provide required material and pay for any subsequent inspections and testing necessary to verify compliance of proposed materials to those specified.
 - c. At least 60 days before any backfill work is to be done, Contractor must clear the site proposed to provide imported borrow, structure backfill, or pervious backfill and allow the Owner's agent to take samples as required to test materials for conformance to these specifications.

**Hamilton Station Stabilization
C20046F**

1.05 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for Structural Backfill will be by the unit-price method.
- B. Unit Prices: The unit-price method of measurement and payment will be as follows:
 - 1. Measurement: Structural Backfill will be measured by the cubic yard.
 - 2. Payment: Structural Backfill will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.03.B.1, "Measurement," herein.
- C. The Contract price paid for Structural Backfill includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including restoring track ballast and for doing all the work involved in the backfill, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. Structural Fill: Conforming to the requirements of Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications.
- B. Imported Borrow: Conforming to the requirements of Section 19-7, "Borrow Excavation," of the Standard Specifications.
- C. Pervious Backfill Material: Conforming to the requirements of Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications.
- D. Concrete for Fill: Lean concrete as define in Section 03 30 00.
- E. Granular Fill: Conforming to the gradation and quality requirements of the Caltrans Standard Specifications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.

3.02 PREPARATION

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

**Hamilton Station Stabilization
C20046F**

3.03 FILLING

- A. Maintain optimum moisture content of fill materials to attain 95% compaction density.
- B. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- C. Correct areas that are over-excavated.

END OF SECTION 31 23 23

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 31 32 36

TIEBACK ASSEMBLY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Constructing tiebacks including grouting steel rods in corrugated plastic sheathing
- B. Installing anchorage systems

1.02 RELATED SECTIONS

- A. Section 7.43, Submittal of Shop Drawings, Product Data, and Samples.
- B. Section 01 45 30, Structural Quality Control.
- C. Section 03 05 15, Portland Cement Concrete.
- D. Section 03 20 00, Concrete Reinforcing.
- E. Section 03 30 00, Cast-In-Place Concrete.
- F. Section 05 50 00, Metal Fabrications.
- G. Section 34 11 14, Ballast.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment will be by the unit-price method as determined by the listing of the bid items indicated in the Schedule of Quantities and Prices of Bid Form 1.
- B. Unit Prices: The measurement and payment for tieback assembly is by the unit-price method, and will be as follows:
 - 1. Measurement: Tiebacks will be measured by each.
 - 2. Payment: Tieback assembly will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.3.B.1, "Measurement," herein.
 - a. The Contract price paid for tieback assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the tieback assemblies, complete in place, as shown on the Contract Drawings, as specified in these Technical Specifications, and as directed by VTA
 - b. Full compensation for furnishing and installing anchorages, threaded rods, and other miscellaneous metal items required for tieback assemblies is included in the Contract prices paid per each for tieback assembly and no additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

1.04 REFERENCES

A. ASTM International (ASTM):

1. ASTM A615/A615M Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
2. ASTM D1784 Standard Specifications for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) CPVC Compounds

1.05 DEFINITIONS

- A. Tieback: A threaded rod in a greased polyethylene sleeve encapsulated full length in a grouted corrugated plastic sheathing.
- B. Anchorage: A steel bearing plate with connectors fastened to the ends of the tieback using steel nuts, washers, hollow structural steel tube, and self-undercutting type mechanical anchors.

1.06 SUBMITTALS

- A. General: Submittals for tieback assembly shall be made in accordance with the General Conditions and these Technical Specifications.

B. Shop Drawings:

1. Submit fully detailed Shop Drawings of steel anchorages per Section 05 50 00 – Metal fabrications, Article 1.5, “Submittals.”
2. Submit a complete Shop Drawing submittal for tieback assemblies. The Shop Drawing submittal for tieback assemblies shall contain all information required for the construction including the following:
 - a. The proposed schedule and detailed construction sequence of the installation and grouting of tiebacks, including excavation and backfill of ballast as required to construct tieback assemblies and concrete walers.
 - b. Complete details and specifications for the anchorage system, couplers, and tiebacks including encapsulation materials and grouting methods.
 - c. Grout placement procedures and equipment.
 - d. Complete details and specifications for the anchorage system and tiebacks including encapsulation materials and grouting methods.

- C. Product data shall be submitted for the threaded rod, anchorage systems and grout mix design.

1. Submittals shall be made to VTA for review by VTA and the Structural Engineer of Record. Do not order materials, begin fabrication, or begin construction of work related to the submittal until the submittal has been reviewed and stamped by the Structural Engineer of Record with a Shop Drawing stamp marked "No Exceptions Taken" or "Make Corrections Noted" and returned to Contractor by VTA.
2. Provide the proposed schedule and detailed construction sequence of the installation, grouting of tiebacks, complete details and specifications for the anchorage system, and tiebacks, including encapsulation materials and grouting methods.

**Hamilton Station Stabilization
C20046F**

3. Grout mix designs and testing procedures.
 4. Proposed tieback tensioning equipment, and the method and equipment for determining tieback displacement during testing.
- D. Submittals shall include the following requirements:
1. Grout mix design.
 2. Mill Certificates / Certificates of Compliance for materials:
 - a. Certificates of compliance for threaded rod
 - b. Mill certificates and certificates of compliance for bearing plates and concrete anchors
 - c. Certificates of compliance for grout materials
 3. Tensioning measurements and procedures

1.07 QUALITY CONTROL

- A. Inspection: Cooperate with and notify VTA at least 48 hours in advance of inspections. Inspection shall consist in the monitoring to tieback tensioning operations and expansion anchor installation.

1.08 SITE CONDITIONS

- A. Difficult tieback assembly construction is anticipated due to caving ballast/soil, access with existing track adjacent to work and train operations.

1.09 STORAGE AND HANDLING

- A. Store and handle tieback assemblies in a manner to avoid damage or corrosion. Replace tiebacks exhibiting abrasions, cuts, welds, weld splatter, corrosion or pitting. Repair or replace any bars exhibiting damage to encapsulation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Tieback: The tieback shall be a threaded rod in a greased polyethylene sleeve encapsulated full length in a grouted corrugated plastic sheathing, conforming to the details shown on the Contract Drawings and as specified in these Technical Specifications. The rod shall be centered in the sheathing and the space between the sheathing and the rod shall be filled with grout. Splicing of tiebacks shall be made only at the locations shown in the approved Shop Drawings or at ends of tiebacks that VTA has directed to be lengthened.
- B. Threaded rod for tiebacks: Hot-dipped galvanized or epoxy coated threaded rod conforming to ASTM F1554 Gr. 105. Couplers for splicing, if used, must be hot dipped galvanized and have a minimum capacity of 1.2 times the rod capacity.
- C. Encapsulation: Corrugated plastic sheathing shall have sufficient strength to prevent damage during construction operations and shall be chemically stable without embrittlement or softening, and nonreactive with concrete. The sheathing shall be either polyvinyl chloride (PVC) or high-density polyethylene (HDPE). The minimum sheathing wall thickness shall be 25 mils.

**Hamilton Station Stabilization
C20046F**

1. Polyvinyl chloride (PVC) sheathing shall conform to ASTM D1784, Class 13464-B.
 2. HDPE shall have a density between 0.940 and 0.960 grams per cubic centimeter when measured in conformance with the requirements in ASTM D792, Test Method A.
- D. Centralizers: Centralizers shall be fabricated from schedule 40 PVC pipe or tube, steel, or material non-detrimental to the tieback rod steel. Wood must not be used. The centralizers shall be securely attached to tieback assembly, sized to position the tieback assembly at the center of the pipe.
- E. Anchorages for tiebacks: Steel plates, nuts, washers and welded assemblies at anchorages shall be hot dipped galvanized after fabrication and conform to the details shown on the Contract Drawings and the provisions in Section 75-1.02, "Miscellaneous Iron and Steel," of the Caltrans Standard Specifications and these Technical Specifications. Concrete self-undercutting anchors shall be stainless steel.
- F. Grout: Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Caltrans Standard Specifications and these Technical Specifications. California Test 541 will not be required nor will the grout be required to pass through a screen with a 0.07-inch maximum clear opening prior to being introduced into the grout pump.
1. Fine aggregate may be added to the grout mixture of cement and water in drilled holes 6 inches or greater in diameter, but only to the extent that the cement content of the grout is not less than 930 pounds per cubic yard of grout. Fine aggregate, if used, shall conform to the provisions in Section 90-2, "Materials," and Section 90-3, "Aggregate Gradings," of the Caltrans Standard Specifications. Grout with fine aggregate shall have a nominal penetration equal to or greater than 90 mm when measured in conformance with California Test 533 and shall have an air content of equal to or less than 2 percent when measured in conformance with California Test 504. Air-entraining admixtures must not be used for grout with fine aggregate.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Tiebacks shall be installed in an expeditious manner so that caving or deterioration of the excavation does not occur.
- B. Centralizers shall be used during installation to support the tieback in the center of the pipe. Centralizers shall be spaced at a maximum of 4 feet on center along the length of the rod, and 18 inches from the end of the rod.
- C. After placing grout, tiebacks shall remain undisturbed for a minimum of 4 hrs.

3.02 PRETENSIONING – GENERAL REQUIREMENTS

- A. Contractor shall pretension tiebacks to the loads shown on the plans.
 1. Contractor shall monitor and record total movement of the bearing plate relative to platform edge during application of the pretension load. If movement exceeds ½", stop tensioning operations and notify VTA.

**Hamilton Station Stabilization
C20046F**

3.03 PRETENSIONING – GENERAL REQUIREMENTS

A. Quality Control:

1. Cooperate with and notify VTA at least 48 hours in advance of grouting tiebacks, drilling for and installing expansion anchors and pretensioning of tiebacks.

END OF SECTION 31 32 36

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 33 05 10

UTILITY GRADE ADJUSTMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Section includes specifications for adjusting existing structures to new finish grade including such structures as manholes, vaults, hand holes, drainage structures, utility boxes and valve structures, including raising or lowering and resetting existing frames, covers, grates, and lids. Including adding or replacing riser collars and box extension.
- B. Section includes specification for adjusting existing fire hydrant to finished grade by addition of an extension barrel section and stem.

1.02 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for approval showing modification for raising and lowering of each type of structure frame and cover impacted by the Work. Provide documentation that the modification can accommodate all loads resisted by the existing structure.
- B. Product Data: Submit product data for approval for cast iron and pre-cast risers for adjustment of frames, covers, lids, and grating.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement: The work shall be measured by the unit (each) as listed in the Schedule of Quantities and Prices of Bid Form 1.
- B. Payment: The Contract prices per unit (each) for utility grade adjustments shown in the Schedule of Quantities and Prices include furnishing and installing all material required to complete the work as listed in the Contract Drawings and as specified in the specifications. No additional compensation will be allowed therefor.

PART 2 PRODUCTS

2.01 PRODUCTS

- A. Materials for adjusting facilities to grade must be similar in character to the existing materials.
- B. Provide cast iron or pre-cast concrete riser collars to suit existing structures, to accommodate loads resisted by the existing structure, and in accordance with the requirements of the jurisdictional authority.
- C. Provide extension barrels and stems to suit existing fire hydrants, and all other necessary appurtenances, in accordance with the requirements of the jurisdictional authority
- D. Miscellaneous Materials: As required and in accordance with the requirements of the jurisdictional authority and the approved shop drawings.

**Hamilton Station Stabilization
C20046F**

PART 3 EXECUTION

3.01 ADJUSTMENT OF MANHOLE COVERS, GRATES, LIDS AND SIMILAR FACILITIES TO GRADE

- A. Adjust existing facilities as shown on the Contract Drawings by raising or lowering to match the new grade line.
- B. Construct or alter the structure to the required line and grade.
- C. Use approved cast iron or pre-cast concrete riser collar and box extension.
- D. Adjust frames and covers to new grade.
- E. Perform minor concrete work after structures have been adjusted to new pavement grade.
- F. Maximum adjustment of manhole covers, drainage grates, and valve covers shall be 12 inches plus or minus, unless noted otherwise.
- G. Adjustment of utility boxes to grade includes electrical boxes, communication boxes, telephone boxes, cleanout boxes, irrigation boxes, water meter boxes.

3.02 ADJUSTMENT OF FIRE HYDRANTS TO GRADE

- A. Adjust existing fire hydrants as shown on the Contract Drawings by raising or lowering to match the new grade line.
- B. Remove and reinstall the existing fire hydrants to the required line and grade.
- C. Use approved extension barrel section and stem.
- D. Perform minor concrete work after fire hydrants have been adjusted to new grade.

END OF SECTION 33 05 10

SECTION 34 11 10

TRACK CONSTRUCTION GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

- A. This Section includes specifications for general information concerning track construction as indicated on the Contract Drawings.

1.02 DEFINITIONS

- A. The use of the following terms in these Specifications and the Contract Drawings shall be interpreted as specified herein:
1. Anchor Plate - A device used in embedded track to secure running rails to concrete slab at the proper track gauge to provide vertical, lateral and longitudinal restraint of the rail.
 2. At-Grade Road Crossing - The crossing of a railway track and a vehicular roadway at the same elevation.
 3. At-Grade Track Crossing - The crossing of two or more railways tracks at the same elevation. See Crossing, Diamond.
 4. Ballast – An integral part of the track structure, generally composed of graded crushed stone, in which ties are embedded.
 5. Closure Rails - The rails placed between components of special trackwork unit, such as the rails between the switch and the frog in a turnout.
 6. Continuous Welded Rail (CWR) - A number of rails welded together into a continuous string.
 7. Compromise Plug Rail – A short rail piece linking rails having different sections.
 8. Crossing - An at grade railroad crossing (diamond) where two tracks cross or intersect each other requiring special trackwork.
 9. Crossover, Double – Two single crossovers that intersect between the two adjacent and generally parallel tracks forming a connection.
 10. Crossover, Single – Two turnouts, with track located between the frogs and arranged to form a continuous passage between two adjacent and generally parallel tracks.
 11. Dutchman – A temporary rail section inserted between two rail strings during the laying of CWR.
 12. Standard Drawings - Known as VTA Standard Drawings and referenced in the construction contract to convey information pertinent to track methods and track components for the purpose of supporting construction and/or procurement of track and materials.
 13. Fastenings - A general term applied to device used to retain the rail in place such as spring clips, insulators, etc.
 14. Frog - A track device used at the intersection of two running rails to provide support for wheel treads and passageways for wheel flanges, thus permitting wheels traversing either rail to cross the other.

**Hamilton Station Stabilization
C20046F**

15. Frog Number - The number used to designate the size of a frog, and being equal to one-half the cotangent of one-half the frog angle or the number of units of center line length when the spread N is one unit.
16. Gauge, Track - The distance between the inside faces of running rails of a track measured at a point 5/8 inch below the top of rail of 115 RE rail or 1/2 inch (14 mm) below top of rail of Ri 59N girder rail. The standard gauge distance shall be 4 feet – 8 ½ inches.
17. Guard Rail - A rail installed parallel to and inside of the running rail of a track to hold wheels in a correct alignment to prevent their flanges from striking the points of turnout or crossing frogs.
18. Inside Rail - On curved track, the rail nearest to the curve center; the rail with the shorter radius. Also referred to as the "low rail."
19. Joint Bar – Device used to join the abutting ends of two rails of the same cross section
20. Joint Bar, Compromise - A joint bar used to connect two rails of different cross sections.
21. Joint Bar, Insulated - Joint bar used to arrest the flow of electric current between two rails. Standard types are bonded and non-bonded.
22. OTM – Other Track Materials are rail fastening systems components on concrete or timber ties which includes; rail clips, screw spikes, track bolts, nuts, spring washers, tie plates, tie hole plugging material, rail anchors, standard toeless joint bars, compromise joint bars, and insulated joints.
23. Outside Rails - On curved track, the rail farthest from the curve center; the rail with the longer radius. Also referred to as the "high rail."
24. Pedestrian Crossing - The crossing of a railway track and a pedestrian sidewalk at the same elevation.
25. Premium or High Strength Rail - Rail having greater hardness than standard rail for use at locations of high track wear. Premium or High Strength Rail shall be head hardened.
26. Primary Track - Revenue track considered mainline, crossovers, and pocket tracks.
27. Profile Grade Line (PGL) - The datum line that defines the vertical alignment of the track, applied at the centerline of track at the top of the rail elevation on tangent track and the top of the inside (low) rail elevation on curves.
28. Rail Anchor – A device that clamps to the base of a rail and bears against the side of a cross tie to restrain longitudinal movement of the rail.
29. Rail Fastening - A device used in track to secure running rails to track slab at the proper track gauge. It also provides proper vertical and lateral restraint of the rail.
30. Rail, Tee - The common class of steel rail design symmetrical in section and which approximately resembles an inverted letter "T."
31. Rail, Girder – A common class of steel rail design that has a deep web, flat base, and wide and shallow top, adapted to wheels with small flanges."
32. Restraining Rail - A guard rail mounted and generally installed parallel and on the gauge side of the inside rail (or both running rails) of curved track to reduce wear on the running rails.

**Hamilton Station Stabilization
C20046F**

33. Running Rails - The support rails of a track on which the vehicle wheel tread contact.
34. Lag Screw bolts - A threaded fastener for ballasted track construction that secures tie plates and special trackwork plates to timber crossties and switch ties.
35. Special Trackwork - A generic term referring to turnouts, single and double crossovers, track crossings, and other items.
36. Spike, Cut - The standard drive-in component of ballasted track construction that secures tie plates to timber crossties and switch ties (See AREMA Manual, Chapter 5, Part 2).
37. Spike, Hair Pin Spring Type - Component of ballasted track construction that secures tie plates to timber crossties.
38. Stock Rail - A running rail that a switch point rail mates against in a split switch.
39. Subballast - A material superior in composition to the subgrade material that provides a semi-impervious layer between the track ballast and the subgrade to provide better drainage and distribution of loads to the subgrade.
40. Subgrade - The finished embankment or excavation below the level of sub-ballast.
41. Superelevation - In curved track, the amount that the outside rail is raised above the inside rail. The inside rail elevation is maintained at the PGL top of rail profile.
42. Switch, Double Tongue - A wheel flange deflecting device consisting essentially of two movable switch tongues generally used in a turnout in embedded track.
43. Switch, Point of - The tip of the tapered end of a switch point rail; the end of a switch rail farthest from the frog.
44. Switch Point, Switch Rail - The machined movable point rail of a split switch.
45. Switch, Split - The common type of track switch consisting of two planed switch point rails and their associated stock rails and hardware.
46. Switch, Tongue - A switch piece device consisting of a movable tongue, designed for use with another tongue device. Tongue switches are generally used when the turnout is in embedded track.
47. Switch, Undercut - A switch in which the stock rails are undercut to mate with or nest the switch rails so that the actual point of the switch rail head does not protrude beyond the original outline of the stock rail's head outline, commonly called a Sampson switch point.
48. Tie or Cross tie - Portion of track structure placed in ballast perpendicular to rail to hold track gauge and rail alignment. Ties may be made of timber or concrete.
49. Top of Rail (T/R) - That portion of the running rail that follows the PGL. Top of rail elevation is measured at the centerline of the rail.
50. Track, Ballasted - Track constructed of ballast, crossties, tie plates, rails and fastenings.
51. Track, Embedded - Track designed for joint usage with roadway vehicle traffic, with rails encapsulated with rubber rail boot material or elastomeric grout for insulation and concrete on asphalt infill for pavement materials.
52. Track Foot - Unit of measurement for all types of track construction; measured along the centerline of track.

**Hamilton Station Stabilization
C20046F**

- 53. Track, Primary - A revenue service track designated by route name and direction.
- 54. Track, Shop - Track constructed within the Maintenance Facility building or perimeter aprons, generally embedded track or open track supported across vehicle service pits.
- 55. Track, Yard - Track constructed within the Maintenance Facility Yard for the purpose of switching, storing, or maintaining light rail vehicles.
- 56. Track Crossing - An assembly of four frogs, connecting rails and guard rails that allows two single tracks to cross one another. See Crossing (Diamond).
- 57. Track Slab - The reinforced concrete foundation that supports the track, generally in conjunction with embedded track, shop track, and at grade slab track.
- 58. Transition Slab - A reinforced concrete slab located at the junction of ballasted track and embedded track to provide a transition between ballasted track construction and other types of track that have significantly different track modulus.
- 59. Turnout - A track arrangement consisting of a switch, frog, stock rails, closure rails, and guard rails enabling rail vehicles to be diverted from one track to another.
- 60. Turnout Number - The number corresponding to the number of the frog used in a turnout.
- 61. Working Drawings – Contractor prepared drawings to convey work plan information for the installation of the component part of the track works and/or structures.

1.03 REFERENCE STANDARDS

- A. Pertinent provisions of the following listed standards and publications shall apply to the Work, except as they may be modified herein, and are hereby made part of these Specifications to the extent required.
 - 1. American Railway Engineering and Maintenance-of-Way Association, Manual for Railway Engineering, herein referred to as the AREMA Manual.
 - 2. American Railway Engineering and Maintenance-of-Way Association, Portfolio of Trackwork Plans, herein referred to as the AREMA Portfolio.
 - 3. American Society for Testing and Materials (ASTM)
 - ASTM E10 Standard Method of Brinell Hardness for Metallic Materials
 - 4. State of California, Department of Transportation (Caltrans) Standard Specifications

1.04 SUBMITTALS

- A. Submittals shall include certificates of compliance, codes and regulations of the jurisdictional authorities including other submittals as stipulated in these Specifications.
- B. Manufacturer’s printed instruction and shop drawings for special trackwork assembly will be supplied to Contractor as per Section 34 11 23.
- C. Submit the end-hardening procedure and a list of trained or otherwise qualified personnel who will perform the end-hardening on the rail in the field to VTA.
- D. Rail End-Hardening Submittal and Tests

**Hamilton Station Stabilization
C20046F**

- E. Continuous welded rail laying records as specified in Article 3.07, Laying Continuous Welded Rail.
- F. Two rail thermometers.
- G. Submit the type of equipment and method of operation to VTA for acceptance prior to initiation of rail grinding.
- H. In order to determine the acceptability of the installation, Contractor shall make a survey of the track and submit a copy to VTA for review.
- I. Submit construction equipment data and loading diagrams to VTA for review.

1.05 MEASUREMENT AND PAYMENT:

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of Work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Furnish all trackwork materials and incidental materials required for the construction of track under this contract.

PART 3 EXECUTION

3.01 CONSTRUCTION EQUIPMENT

- A. Track gauge, guard rail, flangeway width, curve radii, rail sections, and special trackwork components are designed for Light Rail Vehicle operation. Modify on-track equipment, as required, to operate over this track without causing damage to the track structure.
- B. Clearance for the on-track equipment shall conform to the requirements for vehicle clearances.
- C. Contractor's equipment must not exceed the design loads. Further information concerning vehicle characteristics will be provided by VTA upon request by Contractor.
- D. Contractor shall submit loading diagrams for construction equipment and complete calculations showing conformance with live load requirements for approval before construction equipment is allowed on aerial structures. Contractor shall also submit construction equipment data for on-track construction equipment showing compliance with wheel contour, gauge, and clearance requirements.

3.02 ALIGNMENT DATA

- A. Alignment information shown on the Contract Drawings refers to geometric control points for the track.
- B. Engineering stationing is used to reference geometric control points. Independent stationing will be used for each track.
- C. Mathematized alignment data for each track is included on the Contract Drawings.

3.03 TRACK GEOMETRY

**Hamilton Station Stabilization
C20046F**

- A. Construct track to conform to the alignment and profile data as specified herein, and as indicated on the Contract Drawings.
- B. For tangent track the alignment is based on each centerline of track, equidistant between the gauge sides of the running rails.
- C. For curved track, the alignment is based on the centerline of track with the outside rail located 2 feet 4-1/4 inches radial from the centerline measured at the gauge line of the rails.
- D. Measure track gauge as specified herein for Gauge, Track in Article 1.02, Definitions.
 - 1. Tangent and curved track's track gauge shall be 4 feet 8-1/2 inches.
 - 2. Special trackwork's track gauge shall be as indicated on the Shop Drawings of VTA furnished Special Trackwork Materials.
 - 3. Gauge narrowing or gauge widening. Make the change in track gauge at the rate of 1/8 inch in a transition length of not less than 15 feet. Begin gauge at spiraled curves beginning at the junction of the spiral and tangent, proceed toward the curve, and complete either before or at the junction of the spiral and the circular curve. Gauge at unspiraled curves shall occur on the tangents and shall be completed at the junction of the tangent and the circular curve. Gauge narrowing or widening shall be performed by moving the inside rail of the curve.
- E. Rail Cant (Inclination)
 - 1. Construct embedded mainline track and special trackwork with no rail cant.
 - 2. Construct ballasted tracks with rail cant at 40 to 1 inward inclination of the rails.
- F. Superelevation
 - 1. Superelevate track curves as indicated on the Contract Drawings.
 - 2. Track superelevation shall be accomplished by maintaining the inside rail of the curve at top of rail profile and raising the outside rail.
 - 3. The superelevation at the tangent-to-spiral point shall be zero and shall increase uniformly through the length of the spiral to full elevation of the outer rail at the spiral-to-curve point unless otherwise shown on the Contract Drawings. Provide this spiral and superelevation at the ends of simple curves and segments of compound curves as indicated. Attain the superelevation on curves without spirals over equal lengths on the tangent and curve and increase linearly throughout the rate of change length.
 - 4. Turnouts and Crossovers must not be superelevated.
 - 5. Metal tags shall be installed to mark the beginning and ending points of superelevation and every 1/4-inch increment between the beginning and ending points of the superelevation transition. Bond tags to concrete with epoxy approximately 1 foot inside the outside rail to read in the direction of increasing stationing.
 - 6. Track curve information shall be as indicated on the Contract Drawings. Shop pre-curved rail shall be marked by the manufacturer for proper installation by Contractor.
- G. Track Surface

**Hamilton Station Stabilization
C20046F**

1. Track surface is the relationship of both rails opposite each other in profile and cross level. Track profile is the running surface along the top of the rails. Cross level is the difference in elevation between the top of heads of opposite rails measured at right angles to the track alignment. The ideal surface is a uniform profile consisting of straight gradients connected by vertical curves, with zero cross level on tangents and predetermined cross level on curves.

3.04 TRACK CONSTRUCTION TOLERANCES

- A. The track construction tolerances shall be as specified in Table 1 below.

**TABLE 1
TRACK CONSTRUCTION TOLERANCES⁽⁴⁾**

Type of Track	Gauge ⁽³⁾ Inches	Cross Level ⁽³⁾ Inches	Horizontal Alignment Deviation ⁽¹⁾⁽³⁾	Vertical Alignment Deviation ⁽¹⁾⁽³⁾
Ballast (Primary)	$\pm 1/8$	$\pm 1/8$	$\pm 1/4^{(2)}$	$\pm 1/4$
Embedded (Paved)	$\pm 1/8$	$\pm 1/8$	$\pm 1/4^{(2)}$	$\pm 1/4^{(1)(2)}$

NOTES:

- (1) Designed alignment and the actual constructed track position.
- (2) Deviation at top of rail to adjacent concrete shall be plus 1/4 inch minus 1/8 inch.
- (3) Rate of change variations in gauge, horizontal alignment, vertical alignment, cross level and track surface shall be limited to 1/8 inch per 15 feet of track.
- (4) To verify that constructed track is within these tolerances an "as built" survey by an authorized survey team will be required. See Article 3.11 "Final Track Inspection".

3.05 TYPES OF RAIL

- A. Rail for use as running rail for ballasted tracks, grade crossing panelized track, and in special trackwork shall be 115 RE tee rail in accordance with Section 34 11 15, Running Rail.
 1. Running Rail shall be either standard carbon or high strength rail as indicated on the Contract Drawings.
 2. Special Trackwork components, closure rails, stock rails, guard rails and ladder tracks will have 115RE high strength rails.
- B. Running rail and restraining rail in curves having a horizontal centerline radius less than 500 feet shall be precurved by supplier from T.S. to S.T. 115 RE running rail with vertical curve radius less than 1000 feet and girder rail with a vertical curve radius less than 1500 feet shall be precurved by the supplier from PVC to PVT.
 1. Perform field adjustments of precurved rail to match design radius as required.
 - a. Such field adjustments shall be incidental to the track installation and will receive no separate payment.
 - b. Perform field adjustments in a manner that will prevent permanent kink, twist, overstress or otherwise damage the rail.

**Hamilton Station Stabilization
C20046F**

- C. Install rail section and type of rail at each location as indicated on the Contract Drawings.
 - 1. Design strings of high strength rail:
 - a. To conserve high strength rail by minimizing the generation of unusable short rails;
 - b. To minimize the number of welds
 - 2. The minimum 12-ft plug rail that will replace the defected rail shall be of the same type as the existing rail or proposed rail depending on its location. Locate weld joints in accordance with Article 3.06C.

3.06 RUNNING RAIL AND RESTRAINING RAIL REQUIREMENTS

- A. Running rail and restraining rail procurement is described in Section 34 11 15, Rail. Restraining rail assembly components are described in VTA Standard Details Sheets MS-04, MS-05, MS-06, MS-07 and MS-08.
- B. Running rail shall be welded in accordance with Section 34 11 22, Welding of Rail. Running rail shall be field drilled for restraining rail installation at locations shown on the Contract Drawings.
- C. Locate field welds so that they do not occur at the following locations:
 - 1. Within 12 feet of another thermite field weld in the opposite rail.
 - 2. Within 15 feet of a field weld in the same rail
 - 3. Within 200 feet from the center of bolted joint.
 - 4. On ballasted track within 200 feet of an aerial structure abutment.
 - 5. Within 20 feet of a change of track construction other than that described above.
- D. Cutting, drilling and beveling of rail for installation of bonded insulated joints:
 - 1. Cut rails square and clean by means of either rail saws or abrasive cutting disks.
 - 2. Do not cut rail for the installation of a bonded joint within 10 feet of an electric weld.
 - 3. Accurately space holes for bolting of rail and drill with a rail drill in accordance with the requirements of AREMA Manual for Railway Engineering, Specifications for Rail Drillings, Bar Punchings and Track Bolts.
 - a. Drill cylindrical holes of specified diameter for the size bolt required through and perpendicular to the web of the rail.
 - b. Use a template as a drilling guide. In no case shall a joint bar be used for this purpose.
 - 4. Remove rough edges from the bolt holes.
 - 5. Rail ends in bonded joints shall be in accordance with the joint manufacturer's written specifications.
 - 6. At bonded joints, end-harden standard carbon rail ends in the field that are not end-hardened at the mill.

**Hamilton Station Stabilization
C20046F**

- a. Remove joint bars and associated insulating materials from rail ends during the end-hardening process.
- E. Rail End-Hardening
- 1. Submit the end-hardening procedure and a list of trained or otherwise qualified personnel who will perform the end-hardening on the rail in the field to VTA Representative.
 - 2. Tests shall be performed by Contractor in the field to determine rail-end hardness and to assess hardness procedures, and results shall be sent to VTA Representative.
 - 3. Standard rail and premium rail with Brinell hardness below 341 shall require end hardening.
- F. Rail End-Hardening Submittal and Tests
- 1. Two sample rails shall be end-hardened in accordance with the submitted procedure and tested by an approved independent laboratory. This applies to 115RE, Ri-59N, and Ri-52N girder rail.
 - a. Perform testing at no additional expense to VTA.
 - b. Acceptance of the end-hardening procedure and personnel will be subject to the results of specified tests and samples. Acceptance will not be made if such results do not meet specified requirements.
- G. End Hardening Tests
- 1. Test the two samples of end-hardened rail for Brinell hardness in accordance with ASTM E10 using a standard ball (10 mm) and loading (3000 kgf) in longitudinal indentation increments at least two and one half times the diameters of the indentation on the rail head for a distance of six inches starting from the hardened end of the rail.
 - 2. Record the hardness number and location.
 - 3. The Brinell hardness number (BHN) must not be less than 341 nor more than 401 when measured at a point on the centerline of rail 1/2-inch from the rail end.
 - a. Decrease the hardness uniformly from the end of the rail to the hardness of the untreated rail in a distance of not less than 2 inches.
 - b. The hardness pattern shall be uniform across the top surface of the rail head.

3.07 JOINTS - WELDED, BONDED, INSULATED, AND COMPROMISE RAIL

- A. In primary track, use portable electric flash butt weld or thermite weld joints to join rails in special trackwork in accordance with Section 34 11 22, Welding of Rail.
- B. Bonded insulated joints shall be as specified in Section 34 11 19, Bonded Insulated Joints.
- C. Compromise Rail shall be as specified in Section 34 11 23.
- D. Locate bonded insulated joints and compromise rails as indicated on the Contract Drawings.
- E. Install welds and bonded insulated joints in accordance with the manufacturer's recommendations and procedures.

**Hamilton Station Stabilization
C20046F**

- F. Joints, including insulated joints, must not be located opposite each other. Joints shall be staggered at least 2 feet 0 inches, but not more than 2 feet 6 inches from the joint on the opposite rail, unless otherwise noted on the Contract Drawings or approved by VTA.
- G. Existing insulated joints to be removed shall be replaced by minimum 15ft length plug rail. Adjust the length of the plug rail to meet the requirements of Article 3.06C.

3.08 SPECIAL TRACKWORK

- A. Special trackwork assembly shall be specified in Section 34 11 23.

3.9 RAIL GRINDING

- A. Upon completion of the track installation to the specified tolerances, but prior to its final acceptance, grind running rail, except special trackwork items such as frogs and switch points, to the contour of the rail head with a rail mounted grinder.
- B. Grind the top and gauge side corner of the running rail head. Remove rust, mill scale, and surface irregularities with successive passes of the rail grinder. The grinding wheel shall be not less than 10 inches in diameter and shall have controlled downward pressure to permit grinding more metal per pass at high spots and bridging at low spots less than 10 inches in length. Submit the type of equipment and method of operation to VTA for acceptance prior to initiation of rail grinding.

3.10 FINAL TRACK INSPECTION

- A. To determine the acceptability of the installation, Contractor shall make a survey of the track and submit a copy to VTA for review. Deviations from the Contract Drawings that exceed tolerances specified shall be corrected by Contractor at no additional cost to VTA.

END OF SECTION 34 11 10

**Hamilton Station Stabilization
C20046F**

SECTION 34 11 12

TRACKWAY CONSTRUCTION MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for the design, manufacture, fabrication, preassembly, inspection, testing, and furnishing of trackway construction materials for this Contract.

- B. Trackway construction materials to be furnished as part of this Contract include, but are not limited to, the following items:
 - 1. Rubber railbase boot and rubber filler
 - 2. Embedded rail fastener assemblies
 - 3. Insulating Membrane
 - 4. Trackway paving concrete, insulated epoxy grout and low conductivity grout, joint sealant, and rail pocket sealant for Embedded Trackwork

1.02 REFERENCED STANDARDS

- A. American Iron and Steel Institute (AISI): Material 4340, Steel/Nickel Plate.

- B. National Electrical Manufacturers Association (NEMA): Fiber insulation standards.

- C. American National Standards Institute (ANSI):
 - 1. B18.21.1 Lock Washers (Inch Series).
 - 2. B18.22.1 Plain Washers (Reaffirmation and Redesignation of ASA B27.2-1965).

- D. American Society for Testing and Materials (ASTM):
 - 1. A36 Standard Specification for Structural Steel.
 - 2. A48 Standard Specification for Gray Iron Castings.
 - 3. A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, Concrete
 - 4. A884/A884M Standard Specification for Epoxy Coated Steel Wire and Welded Wire Fabric for Reinforcement.
 - 5. A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
 - 6. B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 - 7. C39/C39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 8. C94/C94M Standard Specification for Ready-Mixed Concrete.

**Hamilton Station Stabilization
C20046F**

9. C150 Standard Specification for Portland Cement.
 10. C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 11. D257 Standard Test Methods for D-C Resistance of Insulating Materials.
 12. E10 Standard Test Method for Brinell Hardness of Metallic Materials.
 13. E18 Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
 14. E428 Standard Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Inspection.
 15. E709 Standard Practice for Magnetic Particle Examination.
- E. American Concrete Institute (ACI):
1. 301 Specifications for Structural Concrete for Buildings.
 2. 302.1R Guide for Concrete Floor and Slab Construction.
 3. 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 4. 304.2R Placing Concrete by Pumping Methods.
 5. 309R Guide for Consolidation of Concrete.
 6. 347 Formwork for Concrete.
- F. State of California, Department of Transportation (Caltrans):
7. Standard Specifications:
 - a. Section 90 Portland Cement Concrete.
 8. Standard Test Methods:
 - a. Test 527 Expansion in Water and Contraction in Air of Portland Cement Mortar.
 - b. Test 540 Making, Handling, and Storing Concrete Compressive Test Specimens in the Field.
- G. Other references as specified in the AREMA Manual, the AREMA Portfolio and the SCVTA Design Criteria and Standard Details Manual also apply to the Work of this Contract.

1.03 SUBMITTALS

- A. Submittals in Performance of this Section:
1. Rubber Railbase Boot and Rubber Filler: Manufacturer's catalog sheets including instructions for use and description of application shall be provided.

**Hamilton Station Stabilization
C20046F**

2. Steel Plate Design and fastener assemblies: The proposed steel plate design and fastener assemblies for embedment of all rehabilitated embedded trackway sections including rail clips and anchor bolts.
3. Insulating Membrane: Manufacturer's catalog sheets including instructions for use and description of application shall be provided.
4. Trackway Paving Concrete Mix Designs:
 - a. Mix designs:
 - 1) Mix designs shall be submitted for each class of concrete on the job and shall show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job.
 - 2) Each mix design submittal, for concrete designated by strength, shall be accompanied by certified test data or trial batch test reports in accordance with the requirements of Section 90-9, "Compressive Strength," of the Standard Specifications, and these technical specifications.
 - 3) Contractor to match color of existing sidewalk concrete. Contractor to submit 4x4 sample concrete panel for approval by City of San Jose.
 - b. Product Data: Manufacturer's catalog sheets including instructions for use and description of application shall be provided.
 - c. Certificates of Compliance:
 - 1) Contractor shall provide Certificate of Compliance for each type of aggregate, cement and admixture to be used in each class of concrete or a Certificate of Compliance for each class of concrete.
 - 2) Certificates of Compliance shall include the name, source, and description of all materials used in each class of concrete, and shall be signed by the concrete supplier certifying that each material item complies with or exceeds the specified requirements.
 - 3) When Certificates of Compliance cannot be provided, Contractor shall hire a professional testing laboratory to verify compliance of each type of material to be used in each Class of Concrete. The cost of testing shall be paid for by Contractor.
 - d. Laboratory Test Reports:
 - 1) Laboratory test reports shall show the name of testing agency, date of testing and types of tests performed, and shall be signed by a principal of the testing agency who is a civil engineer currently registered in the State of California. Laboratory tests must not be older than 8 months and shall certify that the tested materials meet the specified standards.
 - 2) Laboratory test reports for concrete mix designs shall clearly identify each material or mix number of each mix tested to verify the correlation between the tested mix designs and the proposed mix designs.
 - 3) When required by other portions of these technical specifications, laboratory test reports shall be submitted for each material to be used in each class of concrete or for each mix design, and shall show compliance with appropriate ASTM Standards and these technical specifications.

**Hamilton Station Stabilization
C20046F**

1.04 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 RUBBER RAILBASE BOOT AND RUBBER FILLER

- A. The specified Rail Boot shall be manufactured from a thermoplastic rubber. The physical parameters cited in this specification are provided as a benchmark against which proposed elastomer blends will be evaluated. Elastomer compounds that exceed the limits shown will be accepted provided Contractor provides an explicit warranty against elastomer material defects for a period of not less than 10 years. Rail Boot shall cover the entire rail perimeter except for the top and gauge face of the railhead. Provide products as distributed by Iron Horse Engineering or VTA approved equal and comply with the following:
1. Rail Boot shall be fabricated from a virgin, high-grade elastomeric vulcanized compound with suitable reinforcing agents, anti-oxidants, anti-ozone agents, and other additives as necessary to provide material having adequate resistance to direct current, cyclical loading, impact, abrasion, weathering, and aging. Boot shall be resistant to oils and grease and to frequent loadings at extreme ambient temperatures. Materials used will be formed from two durometers hardness into a single extrusion profile.
 2. Provide in continuous reeled lengths not less than 110 feet so as to minimize splice locations. Provide manufacturer's certification that both the Rail Boot and the associative splice "cuffs" have been 100% electrically tested prior to packaging and that any imperfections have been removed and discarded.
 3. Provide splices of "cuffs" along with appropriate adhesives to completely join abutting sections of rail boot. Splices shall be of a length that will completely overlap the end of each abutting rail boot section by a minimum of 12 inches. Provide splices and patches in any locations necessary to provide 100% electrical resistance prior to concrete placement, follow manufacturer's guidelines for executing repairs.
 4. Manufacturer of the Rail Boot proposed shall have been used successfully in similar applications on at least three other railroad or transit properties for a minimum of the last five years.
 5. Hardness:
 - a. Design hardness: per ASTM D2240.
 - 1) Shore D 50 durometer for parts that extend up to top of paving elevation and parts exposed to fastening locations.
 - 2) Shore A 75 durometer for parts that do not extend up to top of paving elevation.
 - b. Manufacturing tolerance: Plus or minus 5 durometer.
 6. Tensile Strength: 1,740 psi minimum per ASTM D412.
 7. Ultimate Elongation: 400 percent minimum per ASTM D 412.
 8. High-Temperature Compression Set: Using Method B of ASTM D395, test for 70 hours at 212 degrees F. The compression set must not exceed 40 percent.

**Hamilton Station Stabilization
C20046F**

9. Ozone Resistance: Test in accordance with ASTM D1171 at an ozone concentration of at least 300 ppm. There shall be no cracking after 336 hours of exposure.
 10. Heat Aging Test:
 - a. Test method: Using ASTM D573, age the elastomer for 70 hours at 158 degrees F. Measure and record the change in hardness, tensile strength, and ultimate elongation.
 - b. Acceptance criteria: Tensile strength shall exceed 1,450 psi. Ultimate elongation shall exceed 230 percent. The change in hardness must not exceed 10 durometer, Shore A.
 11. Volume Resistivity: 4×10^{13} ohm-in, minimum dry, 4×10^{11} ohm-in minimum when saturated with water per ASTM D570. Measure product in accordance with ASTM D257.
 12. Low-Temperature Resistance: Non-brittle after three minutes at minus 40°F when tested per ASTM D570.
 13. Water Absorption: Two percent maximum when tested in accordance with ASTM D570.
 14. Resistance to Oils: When immersed in ASTM No. 1 Oil for 70 hours at 158°F per ASTM D570, changes in properties must not exceed the following:
 - a. Volume change: Plus 70% maximum
 - b. Tensile strength: Minus 50% maximum
 - c. Elongation: Minus 40% maximum
 15. Compression Deflection: When tested in accordance with ASTM D575 shall conform to the following:
 - a. Un-aged condition: 25% of the original thickness minimum.
 - b. Aged in ASTM No. 1 Oil for 70 hours at 158°F : A maximum of a 65% reduction from the un-aged deflection value.
 - c. Aged in an Oxygen bomb for 48 hours at 300 psi and 158°F : A maximum of a 25% reduction from the un-aged deflection value.
- B. Gauge side of rubber filler shall provide a formed flangeway of 2 1/2" to 2 3/4" maximum.
- C. Railbase Boot shall cover the base of the rail up to the limits of the rubber filler. The rubber filler shall be elastomeric flangeway material. The combination system of railbase boot and rubber filler shall provide complete isolations of the rail from the surrounding roadbed and prohibits any return current from interfering with adjacent utilities. Products shall be EPFIEX railseal/enclosure combination distributed by Polycorp or approved equivalent.
- D. Railbase Boot for special track work shall provide complete isolation of the entire system of embedded track from the concrete pavement. Product shall be Track Jacket distributed by Polycorp or approved equivalent.

**Hamilton Station Stabilization
C20046F**

2.02 EMBEDDED RAIL FASTENERS

- A. Contractor shall provide design of embedded rail fastening system and submit to VTA for approval.

2.03 EPOXY

- A. Epoxy-Resin System: Shall be of 2-component, solvent-free, moisture insensitive, epoxy resin system, 1:1 or 1:2 (B:A) ratio by volume. The material must not contain asbestos.
1. Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A Type, containing suitable viscosity control agents. It must not contain butyl glycidyl ether.
 2. Component B shall be an ethylene-amine and an amine adduct combination containing suitable viscosity control agents and accelerators.
 3. Properties:
 - a. Viscosity, .04 lb-s/sq ft to .05lb-s/sq ft.
 - b. Pot life, 30 to 38 minutes, minimum.
 - c. Compressive properties, tested at 28 days in accordance with ASTM D695.
 - 1) Compressive strength, 12000 psi minimum.
 - 2) Modulus of elasticity in compression, 450000 psi minimum.
 - d. Tensile properties, tested at 14 days in accordance with ASTM D638.
 - 1) Tensile strength, 5500 psi minimum.
 - 2) Modulus of elasticity in tension, 300000 psi minimum.
 - 3) Elongation at break, 1 percent to 2 percent.
 - e. Flexural properties, tested at 14 days in accordance with ASTM D790.
 - 1) Flexural strength, 9000 psi, minimum.
 - 2) Tangent modulus of elasticity, 600000 psi minimum.
 - f. Shear strength, tested at 14 days in accordance with ASTM D732, 5000 psi minimum.
 - g. Water absorption, tested at 7 days in accordance with ASTM D570, 1 percent maximum.
 - h. Volume resistivity, tested in accordance with ASTM D257, $4 \times 10^{13} \Omega \cdot \text{in}$ minimum.
 - i. Bond strength, tested in accordance with ASTM C882, 2000 psi.
 - j. Shrinkage: No shrinkage will be allowed.

**Hamilton Station Stabilization
C20046F**

2.04 INSULATED EPOXY GROUT

- A. Insulated epoxy grout shall conform to the requirements of Article 2.15, "Epoxy," and the following:
1. A minimum pullout strength of 6k LB shall be obtained with a 7/8 in. diameter anchor bolt with an embedment depth of 4 in.

2.05 INSULATING MEMBRANE

- A. The insulating membrane shall be cold applied, self-adhesive rubberized asphalt membrane with a high strength polyethylene backing. Insulating membrane material shall be bituthene waterproofing membrane by W. R. Grace & Company, or VTA-approved equal. Contractor may propose, for approval by VTA, a spray-on application insulating membrane material that is equal to that specified herein.
- B. Properties:
1. Tensile strength, tested in accordance with ASTM D412 on a 3/32 in. thick sheet shall be 100 psi, minimum.
 2. Elongation to break, tested in accordance with ASTM D412 (Die F) on a 3/32 in. thick sheet shall be 250 psi, minimum.
 3. Electrical resistivity for 50 percent RH, 2 in. disc and 100mil thick, in accordance with ASTM D257, shall be $4 \times 10^{13} \Omega \cdot \text{in}$ volume.
 4. Puncture resistance measured in accordance with ASTM E154 shall be 40 lb minimum.
 5. Permeability to water vapor, tested in accordance with ASTM E96, Method B, on a 3/32 in. thick sheet at 100°F, shall be 5.75 ng/(Pa·s·m²), (0.1 perm).

2.06 TRACKWAY PAVING CONCRETE

- A. Portland cement concrete shall conform the provisions in Section 90 of the Caltrans Standard Specifications, these technical specifications, and standard specifications of the City of San Jose.
1. Unless the use of a mineral admixture is prohibited, wherever the word "cement" is used in the Standard Specifications or these technical specifications, it shall be understood to mean "cementitious materials" when both of the following conditions are met:
 - a. The cement content of portland cement concrete is specified.
 - b. Section 90 of the Standard Specifications is referenced.
 2. The first paragraph of Section 90-1.01, "Description," of the Standard Specifications is amended to read:
 - a. 90-1.01 Description: Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these technical specifications.
 - b. Unless otherwise specified, cementitious material to be used in portland cement concrete shall conform to the requirements for cement and mineral admixtures in Section 90-2, "Materials" and shall be either: 1) "Type IP (MS) Modified" cement; or 2) a combination of "Type II Modified" portland cement and mineral admixture.

**Hamilton Station Stabilization
C20046F**

B. Aggregates:

1. All aggregates for concrete shall be tested in accordance with ASTM C289. Sources of aggregate shown to be deleterious or potentially deleterious must not be used.
2. Mineral admixture will be required for all concrete in accordance with these technical specifications including precast, steam cured, or other high early strength concrete, unless it has been determined by the Caltrans Transportation Laboratory and documented in writing by VTA that the aggregate is from a source that is not alkali silica reactive. This is in addition to meeting the requirements of ASTM C289 and ASTM C33.

C. Required Use of Mineral Admixture:

1. Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material for use in portland cement concrete. The mineral admixture shall be subject to the approval of VTA.
2. The calcium oxide content of mineral admixtures must not exceed 10 percent and the available alkali, as sodium oxide equivalent, must not exceed 1.5 percent when determined in conformance with the requirements of ASTM C618.
3. The amounts of cement and mineral admixture used as cementitious material for portland cement concrete shall be sufficient to satisfy the minimum cement content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:
 - a. The minimum amount of cement shall not be less than 85 percent by mass of the specified minimum cementitious material content.
 - b. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:
 - 1) When mineral admixtures as specified in Section 90-4.02, "Materials," of the Standard Specifications are used the amount of mineral admixture shall be 15 percent by mass of the total amount of cementitious material to be used in the mix.
 - 2) When a mineral admixture is used, which conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," the amount of mineral admixture must not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix.
 - c. If more than the required amount of cementitious material is used, additional cementitious material in the mix may be either cement, a mineral admixture conforming to the provisions in Section 90-2.04, "Admixture Materials," or a combination of both; however, the maximum total amount of mineral admixture must not exceed 25 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in pounds per cubic foot, the total mass of cement and mineral admixture per cubic foot must not exceed the specified maximum cementitious material content.
 - d. Section 90-4.09, "Optional Use of Mineral Admixture," of the Standard Specifications is deleted.

D. Admixtures containing chlorides must not be used.

**Hamilton Station Stabilization
C20046F**

- E. Paving concrete shall have a minimum compressive strength of 6000 psi at 28 days and shall obtain adequate strength so that the concrete surface must not deform or crack due to traffic loads when the trackway surface is opened to vehicle and pedestrian traffic and/or end of the lane closure.

2.16 JOINT SEALANT AND RAIL POCKET SEALANT

- A. Sealant shall be a 2-component pour- or gun-grade polyurethane sealant which shall cure at ambient temperatures to a firm, flexible, tear-resistant rubber.
- B. Properties:
1. Curing time: 2 hours maximum at 77°F.
 2. Shore A hardness: 25 minimum.
 3. Tensile strength, tested in accordance with ASTM D412, on a 3/32 in. thick sheet: 250 psi minimum.
 4. Volume resistivity, tested in accordance with ASTM D257: $4 \times 10^{11} \Omega \cdot \text{in}$ minimum ambient.
 5. Temperature service range: - 40°F to + 174°F.
- C. Sealant shall be MasterSeal NP2 by BASF or VTA-approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Embedded rail fasteners, miscellaneous metal, paving concrete, and related materials in this section shall be installed on embedded track as specified in Section 34 11 20, "Rail Rehabilitation."

3.02 WARRANTY

- A. Contractor shall furnish, and extend to VTA, manufacturer's warranty against all manufacturing defects in addition to Contractor's standard 1-year warranty for materials and installation.

END OF SECTION 34 11 12

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

**Hamilton Station Stabilization
C20046F**

SECTION 34 11 14

BALLAST

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for furnishing mineral aggregate for ballast on ballasted primary track and ballasted special trackwork and related incidental work.
- B. Excavation and backfill of ballast as required to construct tieback assemblies and concrete walers.

1.02 REFERENCED STANDARDS

- A. American Railway Engineering and Maintenance-of-Way Association (AREMA):
 - 1. Manual for Railway Engineering.
- B. American Society for Testing and Materials (ASTM):
 - 1. C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - 2. C117 Standard Test Method for Materials Finer Than No. 200 Sieve in Mineral Aggregates by Washing.
 - 3. C127 Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
 - 4. C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 5. C142 Standard Test Method for Clay Lumps and Friable Particles in Aggregates.
 - 6. C535 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - 7. D75 Standard Practice for Sampling Aggregates.
 - 8. D4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- C. State of California, Department of Transportation (Caltrans), Standard Test Methods:
 - 1. Test 201 Soil and Aggregate Sample Preparation.
 - 2. Test 202 Sieve Analysis of Fine and Coarse Aggregates. Equivalent to ASTM C117 and ASTM C136, except that results shall be measured to the nearest 0.1 percent.
 - 3. Test 211 Abrasion of Coarse Aggregate by Use of the Los Angeles Rattler Machine. Equivalent to ASTM C535.
 - 4. Test 214 Soundness of Aggregates by Use of Sodium Sulfate. Equivalent to ASTM C88.

**Hamilton Station Stabilization
C20046F**

1.03 SUBMITTALS

A. Submit

1. Quarry qualification test report of specified quarry qualification testing.
2. Plan for Handling and Placing Ballast. Include source, type of equipment to be used, location of stockpiles and method of distribution.

1.04 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 BALLAST

- A. General: Ballast shall be crushed rock with fractured faces composed of hard, strong and durable particles. Approved crushed material shall be angular, rough surface, clean and free of sand, loam, flat, elongated, soft or disintegrated pieces, vegetation or other deleterious substances and conforming to the AREMA Manual and as specified herein.

B. Source

1. Contractor shall select the ballast source from a quarry that has a 5 year history of supplying high quality ballast.
2. Source shall be subject to VTA approval pursuant to quality requirements specified hereinafter.

C. Quality Requirements

1. Carbonate rocks, crushed slag ballast or crushed river gravel is not acceptable.
2. Sample in accordance with ASTM D75 and prepare samples in accordance with California Test 201.
3. Deleterious material in the ballast must not exceed the following amounts, as determined by the testing method specified herein:
 - a. Maximum amount of material passing the No. 200 standard sieve, tested in accordance with California Test 202 (ASTM C117 and ASTM C136), shall be 0.5 percent. Test results shall be rounded to the nearest 0.1 percent.
 - b. Maximum clay lumps and friable particles, tested in accordance with ASTM C142, 0.5 percent.
 - c. Rounding of test results to whole numbers will not be allowed.
 - d. Ballast found to have any root material, tree limbs, or any other deleterious vegetable matter will be rejected. If ballast containing vegetable matter is found to be installed in the trackway, all ballast in that section shall be removed from the right of way to the satisfaction of VTA and disposed of off site without cost to VTA.

**Hamilton Station Stabilization
C20046F**

4. Wear of the material must not exceed 32 percent when tested in accordance with California Test 211 (ASTM C535).
5. Loss must not exceed 5.0 percent after 5 cycles when tested in accordance with California Test 214 (ASTM C88) for sodium sulfate soundness.
6. Absorption must not exceed 1.0 percent when tested in accordance with ASTM C127.
7. Thin or elongated particles (length longer than 3 times average thickness) must not exceed 5 percent when tested in accordance with ASTM D4791.
8. Gradation Requirements
 - a. Gradation shall be tested in accordance with California Test 202 (ASTM C117 and ASTM C136).
 - b. Ballast in ballasted track shall conform to AREMA Manual, Chapter 1, Part 2, Table 2-2, Size 4 (the following gradation requirements are listed for convenience):

<u>Sieve Size</u>	<u>Percent by Weight Passing Sieve</u>
2 inch	100
1-1/2 inch	90 - 100
1 inch	25 - 60
3/4 inch	0 - 10
3/8 inch	0 - 5

9. The maximum moisture content of the ballast must not exceed one percent at the time of measurement.
- D. Preparation of Ballast: Ballast shall be washed clean of deleterious materials including fine particle contamination to the satisfaction of VTA at the quarry before loading and delivery to the site.

2.02 INSPECTION AND TESTING

A. General

1. Ballast shall be subject to inspection by VTA at any time.
2. When VTA determines that ballast does not meet specified requirements, VTA will notify Contractor promptly, and Contractor shall discontinue ballast operations and take appropriate corrective measures. Contractor shall stop further ballast operations until the fault has been corrected and defective material has been removed, disposed of and replaced at no additional cost to VTA.

B. Quarry Testing

1. VTA before production will qualify ballast at the quarry.
2. VTA will take representative samples, test for quality and gradation, and accept or reject the quarry at any time.
3. Additional sampling and testing will be performed when, in VTA's opinion, there are significant changes in quarry operation.

**Hamilton Station Stabilization
C20046F**

C. Quality Control Testing

1. In addition to daily visual inspection, VTA will sample ballast at the time of deposit on the trackbed. A test sample will be taken representing one day's delivery or approximately 4000 ton of ballast, whichever is less. The composite sample will comprise at least three and not more than 6 approximately equal increments, taken at random. VTA may sample and test additional smaller areas representing not less than 50 ft in length of in-place ballast measured along the centerline of the trackway. Such areas may be located within or outside of any larger tested area.
2. Testing will include tests for uniformity and gradation.
3. Soundness tests will be performed in accordance with California Test 214 (ASTM C88).
4. Contractor will be given test results.
5. VTA may take additional samples of in-place ballast.
6. Contractor shall assist and cooperate with VTA in taking samples.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that surface on which ballast will be placed is clean and clear of debris and obstructions and meet specified requirement. Correct defects when defects on surface are found.

3.02 HANDLING

- A. Keep ballast clean and free from segregation during transporting, handling, placing operations, and subsequent work.
- B. Ballast once distributed including ballast placed as first lift or bottom ballast must not be used for driving surface or for any other access except distribution of ties. Contractor shall prevent by whatever means necessary driving on ballast and use of track ballast for access once ballast is distributed. Ballast sections used for driveways, rutted by equipment, or used for ramps and track crossings shall be re-graded and consolidated or completely removed and replaced by Contractor at the direction of VTA.

3.03 INSTALLATION

Place, spread, consolidate, tamp, and dress ballast as specified Ballasted Track Installation in this section.

A. Preliminary Ballast Layer

1. Preparation: Correct all rutting and other damage to the sub grade prior to placing ballast.
2. Installation: A layer of ballast 6 to 8 inches deep shall be placed on the prepared sub-grade or subballast for all main tracks, ready for compacting without further shaping. The ballast shall be compacted with not less than three passes of a vibratory roller of gross weight not less than 5,000 pounds, a drum not less than 58 inches wide and not less than 42 inches in diameter. The vibration frequency shall be between 1,100 and 2,000 vibrations per minute and shall impart a dynamic impact of not less than nine tons. Avoid damage to existing facilities including sub- drains, stub-ups, conduits, and other structures.
3. Ballast Deck Bridges: Install a preliminary ballast layer on main track ballast deck bridges directly over the waterproofing protection boards, taking care not to damage the protection boards and the perforated deck drains.

**Hamilton Station Stabilization
C20046F**

4. Ballast Finish: The top of the preliminary ballast layer shall be a level, flat plane, uniformly compacted prior to cross tie distribution.
- B. Cross Tie Distribution
1. Position all ties with a jig in final location and normal to the centerline of track.
- C. Position all ties within plus or minus 1 inch of required spacing as indicated on the Contract Drawing, without accumulation.
1. Placing Ties
 - a. Place ties so the bottom of each tie will bear fully on initial layer of ballast.
 - b. Alternate the ends of cross ties with contact rail bracket anchor inserts, except at special locations as indicated on the Contract Drawings.
- D. Rail Installation
1. Lay, join and anchor CWR and jointed rail as provided herein.
- E. Tamper-Liner Machine
1. Provide a production type tamper-liner capable of lifting, lining, and surfacing track and turnouts within the specified track tolerances and with the specified ballast. The machine shall be capable of external control of both line and grade. The machine shall be capable of external control of alignment utilizing a laser guidance system.
 2. Each lift of ballast shall be thoroughly tamped, with a squeeze type vibrating tamping machine, from a point 18 inches inside each rail on both sides of the tie to the end of the ties. The ballast shall be packed tight under and around the tie for the length specified. Tamping shall not be permitted at the center of the tie between the above stated limits. Both ends of the tie shall be tamped simultaneously, and tamping inside and outside of the rail shall be performed at the same time.
 3. Lift both rails together as uniformly as possible.
 4. Operate tamper machine in accordance with the machine manufacturer's printed instructions. Provide a copy of the instructions to VTA.
 5. Do not operate the machine on tangent tracks unless the laser guidance system is utilized.
 6. Tamper operation shall not damage ties. All ties damaged in any fashion by tamping of ballast shall be replaced. Patching or other repairs of ties will not be accepted.
- F. Preliminary Surfacing and Aligning
1. General
 - a. Surfacing and/or aligning of the track shall not be performed when the rail temperature is higher than 100 degrees Fahrenheit.
 - b. Track surfacing and aligning shall be performed by methods which will prevent bending of the rail, straining of the rail joints, and damage to the ties or rail fastening assemblies.
 - c. All switch and switch machine rods shall be removed prior to tamping. The rods shall be replaced and the switch readjusted, as required herein, when tamping is completed.

**Hamilton Station Stabilization
C20046F**

2. Control and check the alignment of the track on the preliminary ballast with the necessary alignment and grade stakes.
 3. Ballast:
 - a. Handle, transport, and place ballast to avoid segregation and generation of fines.
 - b. Place and maintain sufficient ballast in the cribs and shoulders to anchor the cross ties and prevent movement or buckling of the track due to temperature changes or equipment operation.
 4. Lifting:
 - a. Track shall be lifted so that it will be necessary to give it a finishing lift of not less than one inch nor more than 2 inches to bring it to final grade. Alignment shall be maintained during the lifting operation.
 - b. Ties that have been pulled loose shall be replaced to proper position, and shall have a bearing against the rail, and shall be secured to the rail.
- G. The amount of each lift, including that required for superelevation, must not exceed 4 inches nor endanger the horizontal or vertical stability of the track.
- H. Final Surfacing and Aligning
1. A finishing lift and alignment shall be made to bring tracks to the true line and grade within the specified tolerances after completion of the preliminary surfacing and aligning.
- I. Ballast Regulation
1. After final surfacing and aligning is completed, ballast shall be dressed as indicated. The portion of the sub grade outside of the ballast shall be trimmed an even surface sloped for drainage.
- J. Ballast Consolidation
1. Compact ballast with rail mounted equipment specifically designed to dynamically stabilize the track structure through the rail.
 2. Dynamic track stabilizer capable of applying stabilizing forces into the track structure at a continuous speed of 1/2 mph. The equipment shall have an operational measuring system that provides for accurate measurement and control of stabilization.
 3. The ballast shall be stabilized twice. Once prior to final raise and once after final raise and alignment to finish grade e.
- K. Contact Rail Installation
1. Contact rail insulator brackets must not be bolted to the crossties until completion of ballast dressing and consolidation.
 2. Ballast shall conform to full section after completion of contact rail installation.

**Hamilton Station Stabilization
C20046F**

3.04 FAILED AND REJECTED BALLAST

- A. When Contractor has been notified that ballast does not meet these technical specifications, Contractor shall discontinue ballast operations. Ballast in transit, only, may be dumped in stockpile or on separate track area, but no additional ballast shall be hauled.
- B. No track material of any kind shall be distributed on any part of rejected area.
- C. Ballast areas rejected, based on daily or special area sampling and test results, will represent the entire area defined by the sample and test results, and all material within that area will be subject to removal and replacement. VTA will not base its acceptance of the ballast on observations or visual interpretations of conformance of ballast to these technical specifications.
- D. Alternative methods of treating failed and rejected ballast in place on the right-of-way such as washing or flushing, vacuuming, or other in-place methods will not be acceptable substitutes to removal and replacement of failed or rejected ballast.
- E. VTA may not waive or alter these requirements without providing written direction to Contractor on a case-by-case basis. Any such approval given must not be interpreted as blanket approval, waiver or modification of these technical specifications.
- F. Failure of Contractor to comply with the requirements of this Section will subject Contractor to a work stoppage issued by VTA until deficiencies are corrected. Track segments containing failed or rejected ballast according to these requirements shall result in removal of track section affected from progress payments until deficiencies are corrected.

END OF SECTION 34 11 14

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 34 11 15

RUNNING RAILS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for the design, manufacture, fabrications, inspection, testing, shipping, unloading, and stacking of standard running rail, premium running rails and related incidental work.
- B. Related sections
 - 1. 34 11 22 Welding of Rail.

1.02 REFERENCES

- A. Association of American Railroads (AAR): Current rules governing the loading of commodities on open top cars.
- B. American Railway Engineering and Maintenance (AREMA)
 - 1. Manual for Railway Engineering (AREMA Manual)
 - 2. Portfolio of Trackwork Plans (AREMA Portfolio)
- C. American Society for Testing and Material (ASTM):
 - 1. A36M: Standard Specification for Carbon Structural Steel.
 - 2. A48M: Standard Specification for Gray Iron Castings.
 - 3. E10: Standard Test Method for Brinnell Hardness of Metallic Materials.
 - 4. E18: Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
 - 5. E428: Standard Practice for Fabrication and Control of Metal, other than Aluminum Reference Blocks Used in Ultrasonic Inspection.
 - 6. E709: Standard Practice for Magnetic Particle Examination.
- D. American Iron and Steel Institute (AISI)
 - 1. Material 4340 Steel/Nickel Plate.

1.03 SUBMITTALS

- A. Contractor shall make all submittals in accordance with the requirements of Section 6.6 and Section 6.51 and as specified herein.
- B. Submittals: Contractor shall submit the following required items within 10 days of the Contract award date:
 - 1. Description of the vacuum degassing process.
 - 2. Description of the head hardening process and chemical composition of the rail.

**Hamilton Station Stabilization
C20046F**

3. Description of the non-destructive testing procedures.
- C. Submittals in Performance of the Contract:
1. Submittal Date: Contractor shall submit required items a and b immediately below to VTA for approval at least 30 days before fabrication unless specified otherwise below. Fabrication may not commence until these items are approved.
 2. Required Items:
 - a. Rail Certificate: Source, chemical composition, hydrogen reduction process, and heat treating process of the 115RE being supplied.
 - b. Marking and Identification System: Description of Contractor's system for marking and identifying sizes, types, and composition of products, as well as identifying parts for the purpose of proper location during installation.
 - c. Shipping, Handling, and Stacking Procedures: A description of shipping, handling, and stacking procedures including a layout plan for storage yard in accordance with Article 1.04, herein, shall be submitted at least 30 days before shipping.
 - d. Documents for Final Acceptance of Rail: Contractor shall submit the following documents to VTA for review at least 30 days before shipping. Contractor must not ship until VTA approves them. Final acceptance of rail will be made only after VTA review and approval of these documents:
 - 1) Vacuum degassing and head hardening records.
 - 2) Non-destructive testing records.
 - 3) Mill certificates and results from rail hardness tests.

1.04 HANDLING, SHIPPING, UNLOADING, AND STACKING

- A. All rails shall be handled carefully to avoid damage and shall be loaded in rail cars or trucks with the branding on all rails facing the same directions, in accordance with the AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1, "Specifications for Steel Rails," and the current rules governing the loading of commodities on open top cars published by the AAR.
- B. Rails shall be delivered, unloaded, and stacked in accordance with a method approved by VTA at the delivery sites indicated in Section 6.7. Contractor shall furnish all equipment, labor, rigging, dunnage, and other materials necessary to perform the work.
 1. Bottom row of rails shall be placed on 7 inch by 9 inch minimum timbers spaced a maximum of 10 feet apart. Between rows, 2 inch by 4 inch minimum timbers shall be placed with a maximum distance of 10 feet between them.
- C. Rails shall be stacked separately by standard section and by the following classifications:
 1. Vacuum degassed standard strength straight rails.
 2. Head hardened, premium straight rails.
- D. Standard length and short length rails shall be stacked separately with all rail length markings to be exposed on one end of each stack.

**Hamilton Station Stabilization
C20046F**

- E. Contractor shall unload and stack rail to avoid damage to rail. Damaged rail shall be replaced promptly at Contractor's sole expense.

1.05 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 STANDARD AND PREMIUM STRENGTH RUNNING RAIL

- A. 115RE sections shall be vacuum degassed carbon steel tee rail manufactured in accordance with the AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1.4.1, "Specifications for Standard AREMA Chemistry Steel Rails", and as specified in VTA Light Rail Transit Standard Detail STW-002.
- B. Standard strength 115RE running rail shall have a minimum Brinell Hardness of 285 min.
- C. Premium/high strength 115RE running rail shall have a Brinell Hardness of 341 to 388 min.
- D. Premium strength 115RE running rail shall be head hardened according to the manufacturer's standard head hardening process and in accordance with Paragraph 2.02A, Rail Hardening Treatment, herein.
- E. Rail Branding and Stamping: Rail branding and stamping shall be in accordance with the AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1, Article 2.1.6, "Specifications for Steel Rails, Branding and Stamping".

2.02 FABRICATION

- A. Rail Hardening Treatment:
1. Rails for head hardening must not include "A" rails or Number 2 rails. Rails to be treated shall be selected from heats of steel with a chemical composition capable of providing the required hardness when treated in the specified manner.
 2. Head hardened rail shall be in accordance with the current AREMA Manual for high strength rail.
 - a. The hardness of head hardened rail when tested in accordance with these technical specifications shall be within the range of 341 HB to 388 HB throughout the rail head. Brinell Hardness determinations shall be made in accordance with ASTM E10, on a minimum of ten percent of the rails randomly selected in each quenching and tempering charge. Hardness tests shall be made on full rail sections from the same heat as the rails being treated. The test section shall be at least 10 inches in length. The hardness readings shall be taken at the midpoint of the hardness test specimens, with regard to both length and width, on the top of the rail head after removing the decarburized metal. If all the rails or samples tested meet the specified hardness, the rails represented will be accepted subject to the other requirements of these technical specifications. The results of the Brinell Hardness tests shall be furnished by Contractor on the mill certification. The mill certificate shall contain the following data:
 - 1) Identification of each rail in a charge by heat, ingot, and letter.
 - 2) Identification of each equivalent sample by heat.
 - 3) Listing of all Brinell readings.

**Hamilton Station Stabilization
C20046F**

- 4) A representative check of Brinell readings over the entire cross section.
 - 5) Date of all phases of head hardened treatment for each charge. Indicate the acceptance or rejection of the rails in each charge.
- b. If any rail or sample tested fails to meet the specified Brinell Hardness values, Contractor shall perform additional hardness measurements, one on each side of the point first measured and each approximately 1 inch from that point. If both of these check measurements meet the required hardness, the rails represented will be accepted. If any of the rails or samples tested fail in the check test to meet the required hardness, each rail in the charge shall be tested and only those showing a hardness meeting these technical specifications will be accepted. Any rails failing to meet required hardness may be retreated, but not more than one additional time unless approved by VTA. Rail, which has been retreated, shall be retested for hardness in accordance with these technical specifications.
- c. After the final treatment, the rails shall be conditioned by straightening to comply with the current requirements of AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1, "Specifications for Steel Rails".
- B. Non-Destructive Test on Rail**
1. The interior condition of the rails to be supplied to VTA shall be determined by non-destructive testing. Contractor's equipment, procedures, and standards shall be in accordance with the AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1, Article 2.1.8, "Ultrasonic Testing".
 2. The full length of each rail head, web, and base shall be ultrasonically tested by Contractor for internal imperfections using the in-line ultrasonic testing equipment provided by Contractor. Contractor shall provide records of the cathode ray tube displays to VTA for any rail giving ultrasonic fault indications. The test block shall be Material 4340 AISI Steel/Nickel Plate conforming to ASTM E428.
 3. Contractor shall conduct magnetic particle testing in accordance with ASTM E709 when it will provide a better indication of shallow defects and cracks. Magnetic particle testing will not be accepted as a substitute for the full ultrasonic testing.
- C. Cutting, Drilling, and Beveling**
1. Rails shall be cut square and clean by means of rail saws, shears, or abrasive cutting wheels only, in accordance with the current AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1, "Specifications for Steel Rails". Torch cutting is prohibited.
- D. Markings**
1. Each Premium high strength rail shall be marked with a 2 inch wide orange stripe painted on both sides of the web and around the rail head at a point approximately 3 feet from each end of the rail.
 2. Each standard strength rail shall be marked with a 2 inch wide blue stripe painted on both sides of the web and around the rail head at a point approximately 3 feet from each end of the rail.

PART 3 EXECUTION

3.01 EXAMINATION

- A. VTA may examine any materials for defects, damage, or non-conformance prior to installation. Contractor shall inspect and keep aware of the condition of the rail as it is being installed, and shall notify VTA of any

**Hamilton Station Stabilization
C20046F**

suspected defects in any rail. Materials that are damaged or defective must not be installed into the work, but shall be clearly marked by Contractor and placed by the rail bed. Whichever means Contractor uses to mark defective rail, shall be communicated to VTA and to Contractor's employees. Isolated defects shall be removed in accordance with this Section.

3.02 HANDLING AND INSTALLATION

- A. Rail shall be installed in accordance with the requirements of Related Section 34 11 10, Track Construction – General Requirements.
- B. Rail shall be handled by methods that will not result in damage to the rail. Rail must not be dropped on uneven surfaces nor left unevenly supported. Rail handling shall conform to Section 1.04, "Handling, Shipping, Unloading, and Stacking."

3.03 CUTTING AND DRILLING OF RAIL

- A. Contractor shall use only the following tools for cutting rail:
 - 1. Rail Saw
 - 2. Abrasive Cutting Wheel
- B. Other methods for cutting rail are not acceptable. Cuts shall be square and clean. When given the option of cutting existing rail, or cutting the rail being installed, the existing rail shall be cut.
- C. When new holes are necessary, they shall be drilled and not punched, slotted, or burned with a torch. A proper template shall be used. Each hole location shall be carefully center-marked and center-punched. Holes shall be of the size and location shown on the Plans. Drilled bolt holes shall be peened or ground to remove sharp edges. Tolerance for the diameter of drilled bolt holes is - 0, 1/15 inch.
- D. A single handling hole may be drilled in the ends of CWR. The ends of rails with such a bolt hole shall be cropped a minimum of 3 inch from the bolt hole prior to joining with another rail.

3.04 QUALITY CONTROL AND ASSURANCE

- A. Contractor shall be alert to the presence of any defects in rail being installed.
- B. VTA may make checks of rail wear or defects at any time during the Contract. Rail that is found to be defective must not be installed in track, but shall be set apart from other new rail and marked with marking paint as defective.

3.05 DEFECTIVE RAIL

- A. In tangent track, installed rail that has been found to be defective during construction shall be removed and replaced with 15 ft minimum length of defect-free rail. For rail in curves, the minimum length of replaced rail shall be 30 ft of defect-free rail. The defect-free rail shall be welded into the rail by Contractor in accordance with Related Section 34 11 22, Welding of Rail.

END OF SECTION 34 11 15

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 34 11 19

BONDED INSULATED JOINT

PART 1 GENERAL

1.01 DESCRIPTION

This Section includes specifications for furnishing, fabricating, and delivering rail bonded insulated joints and bolted glued joints.

1.02 REFERENCE STANDARDS

- A. Association of American Railroads, (AAR):
 - 1. Manual of Standards and Recommended Practices
- B. American Railway Engineering and Maintenance-of-Way Association, (AREMA):
 - 1. Manual for Railway Engineering, Vol. I, Chapter 4.
- C. American Society for Testing and Materials, (ASTM):
 - 1. A36 Standard Specification for Carbon Structural Steel
 - 2. A194 Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
 - 3. A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - 4. F436 Standard Specification for Hardened Steel Washers
- D. Steel Structures Painting Council, (SSPC):
 - 1. Volume 1 Good Painting Practice

1.03 SUBMITTALS

- A. The following submittals shall be made by Contractor:
 - 1. Shop Drawings.
 - 2. Procedures, including:
 - a. Installation procedures.
 - b. Recommended bolt tensioning.
 - c. Proposed procedure for maintaining the specified gap in the CWR during installation of bonded joints.
 - 3. Tests
 - a. Test results of bonded insulated joints.

**Hamilton Station Stabilization
C20046F**

- b. Proposed alternative methods of dynamically testing bonded insulated joints.
- c. Pre-qualification of crews.

1.04 QUALITY ASSURANCE

A. Certification

- 1. Tests certified by an approved testing laboratory.
- 2. Manufacturer's certification: Detailed description of the manufacturer's proposed quality control program for manufacturing the bonding adhesive used in the bonded insulated joints, including how it is regulated, maintained, and monitored.

1.05 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

- 1. Joint bars for 115 RE rail shall be minimum 36 inches long with six holes, shaped to fit 115RE rail.
- 2. Hole locations shall be as shown in the AREMA Manual, Chapter 4 and as shown on the Contract Drawings.
- 3. Bolt diameter shall be one inch.
- 4. Joint bars shall hold rail ends to within the straightness tolerances shown in the AREMA Manual, Chapter 4 for rail ends to be welded.

B. Bonded Insulated Joints

- 1. Joint bars for bonded insulated joints, shall provide full face contact, conforming to web configuration of 115 RE rail and the Bonded Joint Clearance Envelope for 115 RE, see (Figure 1), and fabricated from quenched carbon-steel as specified in the AREMA Manual for Railway Engineering, Chapter 4, "Specifications for Quenched Carbon Steel Joint Bars."
- 2. The fishing height of the joint bar shall be within a tolerance of plus or minus 1/64 inch of the dimensions indicated on the submitted and accepted Shop Drawings. The length of the joint bars shall be within plus or minus 1/8 inch of the dimension shown on the Shop Drawings. Portions of the joint bars adjacent to the rail shall be straight within a tolerance of plus or minus 1/32 inch.
- 3. The inside face of the joint bars shall have the insulating material pre-bonded to their face and shall be smooth with no stamping or branding.

**Hamilton Station Stabilization
C20046F**

4. Insulating materials shall be of high pressure and laminated design; shall be impervious to oil, grease, and water, and shall have electrical resistance characteristics equal to or greater than fiber insulation meeting the requirements of the AAR Manual, Part 14.5 and the Electrical Resistance Test specified herein. End posts must not project below the base of the rail and shall be 3/16 inch thick.
5. Fasten bonded insulated joints for 115RE rail together with six pin bolts that meet the chemical composition and mechanical property requirements of ASTM A325. The pins shall be high strength pin bolts, with button heads, made of medium carbon-steel, and the collars shall be tension type made of low carbon steel. The special driving tool for the pin bolts shall be capable of partial swaging of the collars to allow for some adjustment during the bolting process; shall be capable of producing the minimum installed fastener tension recommended by the joint manufacturer; and shall be capable of swaging the collar into angular locking grooves, forming the collar into the size and shape recommended by the pin manufacturer before the pin tail breaks. The size of bolt holes shall be in accordance with the bonded insulated joint manufacturer's recommendation. If a bolt hole's diameter is larger than 1-3/16 inches, then ASTM A325 hardened washers shall be placed between the joint bars and the pin's head and collar.
6. Joint Components. Furnish bonded insulated joints complete with bars, end posts, bushings, washers, pin bolts, collars, and adhesive as recommended by the manufacturer. Bolt tension shall be as specified by the manufacturer.
7. Acceptable Trade-names. Bonded insulated joints shall be one of the following types or an approved equal:
 - a. The "Allegheny" joint as manufactured by the Allegheny Rail Products.
 - b. The "Portec Bond" toeless joint as manufactured by Portec Inc. Railway Products Division.
 - c. Other brands will be considered as approved equal only if they successfully pass the tests specified herein.
8. The adhesive shall have a shelf life of one year when stored in a location protected from the weather at a temperature which may vary from 40 degrees F to 90 degrees F. The adhesive shall be replaced at no additional cost to VTA if the adhesive is found to be defective within one year from the date of delivery.

C. Bolted (Glued) Joints

1. Joint bars for non-insulated bolted glued joints, shall provide full face contact, conforming to the web configuration of 115 RE rail and fabricated from quenched carbon-steel as specified in the AREMA Manual for Railway Engineering, Chapter 4, "Specifications for Quenched Carbon Steel Joint Bars."
2. The fishing height of the joint bar shall be within a tolerance of plus or minus 1/64 inch of the dimensions indicated on the submitted and accepted Shop Drawings. The length of the joint bars shall be within plus or minus 1/8 inch of the dimension shown on the Shop Drawings. Portions of the joint bars adjacent to the rail shall be straight within a tolerance of plus or minus 1/32 inch.
3. The inside face of the joint bars shall be glued to web of rail for full bearing to ensure longitudinal connections at the rail ends.
4. Fasten bolted (glued) joints for 115RE rail together with six pin bolts that meet the chemical composition and mechanical property requirements of ASTM A325. The pins shall be high strength pin bolts, with button heads, made of medium carbon-steel, and the collars shall be tension type made of low carbon steel. The special driving tool for the pin bolts shall be capable of

**Hamilton Station Stabilization
C20046F**

partial swaging of the collars to allow for some adjustment during the bolting process; shall be capable of producing the minimum installed fastener tension recommended by the joint manufacturer; and shall be capable of swaging the collar into angular locking grooves, forming the collar into the size and shape recommended by the pin manufacturer before the pin tail breaks. The size of bolt holes shall be in accordance with the bolted joint manufacturer's recommendation. If a bolt hole's diameter is larger than 1-3/16 inches, then ASTM A325 hardened washers shall be placed between the joint bars and the pin's head and collar.

5. Joint Components. Furnish bolted (glued) joints complete with bars, bushings, washers, pin bolts, collars, and epoxy adhesive as recommended by the manufacturer. Bolt tension shall be as specified by the manufacturer.
6. Acceptable Trade-names. Bolted (glued) joints shall be one of the following types or an approved equal:
 - a. The "Allegheny" joint as manufactured by the Allegheny Rail Products.
 - b. The "Portec Bond" toeless joint as manufactured by Portec Inc. Railway Products Division.
 - c. Other brands will be considered as approved equal only if they successfully pass the tests specified herein.
7. The adhesive shall have a shelf life of one year when stored in a location protected from the weather at a temperature which may vary from 40 degrees F to 90 degrees F. The adhesive shall be replaced at no additional cost to VTA if the adhesive is found to be defective within one year from the date of delivery.

2.02 QUALIFICATION TESTING OF BONDED JOINTS

- A. Bonded Insulated Joint Test Requirements: Three bonded insulated joints shall be tested. Two bonded insulated joints shall be tested as specified in Article 2.02B. The remaining bonded insulated joint shall be tested as specified in Article 2.02C and 2.02D. Testing must not commence before Shop Drawings and installation procedures have been reviewed by VTA Representative.
- B. Longitudinal Compression Test: Assemble two bonded joints in accordance with manufacturer's recommendations on two pieces of 115 RE Rail each 2 feet long. Saw the joint assembly in half at the end post. Perform the sawing in a manner that will prevent overheating, and damage to the epoxy bond. The cut shall be perpendicular to the centerline of the top of the rail with a tolerance of plus or minus one degree. Fabricate a device so that the reaction at the sawn end occurs only at the face of the joint bar when a load is applied at the centroid of the rail at the opposite end.
 1. Apply loads longitudinally in increments of 25,000 pounds. Maintain each load increment constant until the longitudinal deflection of the rail ceases before increasing the load to the next increment. Increase the load in these increments until a total load of 600,000 pounds for 115RE joints is attained, or failure occurs. Record at each increment of loading the load and differential movement of the rail and the joint bars, measured to 0.001 inch.
 2. Acceptance Criteria. At no time may the bonded insulated rail joints show indication of slippage before a compressive load of 650,000 pounds is applied to the joint, nor shall the magnitude to the differential movement be more than 1/8 inch in any direction. At the completion of the test, after the load on the rail has been released, the relative position of rail and joint bar shall be within 1/8 inch of its original location. Failure of a joint to meet the above requirements shall be reason for rejection.

**Hamilton Station Stabilization
C20046F**

- C. Electrical Resistance Test. Fully assemble a bonded insulated rail joint in accordance with manufacturer's recommendations on two lengths of 115 RE Rail, one 24 inches in length, the other 42 inches in length, for an electrical resistance test. Support the rail on non-electrical conducting material.
1. With 500 volts dc applied to the rail on either side of the bonded insulated joint for a duration of three minutes, measure the actual current flow through the joint to the nearest 0.1 microampere and record.
 2. Acceptance Criteria: The minimum resistance for 500 volts dc shall be 10 megohms.
 3. Apply a potential of 50 volts ac to the rail on either side of the joint for a duration of three minutes for each increment of measurement for frequencies from 20 hertz to 10 kilohertz. Measure the impedance after three minutes with an accuracy of plus or minus 2 percent and record for each frequency.
 4. Acceptance Criteria: The minimum impedance for frequencies between 20 Hz and 10 KHz with 50 volts ac shall be 10,000 ohms.
- D. Dynamic Testing of Bonded Insulated Joint: Subject the one bonded joint that has passed the electrical resistance test to dynamic testing. Support the test joint on 36-inch centers with the joint located between supports as shown in Figure 2. Apply repeated loads with two hydraulic rams. Apply loads to the rail alternatively at Points A and B. Vary each load from zero to 44,400 pounds in the approximate shape of a sine curve. Apply loads for two million cycles. Application of load at Point A and then at Point B shall constitute one cycle. Measure rail deflection every 500,000 load cycles at Point A and record to the nearest 0.001 inch.
1. Monitor loads with load cells placed between each ram and the railhead. Calibrate these load cells prior to commencement of the test program.
 2. Other methods of testing the joint dynamically may be submitted to VTA for review. The moment diagram envelope generated by other methods shall meet or exceed that specified in this Section.
 3. Acceptance Criteria: After 2,000,000 cycles, the bonded insulated joint shall show no evidence of failure by bending. The deflection of the bonded insulated joints must not exceed 0.065 inch during the test.
 4. Repeat the electrical resistance test specified in Article 2.02C. The test results shall be within the acceptance criteria specified.
 5. After completion of the electrical resistance test, subject the joint assembly to the Longitudinal Compression Test as specified in Article 2.02B of this Section. Saw-cut the joint to adapt the section to the requirements stated in the test, with the acceptance criteria remaining the same as stated in the test.
 6. Acceptance Criteria: Should the joint assembly fail to meet the requirements of this Article, the bonded insulated joint will not be accepted.

2.03 QUALIFICATION TESTING OF BOLTED (GLUED) JOINTS

- A. Bolted (Glued) Joint Test Requirements: Two bolted (glued) joints shall be tested. Two bonded insulated joints shall be tested as specified in Article 2.03B and 2.02C. Testing must not commence before Shop Drawings and installation procedures have been reviewed by VTA Representative.

**Hamilton Station Stabilization
C20046F**

- B. Longitudinal Compression Test: Assemble one bolted (glued) joints in accordance with manufacturer's recommendations on two pieces of 115 RE rail each 2 feet long. Saw the joint assembly in half at the rail ends. Perform the sawing in a manner that will prevent overheating, and damage to the epoxy bond. The cut shall be perpendicular to the centerline of the top of the rail with a tolerance of plus or minus one degree. Fabricate a device so that the reaction at the sawn end occurs only at the face of the joint bar when a load is applied at the centroid of the rail at the opposite end.
1. Apply loads longitudinally in increments of 25,000 pounds. Maintain each load increment constant until the longitudinal deflection of the rail ceases before increasing the load to the next increment. Increase the load in these increments until a total load of 600,000 pounds is attained, or failure occurs. Record at each increment of loading the load and differential movement of the rail and the joint bars, measured to 0.001 inch.
 2. Acceptance Criteria. At no time shall the bolted (glued) rail joints show indication of slippage before a compressive load of 650,000 pounds is applied to the joint, nor shall the magnitude to the differential movement be more than 1/8 inch in any direction. At the completion of the test, after the load on the rail has been released, the relative position of rail and joint bar shall be within 1/8 inch of its original location. Failure of a joint to meet the above requirements shall be reason for rejection.
- C. Dynamic Testing of Bolted (Glued) Joint: Subject the one bolted (glued) joint to dynamic testing. Support the test joint on 36-inch centers with the joint located between supports as shown in Figure 2. Apply repeated loads with two hydraulic rams. Apply loads to the rail alternatively at Points A and B. Vary each load from zero to 44,400 pounds in the approximate shape of a sine curve. Apply loads for two million cycles. Application of load at Point A and then at Point B shall constitute one cycle. Measure rail deflection every 500,000 load cycles at Point A and record to the nearest 0.001 inch.
1. Monitor loads with load cells placed between each ram and the railhead. Calibrate these load cells prior to commencement of the test program.
 2. Other methods of testing the joint dynamically may be submitted to VTA for review. The moment diagram envelope generated by other methods shall meet or exceed that specified in this Section.
 3. Acceptance Criteria: After 2,000,000 cycles, the bonded insulated joint shall show no evidence of failure by bending. The deflection of the bonded insulated joints must not exceed 0.065 inch during the test.
 4. Repeat the electrical resistance test specified in Article 2.02C. The test results shall be within the acceptance criteria specified.
 5. After completion of the electrical resistance test, subject the joint assembly to the Longitudinal Compression Test as specified in Article 2.02B of this Section. Saw-cut the joint to adapt the section to the requirements stated in the test, with the acceptance criteria remaining the same as stated in the test.
 6. Acceptance Criteria: Should the joint assembly fail to meet the requirements of this Article, the bolted (glued) joint will not be accepted.

PART 3 EXECUTION

3.01 PREPARATION OF RAIL ENDS

- A. Rails shall be cut square and cleaned by means of rail saws or abrasive cutting wheels in accordance with AREMA Manual Chapter 4, Part 2 Specifications.

**Hamilton Station Stabilization
C20046F**

- B. Where required, rail ends shall be drilled for 36-inch, 6-hole insulated joint bars as shown on approved Shop Drawings and in accordance with the AREMA Manual chapter 4, Part I. Drilled bolt holes shall be ground to remove sharp edges.

3.02 BONDED AND BOLTED JOINTS

A. Crew Qualifications

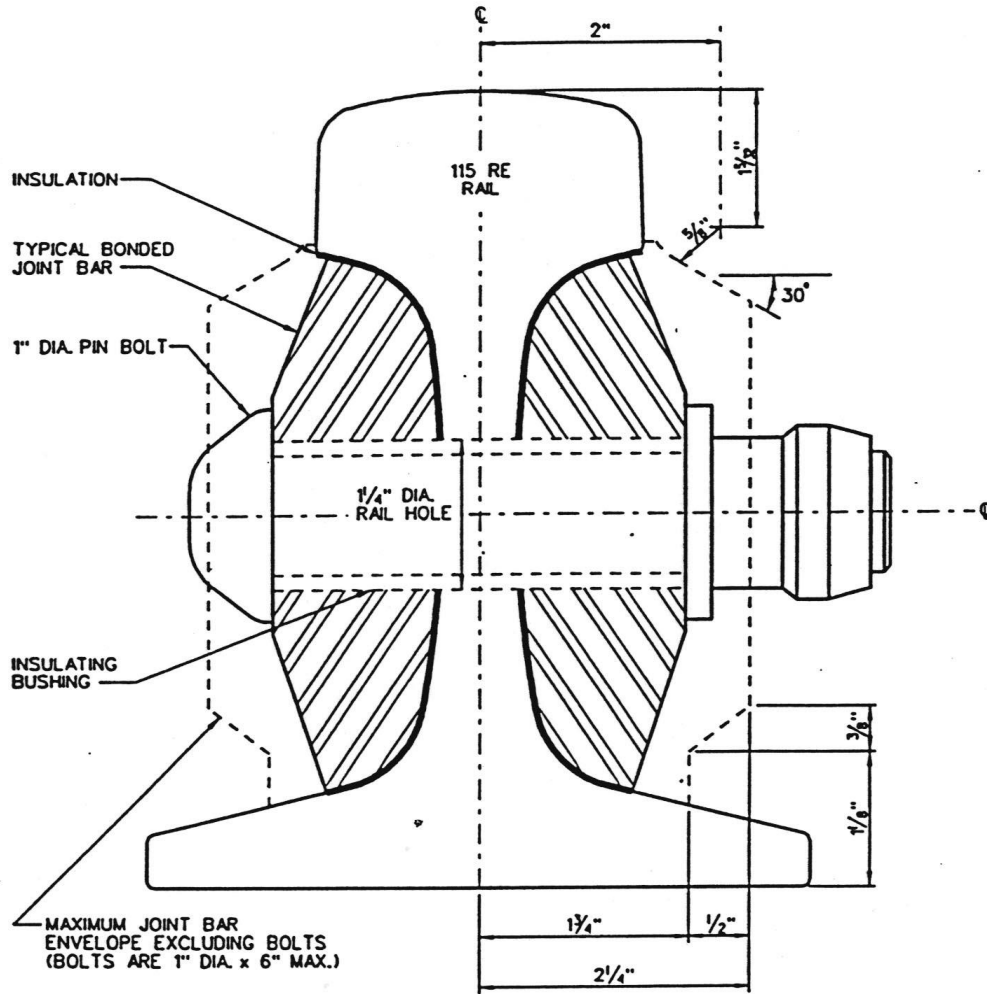
1. The Supplier of bonded insulated joints and bolted (glued) joints shall certify each crew and its foreman who will install the joints by training and/or through work experience in installing bonded and bolted joints. Previous bonded insulated joints and bolted glued joints fabricated by the crew and foreman from other projects should have more than 5 years performance history.
2. For bonded insulated joint only. Resistivity test failure of installed bonded insulated joint on this project disqualifies the foreman and at the discretion of VTA Representative, the entire crew or any crew member. Assign a new foreman and crew personnel and repeat the qualification procedure.

B. Installation

1. Install joints at the locations shown on the Contract Drawings and as required by the signal system. Ensure that the center of the joint is approximately centered between rail supports.
2. Prepare rail ends as described in Article 3.01.
3. Calibrate bolt-tightening equipment.
4. Install joint in accordance with the manufacturer's instructions and the following:
 - a. Alternate directions of bolt insertion.
 - b. Ensure that there is no contact between joint bars and bolts and rail fasteners.
5. For bonded insulated joint only. Test the resistivity across the insulating components of the bonded insulated joint in accordance with Article 2.02C.

**Hamilton Station Stabilization
C20046F**

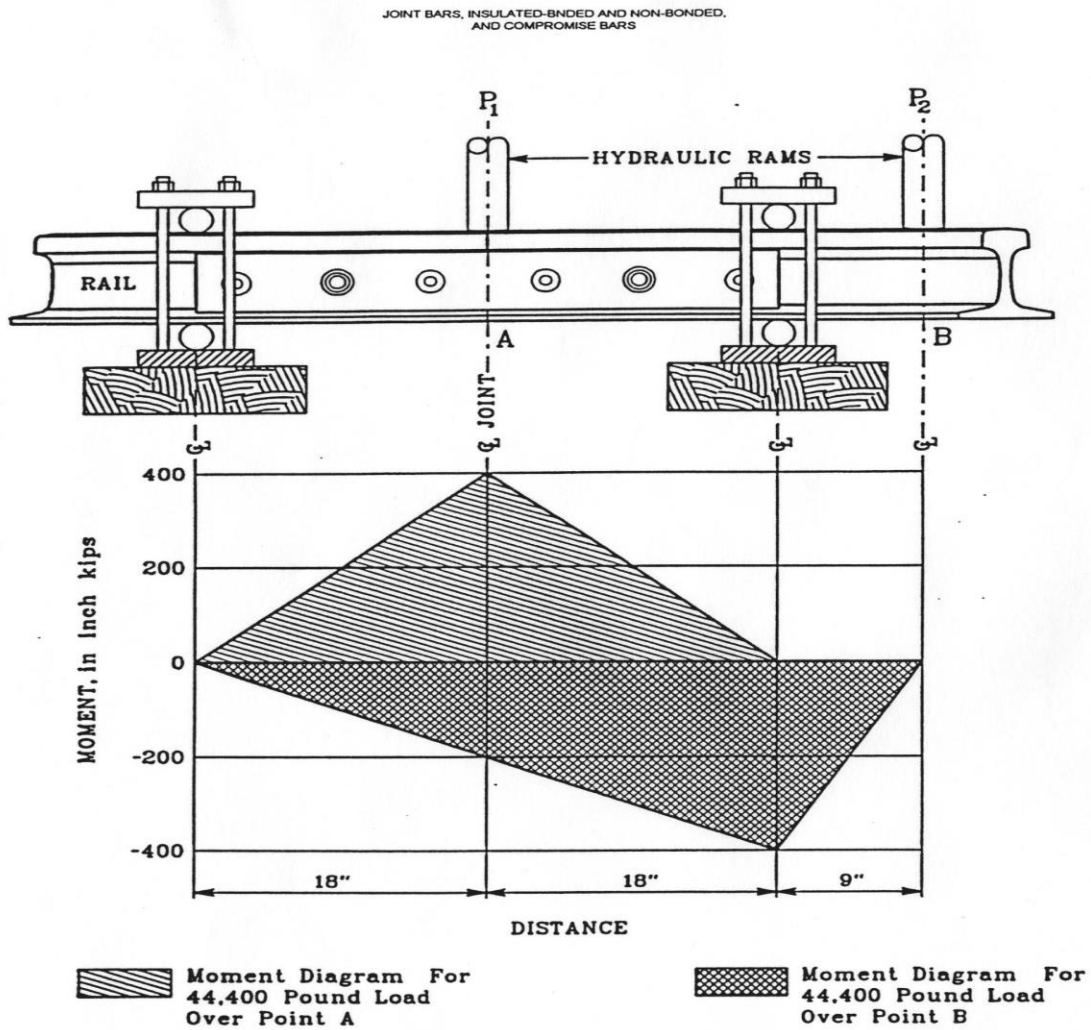
JOINT BARS, INSULATED-BONDED AND NON-BONDED,
AND COMPROMISE BARS



NOTE:
NOT INTENDED TO EXCLUDE USE OF STANDARD
AREA JOINT BARS IN YARDS.

**BONDED JOINT CLEARANCE ENVELOPE
FIGURE 1**

**Hamilton Station Stabilization
C20046F**



**TESTING OF BONDED INSULATED JOINTS
FIGURE 2**

END OF SECTION 34 11 19

THIS PAGE LEFT BLANK

**Hamilton Station Stabilization
C20046F**

SECTION 34 11 20

RAIL REHABILITATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes specifications for all construction related to rail rehabilitation work:
 - 1. Furnishing track materials
 - 2. Track Realignment

1.02 RELATED SECTIONS

- A. Section 34 11 10 – Track Construction General Requirements
- B. Section 34 11 12 – Trackway Construction Materials
- C. Section 34 11 14 - Ballast
- D. Section 34 11 31 – Concrete Ties
- E. Section 34 11 93 – Miscellaneous Track Elements

1.03 REFERENCED STANDARDS

- A. American Concrete Institute (ACI):
 - 1. 301 Specifications for Structural Concrete for Buildings.
 - 2. 302.1R Guide for Concrete Floor and Slab Construction.
 - 3. 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - 4. 304.2R Placing Concrete by Pumping Methods.
 - 5. 309R Guide for Consolidation of Concrete.
 - 6. 347 Formwork for Concrete.
- B. American Society for Testing and Materials (ASTM):
 - 1. A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, Concrete
 - 2. A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
 - 3. C39/C39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - 4. C94/C94M Standard Specification for Ready-Mixed Concrete
 - 5. C150 Standard Specification for Portland Cement

**Hamilton Station Stabilization
C20046F**

6. C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
7. A884/A884M Standard Specification for Epoxy Coated Steel Wire and Welded Wire Fabric for Reinforcement

C. State of California, Department of Transportation (Caltrans):

1. Standard Specifications:
 - a. Section 90 Portland Cement Concrete.
2. Standard Test Methods:
 - a. Test 527 Expansion in Water and Contraction in Air of Portland Cement Mortar.
 - b. Test 540 Making, Handling, and Storing Concrete Compressive Test Specimens in the Field.

1.04 SUBMITTALS

A. Submit:

1. Site Specific Work Plans and procedures for handling of materials, construction of track, and rehabilitation of trackwork for all work items listed in the Contract Documents. Plans for ballasted trackwork shall include equipment used to tamp, line, surface, and compact the track structure; and regulate and sweep ballast.
2. Methods and equipment proposed for achieving required zero thermal stress in the CWR
3. Work Safety Plan for the protection of the public, construction workers and adjacent properties.
4. Construction Schedule.
5. Work Plans and Testing Procedures for protecting and replacing system related items including installation of insulated joints, and LRT detector loops.
6. Work Plans for protecting existing utilities, trees, and other items adjacent to the work limits.

1.05 MEASUREMENT AND PAYMENT

A. Measurement:

1. The work shall be measured by the Track Foot (TF) as listed in the Schedule of Quantities and Prices.
2. All incidental work and required materials to complete the construction work in accordance with the Contract Documents and return the LRT system back in service will not be measured and paid separately as the work and materials are considered to be included in the unit price for track tamping.

B. Payment:

1. The Contract prices per track foot for track realignment shown in the Schedule of Quantities and Prices shall include furnishing and installing all material required to complete the work as listed in the Contract Drawings and as specified in the specifications. No additional compensation will be allowed therefor.

**Hamilton Station Stabilization
C20046F**

PART 2 PRODUCTS

2.01 CONTRACTOR FURNISHED MATERIALS

- A. Furnish all materials, equipment and labor required to complete all aspects of the construction and rail rehabilitation work as specified and shown in the Contract Documents except for items listed in the "Owner Furnished Materials" Section below.
- B. Trackway construction materials shall conform to Section 34 11 23, Trackway Construction Materials.
- C. Ballast shall conform to Section 34 11 14, Ballast.
- D. Running rails shall conform to Section 34 11 15, Running Rails.
- E. Concrete cross ties and fastenings shall conform to Section 34 11 33, Concrete Ties.

2.02 RESERVED

PART 3 EXECUTION

3.01 GENERAL

- A. Contractor shall maintain safe motor vehicle and pedestrian traffic flow around the work zones at all times.
- B. Contractor shall conform to the requirements in Section 6.14 "Safety Precautions, Program and First Aid Requirements."
- C. Track construction shall conform to requirements per Section 34 11 10, Track Construction General Requirements.

3.02 BALLASTED TRACK REALIGNMENT (SHIFTING, TAMPING, LINING, AND SURFACING)

- A. Shift and realign track and turnouts to permanent new alignments as shown in the Contract Drawings and as directed by VTA. Prior to shifting and realigning track or turnout, inspect track section and add ballast to provide a full ballast section through the alignment.
- B. Prior to tamping, lining, and surfacing tracks, replace defect ties and fasteners, replace loose anchors with new anchors.
- C. Ballast shall be unloaded in sufficient quantities to provide adequate amount for track shift and raise.
- D. Track surfacing shall be performed by methods that will prevent undue bending of the rail, straining of the joints, and damaging or loosening the fasteners. The amount of track lift must not exceed 4 inches or endanger the horizontal and vertical stability of the track.
- E. After the track has been finally raised, lined, and surfaced, the rails shall be destressed and refastened within the specified zero thermal stress temperature range. Ties and fastening devices damaged during the surfacing operation shall be removed and replaced with new ties and fastening devices.
- F. Surfacing shall be discontinued when the rail temperature is higher than 100oF.

**Hamilton Station Stabilization
C20046F**

- G. Tamping shall be done with a 16-tool squeeze-vibratory type power tamper equipped with automatic alignment capability acceptable to VTA. Control of the power temper’s tamping cycle shall ensure the maximum uniform compaction of ballast along the tack. Ballast shall be uniformly tamped under both sides of each tie, directly under each running rail for a distance of 15 inches on both sides of the rail. Tamping will not be permitted at the center of the tie but the cribs shall be filled with ballast. For each tie, tamping shall proceed simultaneously inside and outside both running rails on both sides of the tie unless otherwise directed by VTA. Total track length shall be mechanically tamped.
- H. Final surfacing and alignment of track shall be within the tolerance listed as follow:

Gauge Variation	Cross Level and Super-elevation Variation	Horizontal Track Alignment		Vertical Track Alignment	
		Total Deviation (Note 1)	Middle Ordinate In 62 ft Chord	Total Deviation (Note 1)	Middle Ordinate in 62 ft Chord
+/- 1/8 inch	+/- 1/8 inch	+/- 1/4 inch (Note 1)	+/- 1/8 inch	+/- 1/4 inch	+/- 1/4 inch

NOTES:

1. Total deviation is measured between the theoretical and actual alignments at any point in the track.
 2. Aggregate variation from theoretical gauge, cross level and superelevation must not exceed 1:3000 1/8 inch per 31 ft of track.
 3. Chord measurements may be taken between any 2 points 62 ft apart.
 4. Tie spacing tolerance must not exceed + 0 or – 1 inch.
- I. After surfacing complete, the top of ballast shall be refilled and dressed to top of ballast at 1 inch below top of ties.
- J. The track realignment is not accepted as complete until VTA has performed final inspection and field verified the final track alignment. The final inspection includes running of a test train to ensure the track is stable without pumping.

3.03 TRACK INSPECTION

- A. Upon completion of the Work required for final acceptance by VTA, Contractor shall notify VTA in writing to request inspection of the Work. Within 10 working days from the date of receipt of the notification, VTA will inspect the work and furnish Contractor either a letter concurring the completion of the Work in accordance with the Contract requirements or a letter outlining the deficiencies which require further work by Contractor. The follow-up inspection will be performed in the same manner as described hereinabove. All deficiencies shall be directed by Contractor within the time specified by VTA for a final completion of the Work to be considered.
- B. All required testing shall be completed prior to request for VTA inspection.
- C. Track inspection tools shall conform to Section 34 11 93, Miscellaneous Trackwork Elements.

END OF SECTION 34 11 20

**Hamilton Station Stabilization
C20046F**

SECTION 34 11 22

WELDING OF RAIL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the requirements of thermite rail welding.
- B. Thermite welding shall be used for special trackwork, tee rail and girder rail.
- C. Shortages of rail due to waste, rejected welds, or rail damaged by Contractor shall be made up by Contractor at no additional cost to VTA.

1.02 REFERENCED STANDARDS

- A. American Railway Engineering and Maintenance-of-Way Association (AREMA): Manual For Railway Engineering, Volume 1, Chapter 4, Part 2, Section 2.2, "Specification for Fabrication of Continuous Welded Rail (CWR)," and Section 2.5, "Thermite Welding - Rail Joints."
- B. American Society for Testing and Materials (ASTM):
 - 1. E18 Standard Test Methods for Rockwell Hardness and Metallic Materials.
 - 2. E94 Standard Guide for Radiographic Examination.
 - 3. E164 Standard Practice for Contact Ultrasonic Testing of Weldments.
 - 4. E709 Standard Guide for Magnetic Particle Testing.

1.03 QUALITY ASSURANCE

- A. Rail Straightness: Contractor shall check for end straightness before welding.
- B. Both ends and tops of rails shall be straight edged using a 36 in. metal straightedge, and deviations from straight shall be measured with a metal taper gauge.
- C. Rails which are at or exceed the tolerances in AREMA Manual, Chapter 4, Part 2, Section 2.1, Article 2.1.13 shall be straightened or cropped by Contractor.

1.04 SUBMITTALS

- A. Thermite Welds: Before thermite welding, submit a detailed description of proposed method and procedure. Method and procedure specified shall comply with that of the weld kit manufacturer and shall include name of manufacturer and details of following operations:
 - 1. Preparation of rail for welding.
 - 2. Rail end spacing, tolerances, and procedures to maintain rail gap during welding operation.
 - 3. Rail alignment.
 - 4. Placing and bolting prepared molds.

**Hamilton Station Stabilization
C20046F**

5. Preheating rail, including method, temperature and time.
 6. Crucible tapping and procedures including duration of weld and cooling time.
 7. Trimming and grinding of weld.
 8. Method to be used for removing gates and risers.
- B. Submit details and example of methods of identifying thermite welds on rail in the field.
- C. Contractor shall demonstrate welding ability and qualification of welding personnel by the performance of thermite weld samples. VTA will be notified at least 2 days before the making of demonstration and sample welds. A representative of VTA and an inspector of the Testing Agency will be present during the time the demonstration and sample welds or when subsequent rewelds are being performed.
- D. Qualification of Contractor Welding Personnel: Contractor shall provide names and individual qualification of personnel proposed for track welding and weld grinding indicating number of years of experience, previous track welding jobs performed for this or other railroad contractors, and levels of experience and/or certification. Submittal shall include copy of certification provided by an authorized representative of the thermite weld kit manufacturer proposed by Contractor for use on this Project. Contractors who do not have qualified and certified railroad track welders shall be given opportunity to obtain certification and demonstrate such competence.
- E. Thermite Weld and Demonstration Samples: Before production welding and at Contractor's expense, 1 sample thermite weld shall be made and tested by an independent laboratory acceptable to VTA. The certified test results and the sample weld shall be submitted to VTA. The sample weld shall be tested as follows:
1. Radiographic Examination: Sample weld shall be ground smooth to within 0.005" of the parent rail section and radiographically tested with a minimum of 5 exposures; 1 through the head, 1 through the flange, 1 through the web, and 1 through each of the 2 flanges. Radiography shall be performed in accordance with ASTM E94. Radiographic film shall be Type 1 and Type 2. Exposed film density shall be within the range of 1.5 to 3.8. The film and certified tests reports shall be forwarded to VTA for approval.
 2. Ultrasonic Test and Magnetic Particle Test: Sample thermite weld shall be ultrasonically tested and tested using the magnetic particle method as stated in Article 3.03D, herein. Certified test reports shall be forwarded to VTA.
 3. Test weld shall be visually examined for cracks.
 4. Weld hardness test, measured on the head of the rail in the center of the weld, shall show that the hardness of the weld shall be equal to the average Brinell hardness of the 2 rails joined with a permissible tolerance of +/- 20 Brinell points.
- F. Thermite Weld Production Report: Submit sample copy of form to be used by Contractor to record production of each thermite field weld made. Proposed report form shall include complete identification of weld production and of exact location of each thermite weld installed in permanent location in track. Sample copy of a thermite weld production report is attached to this Section identifying the format and content that will be acceptable to VTA.
- G. Weld Testing Agency: Submit copy of Contractor agreement with Weld Testing Agency as specified hereinafter.
- H. The Testing Agency will submit a list of instruments to be used for the testing of rail welds. This list shall include the manufacturer's name, model number, serial number and calibration certificate for each instrument.

**Hamilton Station Stabilization
C20046F**

1.05 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 WELD MATERIALS

- A. Weld materials shall conform to Contractor's thermite weld submittals approved by VTA. Once approved, Contractor must not change thermite welding materials supplier, thermite welding process or track welders and grinders without resubmittal and subsequent approval of the new supplier, process or personnel by VTA.

PART 3 EXECUTION

3.01 PREPARATORY WORK FOR WELDS

- A. Condition of rails to be welded shall conform to the AREMA Specifications as follows:
1. Deviations of the lateral or horizontal line in either direction at the rail ends must not exceed a mid-ordinate of 1/32 in. in 36 in. using a straight edge, and an ordinate of 1/32 in. at the end quarter-point.
 2. Uniform upsweep at rail ends must not exceed an ordinate of 1/32in. in 36 inches, and 1/32 in. maximum ordinate must not occur at a point closer than 18 in. from the rail end.
 3. Surface downsweep and droop will not be acceptable.
 4. Rail that cannot be straightened permanently shall be cut back a sufficient distance to achieve required alignment. Rails shall only be sawed or abrasive wheel cut to length. Variation in end squareness must not exceed 1/32 in. Burrs shall be removed. The method of end finishing rails shall be such that the rail end must not be metallurgically or mechanically damaged. Rail shall only be cut back when VTA is satisfied that the rail cannot be satisfactorily straightened.
- B. All rails for welding by Contractor shall be oriented in the same direction such that rail brands face the field side or outside of the track and rail stamping is oriented to the gauge side of the track being constructed. Turning of rails to accomplish proper orientation shall be included in the work items to which they apply.
- C. Final location of thermite welds in track shall allow not less than 2 in. from edge of any track plate to the edge of the thermite weld. Contractor shall adjust plate spacing as necessary to avoid thermite welds occurring closer than 2 in. and must not exceed maximum plate spacing required by the shop drawings applicable to the track segment being constructed. Respacing of plates to accomplish proper clearance to thermite welds shall be included in the items of work to which they apply.

3.02 RAIL WELDING QUALITY ASSURANCE

- A. Mismatched, nicked, damaged or jagged rail ends shall be either sawed or cut with an abrasive rail cutter.
- B. Defective welds shall be cut by saw or by an abrasive rail cutter. Torch cutting on rail ends to be welded is not acceptable.
- C. Alignment of rails to be welded shall be at the head of the rail. Alternative alignment methods shall be used only upon approval by VTA.

**Hamilton Station Stabilization
C20046F**

1. Vertical alignment shall provide for a flat running surface. Differences of height of the rail shall be corrected in the base.
 2. Horizontal alignment shall be accomplished in such a manner that any difference in the width of heads of rails shall be divided equally on both sides of the head. Where the difference, when divided by 2, exceeds 3/64 in., the gauge side shall be aligned flush allowing differences in the width of heads to occur on the field side.
 3. Horizontal offsets must not exceed 3/64 in. at the head nor 1/8 in. at the base.
- D. Surface Misalignment Tolerance:
1. Combined vertical offset and crown camber must not exceed 1:300 to a maximum of 1/16 in. at ambient temperature in accordance with AREMA Specification.
 2. Welds displaying dip camber in accordance with AREMA Specification will not be acceptable.
- E. Gauge Misalignment Tolerance: Combined horizontal offset and horizontal kink camber must not exceed 1:300 to a maximum of 1/16 in. at ambient temperature in accordance with AREMA Specification.
- F. A finishing deviation of the parent section of rail head surface must not exceed + 1/64 in. to - 0.00.
- G. Sides of rail head weld shall be finished to +/- 1/64 in. of parent section. Top and bottom of rail base shall be finished to within 1 in. of lowest rail.
- H. Web zone, including underside of head, web, and both fillets on each side, shall be finished to within 1/8 in. of parent contour but must not be deeper than the parent section. Finishing shall eliminate cracks.
- I. Notches created by offset conditions, twisted or misshaped rails shall be eliminated by grinding to blend variations.
- J. Fins on weld due to grinding shall be removed before testing.
- K. Whenever possible, grinding shall be accomplished immediately following welding at an elevated temperature. When grinding is done at ambient temperature, avoid grinding burns and metallurgical damage.
- L. Finish grinding on running surface and gauge face of rail head shall be accomplished within 24 in. of either side of the center of the thermite weld.
- M. Failure of Contractor to conform to these requirements will result in a work stoppage issued by VTA until these requirements are in compliance.

3.03 INSPECTION AND TESTING OF WELDS

- A. Magnetic particle and ultrasonic inspection and testing of thermite welds shall be performed by the Testing Agency within 5 work days of production by the Contractor.
- B. Inspect welds in accordance with the AREMA Specifications and furnish test results to VTA.
- C. Defective welds shall be repaired as specified in Article 3.07, "Repair of Defective Welds," herein.
- D. Each thermite rail weld shall be tested ultrasonically and by dry powder magnetic particle method in the field for defects within 5 days after the weld has been made. Testing shall be performed by a qualified inspector of the Weld Testing Agency acceptable to VTA.

**Hamilton Station Stabilization
C20046F**

1. Ultrasonic test equipment shall be capable of detecting a 3/64 in. discontinuity 6 1/2 in. below top of rail. Ultrasonic inspection of welds shall be performed in accordance with ASTM E164. Weld Testing Agency shall develop an ultrasonic testing procedure which shall indicate incompletely fused welds. The testing procedure shall be submitted to VTA. Welds shall be inspected in accordance with accepted procedure and shall be visually inspected for surface cracks. Testing must not be performed until weld has cooled to ambient temperature. Inspection agency shall furnish an ultrasonic test report form that shall record 20 inspected welds per 8 1/2 in. x 11 in. sheet. The form shall include the location of the weld in track, the results of the ultrasonic inspection including the size of defects found in the head, web or base of rail; the results of visual inspection; recommendation for correcting welds found defective, name of inspector and other information needed. The form shall be subject to acceptance by VTA. Welds found defective shall be repaired as specified in Article 3.07, "Repair of Defective Welds," herein.
 2. Inspection of thermite welds by the dry powder magnetic particle method shall be in accordance with ASTM E709.
 3. VTA may require Contractor to perform Brinell hardness test in accordance with ASTM guidelines as needed if the condition of welds relative to hardness is uncertain. Brinell hardness of rail welds shall be measured and compared to the parent metal.
- E. Welds not meeting the requirements specified in Article 3.05, "Location and Acceptance Criteria for Thermite Welding," herein, will not be acceptable and shall be rejected and cut out and replaced with acceptable weld or welds as specified in Article 3.07, "Repair of Defective Welds," herein.

3.04 IDENTIFYING RAIL WELDS

- A. Upon completion of each thermite weld, at the time the weld is made, Thermite Weld Production Report shall be prepared in the field by Contractor's welder and shall be delivered to VTA documenting production of each weld. Included shall be the sequence number assigned to each weld, the heat numbers of rail on each side of welds, the location of each weld placed in track indicated in engineering stationing. Contractor's Thermite Weld Production Report shall also include all of the additional information shown on the attached sample report form.
- B. Each rail weld shall be identified in the field at the time the weld is made in 2 in. high letters and numbers providing the sequential weld number, weld date, rail temperature at the time of the weld and the welder's initials. This information shall be painted on the gauge side of the rail web with permanent paint.
- C. Failure by Contractor to conform to these requirements will result in a work stoppage issued by VTA until these requirements are in compliance.

3.05 LOCATION AND ACCEPTANCE CRITERIA FOR THERMITE WELDING

- A. Running rail and special trackwork in ballasted track shall be joined in the field by thermite rail welding as specified in Article 1.01B, herein.
- B. Field thermite welds must not be located within the following locations:
 1. Within 10 feet of a field weld in the same rail.
 2. Within 13 feet from the center of any bolted or glued joint.
- C. Preparation of Rail Ends: Rail ends shall be saw-cut at a right angle to the rail meeting end squareness indicated in Article 3.01A.4, herein. Surfaces of rail for a length of approximately 6 in. from the end of the rails shall be cleaned by grinding just before welding to remove all grease, dirt, loose oxide, oxidized metal, scale, and moisture. Burrs and lipped metal which would interfere with the fit of mold shall be removed.

**Hamilton Station Stabilization
C20046F**

- D. Weld Gap: At the time of field thermite welding the rails shall have the rail gap recommended by the manufacturer of the weld kit and shall be aligned to produce a weld which, with respect to alignment, shall comply with AREMA recommended practices and these technical specifications. Should the rail gap be larger than the manufacturer's recommended gap after the rails have been adjusted for zero thermal stress, then sufficient rail shall be removed from 1 or both rails to permit insertion of a rail not less than 13 ft long which shall provide the recommended gaps at each end for field welding. At a location where the rail gap is smaller than the manufacturer's recommended gap, the recommended gap shall be obtained by sawing a piece from 1 rail.
- E. Weld Finish: Finishing tolerances applicable to 115RE rail thermite welds shall be as identified in Articles 3.02F through M, herein.
- F. Thermite welds shall be tested ultrasonically and by the dry powder magnetic particle method. Brinell hardness of thermite welds may also be tested. Test results shall be delivered to VTA as specified in Article 3.08, "Testing Agency Agreement," herein. Tests shall be performed according to the procedure for testing as approved and identified herein by VTA. Thermite welds shall be determined acceptable or defective according to the criteria specified in Articles 3.02F through M, Article 3.05E, and in Article 3.06, "Defective Welds," herein.

3.06 DEFECTIVE WELDS

- A. Defective welds when tested in accordance with the ultrasonic and radiographic test procedures in these technical specifications shall be determined as follows:
 - 1. Welds showing a response at any level that is identified as a crack or lack of fusion will not be acceptable.
 - 2. Welds showing a response that is less than 50 percent of the primary reference level will be acceptable.
 - 3. Welds showing a response greater than 50 percent but that do not exceed primary reference level are acceptable, provided that all of the following apply:
 - a. The defects are evaluated as slag or porosity.
 - b. The largest defect does not exceed 3/16 in. in its largest dimension.
 - c. The total area of the defects does not exceed 1/4 in.².
 - d. The sum of the greatest dimension of defects in a line does not exceed 3/8 in.
 - 4. Welds showing a response that exceeds the primary reference level or not meeting the requirements of Article 3.04, "Identifying Rail Welds," herein, must not be acceptable.
- B. Welds indicating a lack of fusion or including cracks when tested by the magnetic particle examination procedure will be considered defective.
- C. The hardness of the weld measured on the head of the rail in the center of the weld shall be equal to the Brinell hardness of the parent metal with a tolerance of +/- 20 Brinell hardness points. Welds with hardness not meeting this requirement will be considered defective.
- D. Defective thermite welds shall be repaired as specified in Article 3.07, "Repair of Defective Welds," herein.

**Hamilton Station Stabilization
C20046F**

3.07 REPAIR OF DEFECTIVE WELDS

- A. Rail welds rejected during inspection or testing shall be cut out and shall be rewelded. When a single rejected weld cannot be replaced by a single weld, defective welds shall be replaced with at least a 15 feet rail welded in its place by 2 thermite welds.
- B. Cutting of rail to remove failed or rejected thermite welds shall be at least 6 in. from the centerline of the thermite weld to be cut out. Cutting of rail to remove other rejects or mechanical damage shall be located as specifically directed by VTA for each location or condition.

3.08 TESTING AGENCY AGREEMENT

- A. Within 10 calendar days after award of the Contract, Contractor shall submit to VTA for review and appropriate action the agreement between Contractor and the Testing Agency. The agreement shall contain the following clauses:
 - 1. All test reports shall be originals and furnished directly to VTA by the Testing Agency.
 - 2. All correspondences related to testing matters from the Testing Agency to Contractor shall be copied to VTA.
- B. All test reports shall be delivered to VTA to allow for 20 calendar days of review and appropriate action by VTA before being eligible for payment.

END OF SECTION 34 11 22

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

**Hamilton Station Stabilization
C20046F**

**Attachment to
Section 34 11 22**

THERMITE WELD PRODUCTION REPORT

CONTRACTOR: _____ Contract: _____

Date: _____ Thermite Weld
Number: _____ (1)

Time: _____

TRACKWORK TYPE: _____ (2)

LOCATION:

STATION: _____ (3) EB _____ WB _____
Right Rail _____ Left Rail _____

NB _____ SB _____

AHEAD (4)

BEHIND (4)

Rail Section: _____

Mill Name and Brand: _____

Month - Year Rolled: _____

Rail Heat Number: (5) _____

Grade of Rail: (6) _____

Destressing Weld: Yes _____ No _____ Rail Cut
Required: (7) Yes _____ No _____

Manufacturer of Thermite Weld Kit: _____

At time weld is made:

Air Temp.: _____ Rail Temp.: _____ (8) Conditions: _____
Weather

Rail Gap (to nearest 1.6 mm): _____

EXACT MARKINGS PAINTED ON RAIL BY CONTRACTOR'S WELDER:
_____ (9)

CONTRACTOR'S WELDER'S SIGNATURE: (10) _____

Name of VTA's Engineer or Inspector
(show only if actually present): _____

Name of Contractor's Foreman
(show only if actually present): _____

See the following required notes for this form.

NOTES APPLICABLE TO THERMITE WELD PRODUCTION REPORT:

**Hamilton Station Stabilization
C20046F**

- (1) Thermite weld numbers shall be consecutive; beginning with first demonstration/test weld made, and shall identify each thermite weld made for the entire project. If weld numbers are omitted or skipped in error, a memo to that effect is acceptable. For welds made where a welding report is prepared and/or weld identification is painted on the rail, a copy of this report shall be delivered to VTA. If any thermite or pressure weld is subsequently cut out, a report will be furnished or revised giving reasons for cutting out the weld. If any weld is subsequently cut out due to failed results in magnetic particle or ultrasonic testing and is replaced with a single weld, the same number for the weld that was cut out will be used, followed by the letter "A". If a failed or rejected weld is cut out and replaced with a rail plug and two thermite welds, the new weld numbers shall be the same as the original weld number, along with the letters A and B, e.g., "###A" and "###B". DO NOT USE A NEW WELD NUMBER FOR A REWELD PERFORMED AT THE SAME LOCATION.
- (2) "Trackwork Type" on VTA shall be only one of the following: Ballasted Primary Track, Ballasted Bridge Track, Grade Crossing Track, Direct Fixation Track, Embedded and ballasted Track, or Special Trackwork (i.e., turnouts and crossovers). When in doubt, "Trackwork Type" for welding locations is based on Contractor's Bid Item List track type specified in the Schedule of Quantities and Prices of Bid Form 1.
- (3) Use accurate engineering stationing as shown on the Plans. Right hand and left hand in trackwork are determined facing up-station (i.e., in the direction of the higher/larger numbers); however, in special trackwork (i.e., turnouts), RH and LH are determined facing the switch points.
- (4) At each weld, the rail "Ahead" is the rail in the up-station direction relative to the weld, and the rail "Behind" is the rail in the down-station direction. For track frogs, switch points, and diamond crossing frogs, simply write "Frog" or "Switch Point" in the "Ahead" or "Behind" column.
- (5) "Rail Heat Number" is the individual serial number stamped in the web of each rail, on the side opposite the branding side of the rail web. This heat number consists usually of 6 numbers followed by a single alpha-character, usually "A" through "F", and then followed by one or two numbers. All numbers and letters shall be recorded for each rail on both sides of the weld.
- (6) "Grade of Rail" shall be Standard or Premium (i.e., head-hardened) rail as determined by VTA. Rails in special trackwork are Premium grade rails.
- (7) Show "Rail Cut Required" only when the weld is at a location where track distressing is being done and rail is cut out to obtain the proper rail gap for thermite welding. If distressing is not being done, check both of these items with "No".
- (8) "Rail Temperature" shall be recorded in degrees F with a rail thermometer placed on the rail in accordance with AREMA standards, at least 10 feet from the thermite weld being made; rail temperature shall be recorded whether or not rail distressing has been completed.
- (9) Each rail weld shall be identified in the field at the time the weld is made, in 2 inches high letters and numbers, providing the sequential weld number, weld date, rail temperature at the time of the weld, and the welder's initials. This information shall be painted on the gauge side of the rail web with permanent paint.
- (10) "Contractor's welder" is the responsible person actually doing the thermite welding, not Contractor's construction foreman or superintendent. Contractor's welder's name, the initials painted on the rail, and the name of the certified thermite welder submitted and approved by VTA, shall all belong to the same person.

SECTION 34 11 23

SPECIAL TRACKWORK MATERIALS

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes requirements for the design, manufacture, fabrication, pre-assembly, inspection, testing, shipping, unloading, and stockpiling of special trackwork materials for this Contract.

1.02 REFERENCES

- A. American Railway Engineering and Maintenance-of-Way Association (AREMA):
1. Manual for Railway Engineering (AREMA Manual).
 2. Portfolio of Trackwork Plans (AREMA Portfolio).
 3. Communications and Signals Manual of Recommended Practices (AREMA C&S Manual).
- B. American National Standards Institute (ANSI):
1. B18.21.1 Lock Washers (Inch Series).
 2. B18.22.1 Plain Washers.
- C. American Society for Testing and Materials (ASTM):
1. A36/A36M Standard Specification for Carbon Structural steel.
 2. A48 Standard Specification for Gray Iron Castings.
 3. B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 4. D257 Standard Test Methods for DC Resistance or Conductance of Insulating Materials.
 5. E10 Standard Test Method for Brinell Hardness of Metallic Materials.
 6. E428 Standard Practice for Fabrication and Control of Metal, other than Aluminum Reference Blocks Used in Ultrasonic Inspection.
 7. E709 Standard Guide for Magnetic Particle Examination.
- D. Santa Clara Valley Transportation Authority (VTA)
1. Light Rail Transit Design Criteria Reference Manual (VTA Design Manual)

1.03 DEFINITIONS

- A. Special Trackwork: A generic term referring to turnouts, crossovers, track crossings, derails, and similar track items.

**Hamilton Station Stabilization
C20046F**

- B. Embedded Track: Track with rails encapsulated with rubber rail boot material or elastomeric grout for insulation and concrete on asphalt infill for pavement materials.
- C. HB: Brinell Hardness Number as defined by ASTM E10.
- D. LRV: Light Rail Vehicle.
- E. WCLB: West Coast Lumber Inspection Bureau, same as WCLIB.

1.04 DESIGN CRITERIA

- A. Light Rail Vehicle Characteristics and Operating Requirements: As specified in the VTA Design Manual, Figures 3.5.1.1, 3.5.1.2a, and 3.5.1.3.
- B. Turnouts shall be curved split switch, insulated design.
- C. Turnouts and crossover shall be designed with spring switches.
- D. Turnout and crossover layout in the Contract Drawings is for reference only. The turnouts and crossovers shall be designed by Contractor to conform to the alignment data provided on the Contract Drawings.
- E. The design of all special trackwork components shall be submitted for approval as specified in Article 1.05, "Submittals," herein.
- F. Crossover and Crossing Diamond Special Trackwork Plate Layout Criteria
 - 1. Single crossover contains two (2) turnouts
 - 2. The plate layout in the Contract Drawings is furnished for general guidance only. VTA will review plate layout submittals and may revise spacing to accommodate rail bonding and rail joint locations.
 - 3. Crossover and crossing diamond units shall be constructed with 115RE premium rails.
 - 4. Rail boot or track jacket shall be coordinated and designed with crossover or crossing diamond units.

1.05 SUBMITTALS

- A. Contractor shall make all submittals in accordance with the requirements of Section 6.6, Contract Data Requirements, the Technical Submittal List, and as specified herein.
- B. Contractor shall submit the following required items within 10 days of the contract award date:
 - 1. A Product List consisting of a listing by product type, name of supplier, and model number of all proposed Contractor and subcontractor supplied products. Product literature or catalog cuts, material composition, and method of manufacturing shall also be included.
 - 2. Description of the vacuum degassing process.
 - 3. Description of the head hardening process and chemical composition of the rail.
 - 4. Description of the non-destructive testing procedures.
 - 5. Description of the procedures, equipment, and tolerances for precurving rail.

**Hamilton Station Stabilization
C20046F**

C. Submittals in Performance of the Contract:

1. Submittal Date: Contractor shall submit the required items to VTA for approval at least 30 days before fabrication unless another submittal date is specified below. Fabrication must not commence until the items requiring approval before fabrication are approved.
2. Required Items:
 - a. Shop Drawings:
 - 1) Special Trackwork: Design and submit a detailed layout of all components for the turnouts, crossovers, curved rail and restraining rail to be supplied under this contract.
 - 2) Design of steel plates and fastening system for installation of compromise plug rail at different locations.
 - 3) Design of 22-foot insulated gauge plate for Hostetter.
 - b. Flangeway Width and Gauge Calculations: Submit with the shop drawings, design calculations deriving the proper flangeway width through frogs, guard rails, restraining rails and switches, as well as gauge widening requirements through special trackwork.
 - c. Rail Certificate: Indicate source, chemical composition, hydrogen reduction process, and head hardening process of the 57 kg/m (115RE) rail to be supplied.
 - d. Rail Welding: Proposed welding and test procedures for special trackwork components that are to be welded.
 - e. Marking and Identification System: Description of Contractor's system for marking and identifying sizes, types, and composition of products, as well as identifying parts for the purpose of proper location during installation, in accordance with Article 2.16, "Markings," herein. Rail joints, including bonded, insulated, and to joints to be field welded, within the limits of each special trackwork unit, shall be identified by sequential numbering.
 - f. Depth Hardening Procedure: Description of the proposed procedure for depth hardening of turnout and crossing frog castings, the area of each frog to be depth hardened, and the Brinell Hardness patterns which Contractor normally achieves with such procedures.
 - g. Shipping and Handling Procedures: Description of packaging, shipping, handling, unloading, and stacking procedures, in accordance with Article 1.06, "Handling, Shipping, Unloading, and Stockpiling," herein. Provide layout of special trackwork material storage in the storage yard. Submit at least 30 days before scheduled shipping date.
 - h. Assembly Procedures: Submit assembly procedures, including placement plans, to be followed by the installation contractor 30 days before delivery of the supplied materials. The procedures shall be comprehensive, clear, and concise and shall include sequential layout and assembly steps to be followed by the construction contractor in building of each special trackwork unit in the field.
 - i. Operating and Maintenance Data Manuals:
 - 1) Information contained in the operating and maintenance data manuals shall include the following:
 - a) The finish hardware schedule.
 - b) The description of and operation and maintenance instructions for special trackwork assemblies, including complete parts list.

**Hamilton Station Stabilization
C20046F**

- c) The periodic maintenance schedule for all components of the special trackwork, including critical locations which will require lubrication; type of lubrication to be applied; components which will require adjustments or tightening; components which will require periodic inspection, and the frequency at which components requiring periodic inspection should be inspected.
 - d) Tools required and torque for all threaded components and fasteners.
 - e) Tolerances and wear limits for all adjustable components and components subject to wear.
 - f) Names, addresses, and telephone numbers of subcontractors and suppliers responsible for special trackwork assemblies.
- 2) The information contained in the operating and maintenance data manuals shall be arranged in an order that parallels the breakdown in these technical specifications. The technical specifications section titles shall be used to identify relevant data. Hard paper divider sheets marked with labeled vinyl-protected tabs shall separate the data.
- j. Copies of Brinell Hardness test results for all non-rail items with specified hardness, 10 days prior to shipping date.
- k. Documents for Final Acceptance of Rail:
- 1) VTA's Review: Final acceptance of the rail will be made only after VTA's review and approval of the documents required below. Submit these documents to VTA for review at least 30 days before shipping and do not ship until VTA approves them.
 - 2) Required Documents:
 - a) Vacuum degassing and head hardening records.
 - b) Non-destructive testing records.
 - c) Mill certificates and results from rail hardness tests.
 - d) Certificates of compliance from original steel manufacturer.
- l. Six complete samples of lag screw assembly including lag screw, insulating bushing, (one of each length), double coil spring and flat washer shall be provided as a sample during the submittal process for each item. Once approved by VTA, materials and dimensions for each item of lag screw assembly may not be changed without prior written approval of VTA.
3. Electronic Medium: Shop drawings shall be prepared in AutoCAD and in Acrobat format. Final shop drawing files (after approval by VTA) shall be downloaded onto CD and furnished to VTA prior to release of payment to Contractor.

1.06 HANDLING, SHIPPING UNLOADING, AND STOCKPILING

- A. Metal Preservative Coating: All machined surfaces and threaded components shall be coated with a light petroleum based (non-water soluble) lubricant. Any component shipped across the ocean shall be enclosed in a watertight container.
- B. Packaging:
- 1. All turnouts and crossovers shall be packaged separately as complete units in secured bundles. Each unit shall be designated by a number to be provided by VTA.
 - 2. Contractor shall propose a packaging method for review and acceptance by VTA. The proposed method shall limit the amount of "bundles" for each unit to the absolute minimum possible and

**Hamilton Station Stabilization
C20046F**

shall indicate how the materials will be stacked and marked to allow for easy identification of all the components that are part of the same unit.

- C. Marking: All bundles, boxes, and kegs specified in Article 1.06B., herein, shall be clearly marked with the following: Identification of item contained; Contractor's name; Contract No.; shipping date; number of pieces; gross weight; trackwork unit designation including left or right hand; customer's name and delivery address to be provided by VTA.
- D. Shipping, Handling, Unloading and Stockpiling: Special trackwork procurement materials shall be unloaded and stockpiled using a method approved by VTA. The unloading and stockpiling site will be accessible by truck.
 - 1. Contractor shall furnish all equipment, labor, rigging, dunnage, and other materials necessary to perform the work.
 - 2. Any item lost or damaged during shipping, unloading, and stacking shall be promptly replaced at Contractor's sole expense.
 - 3. The shipping inventory list sent prior to shipment shall be presented in the same format as the shipment inventory list for ease of checking.
 - 4. Special trackwork units shall be stacked separately to allow individual removal by the installation contractor.
- E. Delivery: The exact location of the delivery sites will be provided to Contractor within 4 weeks after NTP. Delivery sites will be within 32 km (20 mi.) of the project installation site.

1.07 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 RAIL

- A. Tee rail for special trackwork components, including switch rails, stock rails, closure rails, wing rails and straight and precurved running rails and guard rails shall be vacuum degassed and head hardened manufactured in accordance with the current AREMA Manual, Specifications for Steel Rails, and as specified herein. The rail shall be new 57 kg/m (115RE) sections conforming to the applicable special trackwork unit.
- B. Head hardened rail shall be treated according to the manufacturer's standard process and in accordance with Article 2.12, "Rail Hardening Treatment," herein.
- C. All tee rail shall have a Brinell Hardness within the range 341 HB to 388 HB.

2.02 STOCK RAILS

- A. Stock rails for turnouts shall be fabricated from head hardened rail as defined in Article 2.01, "Rail," herein. Stock rails for turnouts shall be undercut in accordance with the AREMA Portfolio Plan No. 221, Detail 5100.
- B. Stock rail ends shall be left blank to allow field welding by others. See Article 2.15, "Cutting, Drilling and Beveling," herein, for information on rail ends for.

**Hamilton Station Stabilization
C20046F**

2.03 CLOSURE RAILS

- A. Closure rails for turnouts shall be fabricated from head hardened rail as defined in Article 2.01, "Rail," herein. Closure rails shall be fabricated to the correct length as required for the installation of thermite welds with 25 mm (1 in.) gap. Closure rails of radius less than 120 m (400 ft.) shall be precurved by conventional railroad industry frog and switch shop procedures.
- B. Except at insulated joint locations, closure rail ends shall be left blank to allow field welding by others. See Article 2.15, "Cutting, Drilling, and Beveling," herein, for information on rail ends for various types of special trackwork components.
- C. Curved closure rails on insulated turnouts shall be furnished with insulated joint as specified in Article 2.10, "Bonded Insulated Joints," herein. The 915 mm (36 in.), 6-hole bonded insulated joint shall be supplied as a kit to be installed by others.

2.04 SWITCHES

- A. General: Switches shall be curved split switch design with manganese steel tips, fabricated in accordance with the AREMA Portfolio Plan No. 100, Specifications for Special Trackwork, as modified in these technical specifications. Alignment and assembly tolerances shall be in accordance with the AREMA Portfolio Plan No. 1020-03. Switch points shall be fabricated for installation with undercut stock rails.

Alternative to manganese steel tips may be proposed with qualifying justification. Approval from VTA must be obtained prior to procurement.

- B. Switch rails shall be fabricated from tee rail conforming to the requirements of Article 2.01, "Rail," herein.
 - 1. Switch rails for turnouts shall use double reinforced 115RE head hardened rail per AREMA Manual. Huck bolts shall be used to secure the reinforcing bars to the switch rail. Rivets must not be used.
 - 2. Switch rail lengths for turnouts shall be as indicated on the Contract Drawings.
 - 3. Switch points shall be in accordance with the AREMA Portfolio Plan No. 221-12, Detail 5100.
- C. Switch Rod Assemblies:
 - 1. Switch stands, connecting rods, and components shall be compatible with Racor 36-E and Cleveland Model B motion dampened spring enclosed connecting rod, or VTA-approved equal. Steel switch rods shall conform to the AREMA Portfolio Plan No. 100, "Specifications for Special Trackwork."
 - 2. For turnouts, switch rods and clips shall be insulated. Insulated switch rod assemblies shall conform to the AREMA C&S Manual Part 12.1.6, Recommended Design Criteria for Insulated Rod for Switch Circuit Controller, Details & Assembly. Contractor shall certify conformance with the dielectric requirements of that Specification.
 - 3. Fiber Insulation for Switch Rod Assemblies:
 - a. Fiber angles, plates and end posts shall be fabricated of fiberglass mat reinforced polyester 3/16 in. thick, GPO-1 Sheet Stock NEMA, Class B.
 - b. Fiber bushings shall be fabricated of NEMA Grade 10 epoxy glass fabric.

**Hamilton Station Stabilization
C20046F**

- c. All cut edges of fiberglass shall be sealed with Sherwin Williams Polane, 2-part coatings, or VTA-approved equal.
 - d. All contact metal surfaces shall be painted with General Electric insulating enamel, Red Glyptol No. 1201, or VTA-approved equal.
 - e. During assembly, a bead of silicon rubber paste, Devon Silite 100, General Electric RTV.102, or VTA-approved equal, shall be placed at the seat of angle bends between gauge plate, insulation, and steel angles.
 - f. During assembly, all void areas between the outside edge of bolts and the inside edge of holes in angles shall be filled with clear silicon rubber paste, Devon Silite 100, General Electric RTV.108, or VTA-approved equal.
 - g. As an alternate, 3/4 in. x 8 in. x 9 in. scotch ply insulation may be proposed.
4. Power operated switches shall have insulated switch rod No. 1 and shall be provided with basket adjustments and shall be 2-1/2 in. x 1-1/4 in. with bolt hole diameter of 1-9/64 in..
- D. Heel Block Assembly:
- 1. Split switches for welded turnouts shall be furnished with a floating heel assembly, as designed by Contractor. The design shall be subject to review and approval of VTA.

2.05 RAIL BRACES

- A. Adjustable rail braces shall be provided for all switches in accordance with Bethlehem Steel Corporation Sure Fit Boltless Adjustable Brace or VTA-approved equal and AREMA fit requirements for Type A braces as shown on AREMA Portfolio Plan No. 224.
- B. The adjustable brace shall have a locking device to prevent loosening of the rail brace wedge and shall be designed to permit easy removal of the wedge using standard track tools.

2.06 FROGS

- A. As part of the design of the turnouts and crossovers, Contractor shall submit, for review and approval, a design for each of the turnout and crossover frog to be procured in this Contract. The following are the minimum requirements for the frogs.
- B. Turnout frogs shall be tread bearing railbound manganese and diamond crossing frogs shall be tread bearing solid manganese steel frogs. Both types shall meet the requirements of these technical specifications. All manganese frog castings shall be high integrity castings with minimum Brinell hardness of 352.
 - 1. Railbound manganese frogs shall conform to the AREMA Portfolio, Specification 100-08 and Plans 600B-03, 621-09 and 622-09. The impact areas and running surfaces of frogs shall be depth hardened in accordance with M2.7, Depth Hardening, of AREMA Portfolio Plan 100-08; however, M2.7.5 will not be acceptable.
 - 2. Diamond crossings at Younger Half Grand Union shall be tread bearing welded boltless manganese frogs. The frogs shall conform to the AREMA Portfolio, Specification 100-08 and Plans 700-1, 700H-01, and 773-02. The frogs are to be milled to provide compatible head profiles in accordance with the AREMA Portfolio and the wheel profile shown on VTA Light Rail Transit Design Criteria Manual, Figure 3.5.1.3. The impact areas of frogs shall be depth hardened in order to provide the Brinell Hardness requirements of M2.7, Depth Hardening, of AREMA Portfolio Plan 100-08.

**Hamilton Station Stabilization
C20046F**

- C. All frogs shall be designed to accommodate the wheel flange of the light rail vehicle. The points shall be depressed in accordance with AREMA Portfolio Plan 600B-3. Alignment and assembly tolerances shall be in accordance with the AREMA Portfolio Plan 1028-06.
- D. Turnout frog lengths shall be as indicated on the Contract Drawings.
- E. Frogs shall be furnished with all necessary tie plates as indicated in Article 2.08, "Plates," herein.
- F. All impact and wear areas shall be ground smooth to a finished surface.

2.07 GUARD RAILS

- A. Guard rails for use with turnout frogs shall be fabricated from planed tee rail in accordance with the AREMA Portfolio Plan No. 504. Guard rails shall be flush with the plane of running rail. They shall conform to the AREMA Portfolio Plan No. 100, Specifications for Special Trackwork, M3, Carbon Steel Castings; or M4, Gray Iron Castings, ASTM A 48, Class 50; or M5, Malleable and Ductile Iron Castings. Rail shall be as specified in Article 2.01, "Rail," herein.

2.08 PLATES

- A. Plates to be provided in this Contract include all the required plates and rail stops within the limits of special trackwork. Insulated gauge plates shall be provided at the switch and frog area as shown on the Contract drawings. Plates shall conform to the AREMA Portfolio Plan No. 100, Specifications for Special Trackwork, Section M7, "Rolled Mild Steel." Standard plate thickness shall be 3/4 in. Insulated gauge plates at the switch shall be designed using uniform risers similar to AREMA Plan 123. Holes shall be clean and deburred top and bottom.
- B. Switch and frog gauge plates for turnouts and crossovers shall be insulated in accordance with the AREMA Portfolio Plan No. 223. Insulation materials shall conform to the requirements of Subparagraph 2.04.C.3, Fiber Insulation for Switch Rod Assemblies, herein. Switch gauge plates for power operated switches shall have field end of plate bent up in accordance with AREMA Portfolio Plan No. 223.
- C. All rails shall be secured to plates with threadless spring clip fastenings. Plate for special trackwork will be secured to concrete foundation with epoxy grouted anchor bolt assemblies.

2.09 LAG SCREW ASSEMBLY

- A. Each lag screw assembly includes a double coil spring washer, flat washer, and an insulating bushing. A minimum of 4 lag screws shall be used for each plate. Insulating tie pads shall be provided for all plates. There shall be a minimum of 1/2 in. of clearance between tie pads of adjacent plates at the heel of switch and the toe and heel of frogs.
 - 1. Lag screws shall be 3/4 in. diameter at the shank, 7 in. in length, twin lead threads, heat treated medium carbon steel with a tensile strength of 150 000 psi. Lag screws shall have a 3/4 in. square head and shall provide 2 in. smooth shank under the head and 5 in. of thread originating from a sharp, self tapping point. Screw threads shall be 5 per 1 in. All screws furnished for all components supplied under this Contract shall be identical. Contractor shall submit product data sheet of lag screws to VTA for approval.
 - 2. Insulating bushing shall be a 1-piece, toughened, impact modified, glass reinforced, heat stabilized nylon resin, meeting the following requirements:
 - a. Tensile Strength at 73°F: 6000 psi minimum.
 - b. Elongation at Break at 73°F: 210 +/- 10 percent.
 - c. Flexural Modulus at 73°F: 125 000 psi minimum.

**Hamilton Station Stabilization
C20046F**

- d. IZOD Impact at 73°F: 20 ft-lb./in. minimum.
 - e. Electrical Resistivity for 50 percent RH, 2 in. disc and 100-mil thickness, in accordance with ASTM D257: 1 x 10¹⁴ volume Σ -cm.
 - f. Insulating bushing shall be color coded to distinguish between various lengths.
3. Insulating tie pad material shall be high density polyethylene, having the following characteristics:
- a. Tensile Strength: 3500 psi minimum.
 - b. IZOD Impact: 0.6 ft-lb./in. 1/2 in. bar.
 - c. Rockwell Hardness: Shore D: R60 minimum.
 - d. Specific Gravity: 0.95 minimum.
 - e. Thermal Expansion Coefficient: 10 x 10⁻⁵ mm/(mm.°C) (in./in. °C).
 - f. 24-Hour Water Absorption: Less than 0.03 percent.
 - g. Electrical Resistivity for 50 percent RH, 2 in. disc and 100-mil thickness, in accordance with ASTM D257: 1 x 10¹⁴ volume Σ -cm.
 - h. Insulating tie pads shall be 3/8 in. thick, provide full support under all turnout plates (including switch and frog gauge plates) and shall extend 1/2 in. beyond all edges of each plate.
 - i. Insulating tie pads shall be drilled with 7/8 in. holes to match the hole pattern of the appropriate tie plate.
 - j. Insulating tie pads for gauge or other long plates may be furnished in two end-to-end fit pieces. However, each and any tie pad must be retained in its position by a minimum of 4 lag screw assemblies.
 - k. Insulating tie pads shall be black in color and shall be designed to resist degradation by exposure to sunlight (UV-resistant).
4. Washers, spring and flat, diameter as required, carbon steel, zinc electro-deposited in accordance with ASTM B633, Type II, SC4.
- a. Flat washers shall be ANSI B18.22.1, Type B, Regular. Outside diameter as required.
 - b. Spring washers shall be ANSI B18.21.1, double coil helical spring, extra duty.
- B. Lag screw assemblies, insulating tie pads and insulating bushings are required on all special trackwork plate work including gauge plates and switch plates.
- C. The bottom of plate shall be parallel to the rail seat so as to provide no cant to the rail, and shall be flat and without any downward projections.

2.10 ANCHOR BOLT ASSEMBLY

- A. Each anchor bolt assembly includes anchor bolt, nut, rebound spring, washers, insulating bushing and epoxy grout. A minimum of 4 anchor bolts shall be used for each plate, two on each end of the plate.

**Hamilton Station Stabilization
C20046F**

- B. Contractor shall provide certification from the epoxy grouted anchor bolt system supplier that the functional strength of a properly installed device exceeds 48,930 Newtons of pull-out force and shear force when tested in accordance with ASTM E 754 and C900.
- C. Contractor shall provide certification that anchor bolt component meets the following minimum requirements:
1. Anchor bolt ASTM A 36
 2. Anchor nut ASTM A 563, Grade A
 3. Washer ANSI B.18.22.1 Type A Plain
 4. Spring Shall be double helical steel with loading and unloading points at a nominal 20 KN at 4 mm depressed.
 5. Insulating busing ASTM D 638 – Tensile strength at 23o C – minimum 100 MPa,
Elongation at break at 23o C – Minimum 3%.

ASTM D 257 – Volume resistivity 1 x 10⁹ ohms-cm.

ASTM D 570 – Water absorption 24 hours @ 23o C – Maximum 0.6%.
 6. Epoxy grout Vinyl Ester Resin with a Dibenzoyl peroxide Hardener or equivalent.
- D. Each anchor bolt assembly shall be supplied with all nuts and washers necessary for proper installation.
- E. The epoxy grout shall be packaged in containers that provide the appropriate proportion of each component.
- F. Anchor bolts shall be 22 mm (7/8 inches) diameter and extend into the base slab a minimum of 165 (6 1/2 inches)
- G. Anchor bolt, nut, washers and spring shall be plated to ASTM B 633 SC1.
- H. The epoxy grouted anchor bolt system will be subject to approval by VTA.

2.11 CASTINGS

- A. Castings shall conform to the appropriate Section of the AREMA Portfolio Plan No. 100, Specifications for Special Trackwork, Sections M2 through M5. The material for each casting shall be shown on the shop drawings. Radiographic testing is required at locations in compliance with AREMA Criteria 1 and 2. Sectioning is not required.
- B. All Manganese castings shall be radio graphically tested.

2.12 BONDED INSULATED JOINTS

- A. Bonded insulated rail joints shall be furnished with welded insulated turnouts and insulated crossovers and also along the segment to be reconstructed Location and number of insulated joints required for turnouts, crossovers and along the track are as indicated on the Contract Drawings. Contractor may adjust locations to allow placement between ties as long as all other requirements of the Specifications are met. Bonded insulated joints shall be 36 in., 6-hole full contact bars conforming to the appropriate rail section. Bonded insulated rail joints falling within the limits of guard rail or extended guard rails shall be fabricated with insulated joint to include running rail and guard rail.

**Hamilton Station Stabilization
C20046F**

1. Bonded insulated rail joints shall be factory fabricated for tee rail and field performed for girder rail, within closure or other rails as indicated on the Figures. Contractor shall devise a rail and switch tie layout such that the center of the insulated joint will be situated between plates. Insulated joints shall be located no closer than 4 m (13 ft.) from the end of the rail in which it is installed. Special insulated rail joints shall be factory fabricated for guard rail locations, as indicated on the Figures.
2. The number of bonded insulated joints required for each insulated special trackwork unit shall match locations on existing crossover. The design shall be subject to review and approval of VTA.
3. Bars shall be of quenched carbon steel conforming to AREMA Manual Specifications for Quenched Carbon Steel Joint Bars. The inside face of the joint bars shall be pre-glued insulating material and shall be smooth with no stampings or branding.
4. Insulating materials shall be of high pressure, laminated design impervious to oil, grease and water and shall have electrical resistance characteristics meeting or exceeding the requirements of the AAR Manual, Part 116, "Signal Section Specification."
5. End posts shall match the cross section of the rail and shall be 3/8 in.thick.
6. Bonded insulated joints shall be furnished complete with end posts, bushings, bolts, nuts, and washers. Bolts, nuts and washers shall be as specified in Article 2.11, "Bolts, Nuts and Spring Washers," herein.
7. Special modified rail joint spring clip fastenings shall be furnished with bonded insulated joints to secure rails to tie plates at the location of the joint. Four spring clips shall be provided with each joint.

2.11 BOLTS, NUTS AND SPRING WASHERS

- A. Bolts, nuts and spring washers shall conform to the AREMA Portfolio Plan No. 100, Specification for Special Trackwork, Sections M11, "Bolts and Nuts," and M12, "Spring Washer." Tolerances shall be in accordance with the AREMA Portfolio Plan No. 100, Specifications for Special Trackwork, Article 7.1, "Fit of Bolts."
- B. Furnish torque specification for each bolt application.

2.12 TIES AND SWITCH TIES

- A. Concrete ties and switch ties shall be as specified in Section 34 11 33 Concrete Tie.

2.13 RAIL HARDENING TREATMENT

- A. Rails for head hardening must not include "A" rails or Number 2 rails. Rails to be treated shall be selected from heats of steel with a chemical composition capable of providing the required hardness when treated in the specified manner.
- B. Head hardened rail shall be in accordance with the current AREMA Manual for high strength rail.
 1. The hardness of head hardened rail when tested in accordance with these technical specifications shall be within the range of 341 HB to 388 HB throughout the rail head. Brinell Hardness determinations shall be made in accordance with ASTM E10, on a minimum of 10 percent of the rails randomly selected in each quenching and tempering charge. Hardness tests shall be made on full rail sections from the same heat as the rails being treated. The test section shall be at least 250

**Hamilton Station Stabilization
C20046F**

mm (10 in.) in length. The hardness readings shall be taken at the midpoint of the hardness test specimens, with regard to both length and width, on the top of the rail head after removing the decarburized metal. If all the rails or samples tested meet the specified hardness, the rails represented will be accepted subject to the other requirements of these technical specifications. The results of the Brinell Hardness tests shall be furnished by Contractor on the mill certification. The mill certificate shall contain the following data:

- a. Identification of each rail in a charge by heat, ingot, and letter.
 - b. Identification of each equivalent sample by heat.
 - c. Listing of all Brinell readings.
 - d. A representative check of Brinell readings over the entire cross section.
 - e. Date of all phases of head hardened treatment for each charge. Indicate the acceptance or rejection of the rails in each charge.
2. If any rail or sample tested fails to meet the specified Brinell Hardness values, Contractor shall perform additional hardness measurements, one on each side of the point first measured and each approximately 1 in. from that point. If both of these check measurements meet the required hardness, the rails represented will be accepted. If any of the rails or samples tested fail in the check test to meet the required hardness, each rail in the charge shall be tested and only those showing a hardness meeting these technical specifications will be accepted. Any rails failing to meet required hardness may be retreated, but not more than one additional time unless approved by VTA. Rail, which has been retreated, shall be retested for hardness in accordance with these technical specifications.
3. After the final treatment, the rails shall be conditioned by straightening to comply with the current requirements of AREMA Manual, Specifications for Steel Rails.

2.14 NON-DESTRUCTIVE TEST ON RAIL

- A. The interior condition of the rails to be supplied shall be determined by non-destructive testing. The test equipment, procedures, and standards shall be in accordance with the AREMA Manual, Volume 1, Chapter 4, Part 2, Section 2.1.8, "Ultrasonic Testing," and as modified in this Article.
- B. The full length of each rail head, web, and base shall be ultrasonically tested for internal imperfections using in-line ultrasonic testing equipment provided by Contractor. Contractor shall provide records of the cathode ray tube displays for any rail giving ultrasonic fault indications. The test block shall be Material 4340 AISI Steel/Nickel Plate conforming to ASTM E428.
- C. Magnetic particle inspection in accordance with ASTM E709 is acceptable as a complementary method when it provides a better indication of shallow defects and cracks, but it will not be accepted as a substitute for ultrasonic testing.

2.15 PRECURVED RAIL AND RESTRAINING RAIL

- A. Rails with track centerline radius of 300 feet or less shall be precurved. Precurving of rail shall be accomplished by conventional railroad industry frog and switch shop procedures approved by VTA.
- B. The bending radii and number of precurved closure rails required will be determined by Contractor for each of the special trackwork components. The deviation from the theoretical middle ordinate in any 3 feet chord must not exceed +/- 1/16 inches. The deviation from the theoretical middle ordinate of the 39 feet rail section must not exceed +/- 1/4 inches. Rail base shall seat flat with no raised edge after precurving.

**Hamilton Station Stabilization
C20046F**

- C. Contractor shall calculate equivalent compound curve radii in order to precurve spirals throughout their length. Precuring of spirals using computer-controlled roller curving equipment is acceptable.
- D. Precurved rails that are entirely within the circular curve or spiral shall be curved throughout the entire length. Straight ends resulting from the precuring process shall be cropped prior to shipment.
- E. Gag bending will not be acceptable.
- F. Restraining rails section shall conform to VTA LRT Standard Detail STW-001. Restraining rails shall be supplied complete with end approaches, block assemblies, and fastening assemblies per VTA LRT Standard Detail MS-04 to MS-06.

2.16 COMPROMISE PLUG RAIL

- A. Compromise plug rail shall be designed to connection Ri 59 girder rail to 115 RE tee rail.
- B. Ri 59 girder rail section shall conform to VTA LRT Standard Detail MS-01. 115 RE tee rail section shall conform to VTA LRT Standard Detail STW-002.
- C. Compromise plug rail piece shall be 12 ft long.

2.17 TRACK BOX FOR T-RAIL AND GIRDER RAIL INSULATED JOINTS

- A. Track Box shall be designed to inspect insulated joints.
- B. Track Boxes shall be customized to geometrical constraints such restraining rail, diamond crossings, etc.

2.18 CUTTING, DRILLING, AND BEVELING

- A. Rails shall be cut square and clean by means of rail saws, shears or abrasive cutting wheels only, in accordance with current AREMA Manual, Specifications for Steel Rails. Torch cutting is prohibited.
- B. Rail ends shall be left blank for welded turnouts.
- C. Plates shall be straightened cold in a press or roller machine to remove twists, waves and kinks until they meet the required surface and line requirements. Holes in plates shall be punched or drilled for fasteners through each plate perpendicular to its face, and shall be clean cut, leaving no torn or ragged edges. Drilled bolt holes shall be ground to remove sharp edges.

2.19 MARKINGS

- A. Each head hardened rail shall be marked with a 50 mm (2 in.) wide orange stripe painted on both sides of the web and around the rail head at a point approximately 915 mm (3 ft.) from each end of the rail.
- B. Each precurved closure rail shall be stencil marked with the turnout identification number, the precurve bend radius, and a designation of inside or outside rail. The marking shall be on the web 915 mm (3 ft.) from one end in letters and numerals not less than 75 mm (3 in.) high. The marking shall be legibly painted on a background of permanent black paint.
- C. Markings identifying the installed location of each component of special trackwork shall be painted before shipment. Standard switches, frogs, stock rails, and closure rails shall be marked with a stock number. Such markings shall be placed on the side near the end of the piece with letters and numerals not less than 100 mm (4 in.) high. Markings must not be in other (adjacent) components. Markings shall be stencil painted with white paint on a background of permanent black paint.

**Hamilton Station Stabilization
C20046F**

1. Stock and closure rails shall have switch length, right hand or left hand, and stock number on web at the end most remote from the location of point of switch.
 2. Frog rail assemblies shall have stock number on web of rail on side opposite machining.
 3. Guard rail assemblies shall have stock number on web of rail on side opposite machining.
 4. The gauge plate assembly, switch plate assembly, and switch rod assembly shall have their stock numbers stenciled.
 5. Marking of tie pads shall be in permanent paint at least 25 mm (1 in.) in height identical to the tie plate stamping to which it corresponds. Tie pad identification shall be between predrilled holes at one end of pad, oriented facing and parallel to the running rail.
- D. Stamped and Painted Markings: The ends of each abutting section at a joint in each special trackwork layout shall be legibly with the joint number as shown on the approved shop drawings. Plate and switch rod assembly identification markings shall be clearly stamped with letters and figures not less than 13 mm (1/2 in.) in height, located on the top surface of the plates, plainly visible when assembled, and not subject to wear. Die stamping shall be done in figures not less than 16 mm (5/8 in.) high. Markings shall include rail section, left hand or right hand, switch length, and plate number.
- E. Tags: Switch point rail identification shall be accomplished by attaching an aluminum tag to the gauge side of the rail. Tags shall identify switch length, rail section, curved or straight, right hand or left hand, and stock number.
- F. Parts belonging to a particular turnout shall be color coded for ease of field installation. Color coding of parts shall be done after shop assembly.

2.20 INSPECTION

- A. Before shipment, the turnouts and crossover as indicated in this contract shall be completely assembled in Contractor's fabrication shop for inspection by VTA. Closure rails shall be cut to the lengths required for installation. Assembly of trackwork for VTA inspection shall be at Contractor's expense. All costs associated with transportation, meals, boarding for VTA's inspection team will be at VTA's expense.
- B. VTA will make a maximum of 2 trips to inspect the assembled trackwork items. Contractor shall coordinate the details and scheduling of the inspection dates with VTA. Contractor shall notify VTA at least 4 weeks before the shop assembly inspection. It is expected that VTA representatives will spend a full 8-hour day at the shop during each inspection trip. Contractor shall provide VTA representatives with safe access to the laydown area and assist with the inspection activities as required.
- C. Joints shall be firmly clamped to secure components in place. No support blocking or gauge rods will be permitted to hold components to proper alignment throughout the unit during the inspection process.
- D. Any variations from the tolerances, dimensions, lengths, or angles shown on the approved shop drawings shall be noted by Contractor on the final shop drawings and tie and fastener layout drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Special trackwork shall be installed as specified in Section 34 11 20 Rail Rehabilitation.
- B. Refer to Signal specification for all Cable Bonding requirements.
- C. Refer to OCS specification for OCS modifications.

**Hamilton Station Stabilization
C20046F**

3.02 WARRANTY

- A. Contractor shall furnish, and extend to VTA, manufacturer's warranty against all manufacturing defects in addition to Contractor's standard 1-year warranty for materials and installation.

END OF SECTION 34 11 23

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 34 11 31

CONCRETE CROSS TIES AND FASTENINGS

PART 1 GENERAL

1.01 DESCRIPTION

This Section includes specifications for the design, manufacture, testing, and handling of monoblock prestressed standard concrete cross ties and grade crossing concrete ties.

- A. Two types of concrete ties to be supplied in this project are:
1. Type A – Standard Cross Tie without restraining rail or guard rail fixation.
 2. Type B – For curved track with Restraining Rail.
 3. Type D – For Track requiring the use of emergency guard rails.

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):

ASTM A325	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A416/A416M	Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A881/A881M	Standard Specification for Steel Wire, Indented, or Low-Relaxation for Prestressed Concrete Railroad Ties
ASTM A886/A886M	Standard Specification for Steel Strand, Indented, Seven-Wire Stress-Relieved for Prestressed Concrete
ASTM C31/C31M	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39/C39M	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C109/C109M	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C143/C143M-98	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete

**Hamilton Station Stabilization
C20046F**

ASTM C191	Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle
ASTM C204	Standard Test Method for Fineness of Hydraulic Cement by Air Permeability Apparatus
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C289	Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
ASTM C295	Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C359	Standard Test Method for Early Stiffening of Hydraulic Cement (Mortar Method)
ASTM C430	Standard Test Method for Fineness of Hydraulic Cement by the 45- μ m (No. 325) Sieve
ASTM C494/C494M	Standard Specification for Chemical Admixtures for Concrete
ASTM C586	Standard Test Method for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Rock Cylinder Method)
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C1105	Standard Test Method for Length Change of Concrete Due to Alkali-Carbonate Rock Reaction
ASTM D257	Standard Test Methods for DC Resistance or Conductance of Insulating Materials
ASTM D395	Standard Test Methods for Rubber Property-Compression Set
ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
ASTM D471	Standard Test Method for Rubber Property-Effect of Liquids
ASTM D570	Standard Test Method for Water Absorption of Plastics
ASTM D573	Standard Test Method for Rubber-Deterioration in an Air Oven
ASTM D732	Standard Test Method for Shear Strength of Plastics by Punch Tool
ASTM D1149	Standard Test Method for Rubber Deterioration cracking in an ozone-controlled environment
ASTM D1229	Standard Test Method for Rubber Property-Compression Set at Low Temperatures

**Hamilton Station Stabilization
C20046F**

- ASTM D2240 Standard Test Method for Rubber Property-Durometer Hardness
- ASTM D2440 Standard Test Method for Oxidation Stability of Mineral Insulating Oil
- ASTM E122 Standard Practice for Calculating Sample Size to Estimate, with Specified Precision, the Average for a Characteristic of a Lot Process
- B. American Association of State Highway and Transportation Official (AASHTO)
- AASHTO T26 Test for Quality of Water to be Used in Concrete
- C. American Concrete Institute (ACI)
- ACI 301 Specification for Structural Concrete
- ACI 305 Hot Weather Concreting
- D. Precast Concrete Institute (PCI)
- PCI MNL 116 Quality Control for Plants and Production of Structural Precast Concrete Products
- E. American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering, AREMA Manual, Chapter 10, Specifications for Concrete Ties.

1.03 DESIGN REQUIREMENTS

- A. Design: Contractor shall prepare the final design of the concrete ties in accordance with AREMA Chapter 10 – Section 1.4 Flexural Strength of Prestressed Monoblock Ties. Concrete ties design can be similar to the design requirements used from the original VTA Tasman Project.
- B. Track Configuration: Prestressed concrete cross ties shall be designed for use in ballasted track sections with 115RE rail and 4 feet 8-1/2 inch gauge.
- C. Operating Conditions:
1. Multiple unit electrically propelled trains of up to 3 cars shall operate at speeds of up to 55 mph on these ties. The design axle load shall be 28,800 pounds subject to a 30 percent impact factor. Approximate annual vehicle trips shall be 356,000.
2. The compaction of ballast under and around the tie shall be done by using hydraulic or electric activated tamping tools on a production ballast tamper. The cross tie shall resist these tamping forces without spalling of concrete on the sides and bottom corners.
- D. Environmental Conditions: Environmental conditions shall be those of the City of Campbell area including a normal ambient temperature range of 50 degrees F to 75 degrees F, with an extreme range from 0 degrees F to 110 degrees F and an average annual rainfall of 16 inches.
- E. Design Criteria: The concrete cross ties shall be as shown on the Contract Drawings and shall meet the following requirements:
1. Type A, Type B, and Type D cross tie consisting of the following components:
- a. The concrete cross tie complete with embedded rail fastening shoulders.
- b. Two rail insulating elastomeric base pads.

**Hamilton Station Stabilization
C20046F**

- c. Four fastening spring clips.
- d. Four spring clip insulators.
- 2. Design strength and electrical isolation requirements.
 - a. The concrete cross ties compressive strength shall be 7,000 psi at 28 days.
 - b. Concrete cross ties shall be tested to confirm the minimum strength and electrical insulation requirements specified in Part 3 of the specification.
 - c. In lieu of the concrete ties strength testing and electrical testing requirements specified in Part 3 of this Section, Contractor may submit certification from prior successful testing of same type of concrete ties and have proven 5 years performance history.
- 3. Dimensions
 - a. Protrusions: Do not use sharp angles or protrusions that are easily damaged by handling or tamping.
 - b. Weight: 800 pounds, maximum.
 - c. Length
 - 1) Type A - minimum of 8 feet 3 inches, exclusive of prestressing tendons.
 - 2) Type B – Length per manufacturers recommended length. Restraining rail flangeway dimension – 1 5/8” (43mm) Restraining Rail detail per VTA Std MS-04.
 - 3) Type D – Length per manufacturers recommended length. Running rail and guard rail separation, 10”. Guard Rail detail per VTA Std Dwg STW-003.
 - 4) Manufacturing tolerances: Plus or minus 1/8 inch.
 - d. Width
 - 1) Design widths
 - a) Minimum at ballast bearing area: 10-3/8 inches
 - b) Minimum at top surface from rail seat to end of tie: 8 inches
 - c) Maximum: 13 inches
 - d) Along the tie, the width at the bottom shall be equal to or greater than the width at the top.
 - 2) Manufacturing tolerances: Plus or minus 1/4 inch.
 - e. Depth
 - 1) Design depth: 6-1/4 inches minimum, 8-3/16 inches maximum.
 - 2) Manufacturing tolerances: Plus or minus 3/16 inch.
 - f. Track Gauge
 - 1) Design gauge shall be 4'-8½"
 - 2) Manufacturing tolerances: The concrete tie and fasteners shall hold track gauge to plus or minus 1/16 inch from that specified, exclusive of mill tolerance in rail. The centerline of the tie shall be within 1/2 inch of the centerline of the track gauge.
 - g. Rail Cant: Cant the rail seats one in 40 toward centerline of tie. Cants between one in 35 and one in 45 will be permitted as tolerances.

**Hamilton Station Stabilization
C20046F**

- h. Rail Seat Plane: Flat smooth surface within plus or minus 1/32 inch.
 - i. Differential Tilt of Rail Seats: The differential tilt in the direction parallel to the rail of one rail seat to the other must not exceed 1/16 inch over a width of six inches.
 - j. Protrusion of Pretensioning Tendons: 1/8 inch maximum beyond the ends of the ties.
 - k. Concrete Cover for Prestressing Tendons, Ducts, and Prestressing End Fittings:
 - 1) Design dimension: 3/4 inch minimum cover. Measure cover from outside of embedded items to surface of concrete.
 - 2) Manufacturing tolerances for clear concrete protection (cover) and depth of prestressing tendons:
 - a) +1/8 inch for any two rows of tendons and
 - b) +3/16 inch for the third row.
 - l. Surface Finish
 - 1) The top and side surfaces shall present a smooth, uniform appearance. Except at the rail seat, a random scattering of surface voids will not be cause for rejection. Heavy concentrations of surface voids or evidence of improper mixing, vibrating, or curing will be cause for rejection.
 - 2) The bottom shall have a rough finish such as may be obtained with a broom.
 - m. Markings: Mark ties with indented or raised letters to indicate the manufacturer, day and year of manufacture, and the words "VTA". A pour indicator button with the year and pour number shall be an acceptable alternative.
 - n. Rail Clip Toe Loads: The tolerances of the ties, shoulders, rail clips, insulators, and rail seat pads shall be small enough to prevent excessive variations in the rail clip toe loads. Tolerances that affect the rail clip toe loads shall be approved by the rail clip manufacturer and submitted to VTA for approval.
4. Rail Hold-Down Components
- a. Rail hold-down assemblies shall be designed for use with 115 RE rail.
 - b. Rail hold-down assemblies shall be comprised of as few components as economically and technically feasible for ease of assembly, disassembly, and maintenance. The rail clips, rail seat pads, embedded shoulders, and insulators shall be furnished by the rail clip manufacturer.
 - c. Design of the ties shall allow the rail clips to be installed or replaced in the field by one worker using hand tools. The clips and fasteners shall be of threadless design.
 - d. Cross ties shall have, on both sides of the rail base, a positive means of preventing more than 1/8 inch total lateral movement of the rail base relative to the fastener in case of failure or loosening of one or both rail clips. The positive means shall extend at least 3/8 inch above the base of rail in the installed position.
5. Rail Seat Pads
- a. Provide rail seat pads compatible with the rail fastening system with a shape that provides positive means of preventing movement of the pad parallel to the rail. Use elastomer pads with a thickness of at least 3/16 inch and not more than 7/16 inch, a width identical to the distance between the shoulder faces on the rail seat (+0, -1/16 inch) and a length one inch longer than the rail seat bearing area ($\pm 1/16$ inch). Mark pads in a permanent manner to indicate manufacturer, month and year manufactured, and designation.

**Hamilton Station Stabilization
C20046F**

- b. Rail seat pads shall be manufactured from natural rubber or thermoplastics.
6. Rail Clips
- a. The rail clip shall be threadless, one-piece elastic, heat treated, alloy spring steel. One identical clip shall be used on the field and gauge side of the rail at the rail seat.
 - b. The clips shall be reusable after removal through repeated applications without effect on the operating performance of the system.
 - c. No part of the clip shall protrude below the tie surface or into the tie.
 - d. The clip must not have point contact. The clip shall be such that lateral rail movements within the confines of the shoulders will not produce transverse denting, carving, or scoring of the rail base. The clip shall be such that longitudinal rail slippage will not produce overstressing, bending, twisting, or other damage to the clips, and will not damage the rail.
 - e. Rail clips and insulators used on rail joint bars need not be identical in design to those used on standard rail, but they shall have similar performance characteristics, shall be made by the same manufacturer, and shall be installed into identical shoulders as the standard rail clip.
7. Insulators between Fastener Hardware and Rails
- a. Provide keys between the insulators and the fastener hardware to prevent relative motion in any direction.
 - b. The insulators shall cover the full widths of the shoulders.
 - c. Except for surfaces in contact with the rail, the surfaces of the insulators shall be smooth, clearly finished and free of flash. Insulators shall be free of internal defects and cavities.
8. Shoulders
- a. Shoulders shall be threadless and shall be designed to provide and maintain proper position and alignment of the rail clip, insulator, rail seat pad, and running rail base.
 - b. The shoulder must not be directly anchored to the pretensioned steel.
 - c. The shoulder shall be ragged stem design to maximize the surface area and pull out resistance.

1.04 SUBMITTALS

- A. Submit the following for approval, at least 30 days before the start of fabrication work, to VTA for review.
 - 1. Shop Drawings: Submit shop drawings of each type of tie, including all information necessary for fabrication. Show the dimensions, details, tolerances, finishes, prestressing steel, fasteners, and other embedded items. Describe the procedures for installation and replacement of the fastener components. Show additional information required by VTA Representative.
- B. The final design submittal shall be prepared, signed, and sealed by a qualified State of California Registered Professional Engineer engaged by Contractor.

**Hamilton Station Stabilization
C20046F**

- C. Submit certification that Contractor's manufacturer of concrete ties has five years experience of long-line production of concrete ties.
- D. Submit the method of handling, shipping, unloading, and stacking of concrete cross ties for review and approval at least four weeks before shipping of the concrete cross ties.
- E. Provide a concrete cross tie marking scheme for identification of ties and submit to VTA Representative.
- F. Provide test records and other required test documentation, for informal review during the in-plant inspection and formally submit prior to shipping of the ties.
- G. Certified test reports. Submit test reports and/or certificates of compliance as specified in Articles 3.07, 3.08, and 3.09.
- H. Contractor's Drawings and Data
 - 1. The Contract Drawings show the general arrangement and such details as are necessary to provide a comprehensive description of the work to be performed.
 - 2. As indicated below, prepare Shop Drawings including design calculations and other data as may be required by these Specifications as are necessary to adequately perform the work.
 - 3. Furnish design calculations and other required data on standard 8-1/2 by 11 inch sheets, printed on one side only.
 - 4. Submit drawings, data, and schedules in accordance with the specified time requirements. If time requirements are not specified, submit in timely manner to permit no less than 21 days for appropriate review by VTA Representative.

1.05 DELIVERY, HANDLING AND STOWING

- A. Shipping and Handling
 - 1. Ship ties with threaded plastic caps or plugs securely installed in threaded insulated inserts. Securely brace ties for transportation to prevent movement that could cause damage. Ship ties in a horizontal position, braced with wooden spacer blocks so that the top surface or cast-in-place hardware does not contact ties loaded above. Do not load ties higher than the top of the cars nor more than six layers deep. Do not drop or skid ties.
 - 2. Package other parts to prevent damage during shipment and to facilitate handling. Do not mix different parts in the same package.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Minimum 28-Day Design Compressive Strength: 7,000 psi. Secure samples in accordance with ASTM C 172. Make and cure specimens in accordance with ASTM C 31/31M. Specimens made to check the adequacy of curing and protection of concrete shall be cured entirely under production conditions. Test 6-inch by 12-inch cylinders for strength in accordance with ASTM C 39/C 39M. For each day of production, test at least three cylinders. Minimum transfer requirement is $f_{ci} = 4,500$ psi for wire and strand.
- B. Minimum 28-Day Flexural Strength: 750 psi. Make specimens in accordance with ASTM C 31/31M. Specimens to check the adequacy of curing and protection of concrete shall be cured entirely under production conditions. Strength tests shall be made on 6 inch by 6 inch by 20 inch beams in accordance with ASTM C 78. Test one beam per every 2,000 ties of production.

**Hamilton Station Stabilization
C20046F**

C. Cement

1. Cement shall conform to ASTM C 150, Type II or III low alkali (less than 0.60 percent). The false set penetration, when tested in accordance with ASTM C 359, must not be less than 50 mm initially, 35 mm at intermediate times, and 40 mm after remix.
2. Separate random samples of cement shall be taken each day of production to represent the cement used on each bed. Each sample must not be less than one pound and shall be clearly identified with the date and bed number. Each sample shall be kept in airtight containers until the corresponding 28-day cylinder tests have been carried out and results accepted by VTA Representative.
3. Not more than two sources of clinker or ground cement shall be used by the manufacturer during any one month. Cement from each source shall be clearly identified and stored in separate weathertight silos. If two sources of cement are used on one bed, the tests shall be performed on the first batch of concrete made with each cement and thereafter as required. Strength tests shall also be conducted on concrete made with each type of cement.
4. Cement mill certificates shall be provided weekly by each supplier and shall continue the results of the following tests on cement delivered during that week.
 - a. Fineness by air permeability (ASTM C 204).
 - b. False Set (ASTM C 359) - Penetration at 3, 5, 8, 11 minutes and after remix.
 - c. Setting Time (ASTM C 191).
 - d. Compressive Strength (ASTM C 109/C 109M) at 1 day, 3 days, and 7 days.
 - e. Chemical Analysis (ASTM C 114) - Including SiO₂, Al₂O₃, Fe₂O₃, CaO, MgO, SO₃, K₂O, Na₂O, and calculated alkalis as Na₂O equivalent, C3S, C2S, C3A, C4AF.
 - f. Residue on 325 mesh sieve (ASTM C 430).
5. At least once during every three months, a randomly chosen sample of cement from each source used shall be analyzed for alkali content in accordance with ASTM C 114 by an outside testing laboratory.

D. Fine and Coarse Aggregates: AREMA Specifications for Aggregates, Article 1.3, Chapter 8 of the AREMA Manual, except as modified herein. Coarse aggregates shall be gravel, crushed gravel, crushed stone, or a combination thereof.

1. Aggregates shall be natural aggregates complying with ASTM C 33 Class 4S.
2. The manufacturer shall provide evidence that concrete containing aggregate from the proposed source with a cement content and alkali burden similar to the job mix, has a satisfactory service history of at least 5 years. This evidence shall include structures requiring a Class 4S aggregate.
3. The maximum size of aggregate shall be 3/4 inch. If the coarse or fine aggregate is supplied in more than one size, each size shall be stored separately.
4. Washed aggregate shall be allowed to drain, in stockpiles, before use. All aggregates shall be free from ice when used.
5. In addition to the requirements of ASTM C 33, the following tests shall be conducted by an outside testing laboratory.

**Hamilton Station Stabilization
C20046F**

- a. Petrographic examination to ASTM C 295. This shall be conducted on each new source.
 - b. Evaluation of potential alkali reactivity shall be made according to:
 - 1) ASTM C289 Potential Reactivity of Aggregates (Chemical Method)
 - 2) ASTM C227 Potential Alkali Reactivity of Cement - Aggregate Combinations (Mortar Bar Test). The alkali content, expressed as sodium oxide plus 0.658 potassium oxide shall be less than 0.6 percent by weight. The mortar bars for testing shall be made with an aggregate/cement ratio by weight of 2.25:1. This test may need to extend over a time period of six months, and should therefore begin early in the Contract period.
 - c. Evaluation of potential alkali carbonate reactivity. Aggregates containing carbonate shall be tested in accordance with ASTM C 586 and C 1105.
 - d. Mixing Water: Water shall be potable and free from harmful amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mixing water, including that portion of the mixing water contributed in the form of free moisture on aggregates, shall have a chloride ion content of less than 100 ppm. When required, test mixing water in accordance with AASHTO T 26.
 - e. Admixtures, if used
 - 1) Air-Entraining Admixtures: ASTM C 260
 - 2) Accelerating, Retarding, and Water-Reducing Agents: ASTM C 494/C 494M.
 - 3) Other Pozzolanic Admixtures: ASTM C 618.
 - 4) Do not use admixtures containing chlorides, fluorides, sulphites, nitrates, or aluminum powder.
- E. Cement Content: 600 pounds per cubic yard, minimum.
- F. Water-Cement Ratio: 0.45 maximum.
- G. Entrained Air: Total air content 3 percent to 5 percent in hardened concrete.

2.02 PRESTRESSING TENDONS

- A. General: Prestressing tendons shall be pretensioned and of one of the following types:
- 1. Wire for tendons in prestressed concrete per A 881 / A 881M.
 - 2. Strand for tendons in prestressed concrete per ASTM A 416, A 886 / A 886M or equal. Do not use strands larger than 7/16-inch diameter.

2.03 RAIL FASTENING IRON SHOULDERS

- A. Ductile iron shoulders shall be obtained by the manufacturer and shall conform to ASTM A536 Grade 60-40-18 or 65-45-12. They shall be marked, on non-bearing surfaces above the concrete level, with the part number, supplier's identification and pattern number.
- 1. The shoulders shall be free from burned-on sand, cracks, cavities, injurious blow holes and other defects. Fins shall be removed from the vertical faces of the head of each shoulder. Fins across the top of the head must not exceed 1/32 inch and below the head, fins must not exceed 1/16 inch. At gates, there shall be no cavity in the shoulder more than 1/8 inch below the general surface level.

**Hamilton Station Stabilization
C20046F**

2. Go and No Go inspection gages shall be used to check that tolerances conform with the iron shoulder drawings. A sampling plan for Acceptable Quality Levels of 1 percent for major dimensions and 4 percent for minor dimensions shall be used (see ASTM E122). The manufacturer shall decide which are major and minor dimensions. These shall be indicated on the shop drawings.
- B. Iron shoulders shall be free of mud, oil, loose rust, and other contamination when cast into ties. They shall be rigidly secured in the forms during casting and must not move within the concrete when the securing device is released. Location within the ties shall comply with the Contract Drawings.
1. The shoulder must not be directly anchored to the pretensioned steel. The shoulder must not come in contact with pretensioned steel.

2.04 EMBEDDED ANCHOR INSERTS

- A. The anchor inserts shall, as a minimum, conform to ASTM A325, and have a Class 2B thread fit.
- B. As part of the insert, there shall be a feature to prevent rotation of the insert after the concrete has reached its design strength. The anchor insert shall have a minimum length of 4 inches and a maximum length of 5 inches and shall have a minimum 3-inch engaging threaded length.
- C. In the installed position, the top of the anchor insert shall provide a flat surface parallel to the rail base with a minimum of 1/8 inch bearing width surrounding the anchor bolt hole.
- D. Inserts shall be furnished with an installed plug of metal or plastic material to preclude the entrapment of moisture, concrete, or other foreign materials. Removal shall be by using a socket or other common device. Plugs shall be capable of reinsertion, and if reinserted, shall still exclude concrete and other materials from entry.
- E. Inserts shall be coated with a uniform epoxy resin insulating coating on exterior surfaces.
1. Coating material shall be 100 percent dry powder epoxy resin such as Scotch Kote Brand Protective Resin No. 203, manufactured by the Minnesota Mining and Manufacturing Company, Corvel Epoxy ECB-1363A, manufactured by the Polymer Corporation, or approved equivalent.
 2. The coating application shall be in accordance with the coating manufacturer's recommendations and the following general requirements, or an approved equivalent.
 3. Before coating, the insert shall be degreased and cleaned to white metal in accordance with SSPC Specification SP5, White Metal Blast Cleaning.
 4. The epoxy coating must not be thinner than 10 mils nor thicker than 20 mils. Epoxy coating having runs, sags, or chips will not be accepted. Thickness shall be tested by a magnetic mil gauge at not less than two areas of the insert.
 5. When tested in accordance with ASTM D2440, epoxy coatings shall have a hardness of not less than 85 nor more than 80 Shore D.
 6. The coated insert shall be tested for pinholes and breaks in a weak electrolytic solution. A 100 volt dc electrical current shall be applied between the electrolyte and the insert; the coating will be acceptable if the circuit is not closed when the insert is immersed in the electrolytic solution. The above tests shall be performed by the epoxy coating applicator. The frequency of testing shall be in accordance with a sequential statistical quality control plan developed by the epoxy coating applicator. The plan shall ensure that the average defective rate must not exceed two percent and that the maximum defective rate must not exceed five percent. These defect rates shall be demonstrated at a 90 percent degree of confidence.

**Hamilton Station Stabilization
C20046F**

2.05 RAIL FASTENING COMPONENTS

- A. The concrete ties running rail fastening system shall include rail seat pads, spring clips and spring clips insulators.
- B. Rail fastening shall be resilient, threadless and detachable. Component part shapes shall be such that they are easily recognizable and are difficult to install incorrectly.
1. Fastening shall be comprised of as few components as economically and technically feasible for ease of assembly, disassembly, and maintenance. The rail clips, railseat pads, and insulators shall be furnished by the rail clip manufacturer.
 2. Construct fastenings so that the rail clips can be installed or replaced in the field by one person using hand tools.
 3. Construct fastenings so that when the rail clips are removed, the rail may be lifted vertically until it is completely free of the fastening shoulder without disturbing the horizontal or vertical alignment of the shoulder or the adjacent restraining rail bracket.
 4. Fastenings shall have, on both sides of the rail base, a positive means of preventing more than 1/8 inch total lateral movement of the rail base relative to the shoulders in case of failure or loosening of one or both rail clips. The positive means of restraint shall extend at least 3/8 inch, but not higher than 1-3/4 inches above the base of rail in the installed position.
- C. Rail Fastening Spring Clips
1. Rail clips must not be dependent on elastomeric components in torsion.
 2. One identical clip design shall be used on the field and gauge side of the rail at the rail seat.
 3. The clips shall be reusable after removal through repeated applications without effect on the operating performance of the system.
 4. No part of the clip shall protrude below the tie surface or into the tie.
 5. The clip must not have point contact. The clip shall be such that lateral rail movements within the confines of the shoulders will not produce transverse denting, carving, or scoring of the rail base. The clip shall be such that longitudinal rail slippage will not produce overstressing, ending, twisting, or other damage to the clips, and will not damage the rail.
 6. Rail clips and insulators used on insulated joint bars need not to be identical in design to those used on a standard rail. The clips shall clear the joint bar, shall have similar performance characteristics, shall be made by the same manufacturer, and shall be installed into identical shoulders as the standard rail clip. Insulated joint bar dimensions are provided in Section 34 11 19, Bonded Insulated Joints.
- D. Insulators between fastening shoulder and rails
1. Configuration
 - a. Provide keys between the insulators and the fastening shoulder to prevent relative motion in any direction.
 - b. The insulators shall cover the full widths of the shoulders.
 - c. Except for surfaces in contact with the rail, the surfaces of the insulators shall be smooth, clearly finished and free of flash. Insulators shall be free of internal defects and cavities.

**Hamilton Station Stabilization
C20046F**

2. Volume Resistivity: 1012 ohm-cm, minimum. Measure in accordance with ASTM D257.
 3. Water Absorption at Saturation: Three percent, maximum. Measure in accordance with ASTM D570.
 4. Dry Shear Strength: 6,500 psi, minimum. Measure in accordance with ASTM D732.
 5. Deformation Under Load: Five percent, maximum. Measure at 2,000 psi and 50degrees C.
 6. Heat Aging: Age for 10 days at 70 degrees C using ASTM D573 as a guide. Compare properties before and after aging at 70 degrees C. The tensile strength must not decrease more than 10 percent. The Rockwell Hardness must not change more than five points. There shall be no warping, cracking, discoloration, or exudation of plasticizer.
 7. Weatherometer Test: After 1,000 hours with cycled water spray, the yield stress shall be a minimum of 8,000 psi and the tensile strength shall be a minimum of 6,000 psi.
- E. Rail Seat Pads
1. Rail seat pads shall conform to AREMA, Chapter 10, Section 1.2.5.
 2. Provide rail seat pads compatible with the rail fastening system with a shape that provides positive means of preventing movement of the pad parallel to the rail. Pad thickness shall be at least 3/16 inch and not more than 1/2 inch, with a width identical to the distance between the shoulder faces on the railseat (+0, -1/16 inch) and a length one inch longer than the railseat bearing area (plus or minus 1/16 inch). Mark pads in a permanent manner to identify manufacturer, month and year manufactured, and pad designation.

PART 3 EXECUTION

3.01 CONCRETE DESIGN MIX

- A. Trial mixtures using aggregates, water, cement, and admixtures proposed for the manufacture of the concrete ties shall be made using at least three different water-cement ratios which will produce a range of strengths. For each water-cement ratio, at least three specimens for each day of production shall be made, cured, and tested as described in Article 2.01 and Article 3.02. Each batch of concrete shall be mixed separately in a pan mixer.
- B. Design compressive strength at the time proposed for transfer of prestress forces to the concrete shall be no less than 4,500 psi, or higher if so required by the tie design or manufacturing method. Design compressive strength at 28 days shall be not less than 7,000 psi. Design flexural strength at 28 days shall be not less than 750 psi.
- C. Aggregates and cement shall be measured by weight. The weight of aggregate shall be based on the saturated surface dry condition corrected for free moisture. Water shall be measured by weight or volume and admixtures shall be measured by volume, unless otherwise directed by the admixture manufacturer.
- D. Mix proportions shall be developed using the method of ACI 301, Section 3.9.
- E. Restriction on design mix proportions:
 1. The cement content shall be not less than 800 pounds per cubic yard.
 2. The water-cement ratio must not exceed 0.40 by weight. Water content shall be kept to the minimum consistent with strength requirements and placement needs.

**Hamilton Station Stabilization
C20046F**

3. Air content in the plastic concrete shall ensure a minimum 3.5 percent air entrainment in the hardened concrete.
- F. The proportions of aggregate to cement shall be such to produce a mixture that will work readily into corners and angles of the form and around the prestressing elements with the assistance of specified vibration, but without permitting the materials to segregate or excess of free water to collect on the surface.
- G. The strength tests shall be made at:
1. the age at which transfer of prestress forces shall be made, and
 2. 28 days, a curve shall be developed for each design mix showing the relationship between water-cement ratio and compressive strength.
- H. Acceptance of trial mix: The maximum permissible water-cement ratio for the concrete mix to be used shall be that shown by the water-cement ratio versus strength curve to produce average strengths of 110 percent of those specified in Article 3.01.B.

3.02 STRENGTH TESTS OF CONCRETE

- A. Compressive and Flexural Strength tests shall be made to check the adequacy of the mix proportions and as a basis for acceptance. Samples for compressive test specimens shall be secured in accordance with ASTM C172. Samples for flexural tests specimens shall be secured and specimens shall be made and laboratory cured in accordance with ASTM C31/C31M. Specimens made to check the adequacy of curing and protection of concrete shall be cured entirely under production conditions.
1. Compressive Strength tests shall be made on 6-inch by 12-inch cylinders in accordance with ASTM C39/C39M. For each day of production at least six cylinders shall be prepared two for 28 day testing, and two for checking strength at transfer, and 2 spares.
 2. Flexural Strength tests shall be made on 6 by 6 by 20-inch beams in accordance with ASTM C78. Minimum flexural strength (modulus of rupture) at 28 days shall be 750 psi.

3.03 FABRICATION AND FORMS

- A. Dimensions and Tolerances: The tie design shall be within the following dimensional limits. The finished tie must not deviate in any dimension from that shown on the Contract Drawings for the approved tie design by more than the tolerance associated with that dimension.
1. Length
 - a. Type A - Standard Concrete Cross Tie; 8 feet 3 inches minimum, 8 feet 6 inches maximum, plus or minus 1/8 inch.
 - b. Type B - per manufacturers recommended length
 - c. Type D - per manufacturers recommended length
 2. Width of Bottom
 - a. Standard Concrete Cross Tie; 10-3/8 inches minimum, 13 inches maximum plus or minus 1/4 inch.
 - b. Type B - Per manufacturer's recommended width of bottom
 - c. Type D - Per manufacturer's recommended width of bottom

**Hamilton Station Stabilization
C20046F**

3. Width of Top
 - a. Standard Concrete Tie; 8 inches minimum, 10 inches maximum plus or minus 1/4 inch.
 - b. Type B - Per manufacturer's recommended width of top
 - c. Type D - Per manufacturer's recommended width of top
 4. Depth
 - a. Standard Concrete Tie; 6-1/4 inches minimum at any location and 8-3/16 inches maximum at the rail seat, plus or minus 3/16 inch.
 - b. Type C - Grade Crossing Concrete Tie; Per Manufacturers recommended depth
 5. Track Gauge: 4 feet 8-1/2 inches, plus or minus 1/16 inch, exclusive of rail dimensional tolerances.
 6. Rail Cant: 1 in 40, plus or minus 5, towards the center line of the tie.
 7. Differential Tilt of Rail Seats: Differential tilt in the direction of the rail of one rail seat to the other must not exceed 1/16 inch in a width of 6 inches.
 8. The centerline of the tie shall be within 1/2 inch of the centerline of track gauge.
 9. Chamfer: 1-inch nominal plus or minus 1/2 inch.
- B. Method of Production: Monoblock ties shall be manufactured by the long line process.
- C. Forms
1. Forms shall be rigid and shall be constructed of material that will result in finished ties conforming to the shape, lines, dimensions and tolerances called for on the Contract Drawings.
 2. Forms shall be constructed to permit movement of the tie without damage during release of the prestressing force.
 3. Forms shall provide proper marking with indented or raised letters or numerals to identify the manufacturer and year of production. Marking shall be placed on top of tie surface.

3.04 PLACEMENT OF PRESTRESSING STEEL

- A. Prestressing force in each of the strands shall be 16,750 pounds +/- 500 pounds.
- B. The load shall be applied in two increments. An initial load of approximately 1,000 pounds shall be applied to the individual strands to straighten them, eliminate slack, and provide a starting or reference point for measuring elongation.
- C. Prestressing force shall be determined by (1) measuring strand elongation and (2) by either checking jack pressure on a calibrated gauge or by the use of a calibrated dynamometer. The cause of discrepancy that exceeds 5 percent shall be ascertained and corrected. Elongation requirements shall be taken from average load elongation curves for the steel used.
- D. Strands shall be stretched either individually or simultaneously. If strands are stretched simultaneously, provision for taking up slack and equalizing stress shall be made individually as required to induce approximately equal stress in each strand.

**Hamilton Station Stabilization
C20046F**

- E. Transfer of force from bulkheads of the pretensioning bed to the concrete shall be accomplished by gradual and simultaneous detensioning of all strands. Exposed strands shall be cut near the tie end. The projection of strands beyond the ends of the ties shall be no more than 1/4 inch.

3.05 MIXING, PLACING, AND CURING OF CONCRETE

A. Preparation for Placing Concrete

1. Prior to the placing of concrete, equipment for mixing the concrete shall be clean, debris shall be removed from spaces to be occupied by the concrete, the forms shall be thoroughly coated with a bond-breaker, and the reinforcement shall be thoroughly cleaned of deleterious coatings. The iron shoulder and prestressing wire must not be contaminated with bond-breaker or other substance that would interfere with bond development. The forms shall be inspected for alignment and tightness of joints and dimensional accuracy of the position of bulkheads, prestressing steel, and inserts shall be verified.
2. Proportioning of Component Materials
 - a. Fine and coarse aggregates and cement shall be measured by weight. Weights of aggregates shall be based on a saturated surface dry condition corrected for free moisture.
 - b. Water and liquid admixtures may be measured by either weight or volume.
3. The accuracy of measurement of the various components of concrete shall be within the following limits:

Cement	1%
Water	1%
Fine aggregate	2%
Coarse aggregate	2%
Cumulative aggregate	2%
Admixtures	3%

B. Mixing of Concrete

1. Mixing equipment shall be capable of combining specified materials within the time specified by the equipment manufacturer into a thoroughly mixed and homogeneous mass, and discharging the mixture without segregation.
2. Concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.
3. Optimum mixing time shall be established by the equipment manufacturer's recommendations. Generally, minimum mixing time shall be one minute for batches of one cubic yard or less. This mixing time shall be increased by at least 15 seconds for each cubic yard, or fraction thereof, of capacity more than one cubic yard. Mixing time must not exceed three times the specified time.

C. Conveying

1. Concrete shall be conveyed from the mixer to the place of final deposit in the shortest possible time by methods that will prevent segregation or loss of materials.
2. Equipment for chuting, pumping, and pneumatic conveying of concrete shall be of such size and design as to assure flow of concrete at the delivery location without segregation of materials.

**Hamilton Station Stabilization
C20046F**

D. Depositing

1. Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. No concrete that has partially hardened or has been contaminated by foreign materials shall be used.
2. Concrete must not be placed when the ambient air temperature of the casting room is below 40 degrees F. Concrete shall have a minimum temperature of 50 degrees F, and a maximum temperature of 90 degrees F. When concrete is placed at an ambient temperature of 90 degrees F or greater, the recommendations of ACI 305 shall be followed to prevent rapid drying and other detrimental effects of elevated temperature on fresh concrete.

E. Consolidating

1. Concrete shall be thoroughly consolidated by vibration during placement, and shall be thoroughly worked around the prestressing elements and embedded fixtures and into corners of the forms. Consolidation at the ends of ties is paramount to comply with the void tolerance specified in Article 3.06B.
2. External form vibration supplemented, if necessary, by internal vibration shall be used to obtain uniform mix, and shall be sufficient to yield concrete with a density not less than 148 pounds per cubic foot.
3. Care shall be taken to assure that forms are not damaged during consolidation.

F. Surface Finishing-Bottom of Tie

1. The bottom surface of the tie shall have a rough screeded finish. Indentations as shown on the Contract Drawings shall be pressed into the bottom of the tie prior to setting of the concrete. Two ties, which show the required bottom surface condition, shall be set aside from an early batch as a comparison standard for the acceptance of later ties.

G. Testing Fresh Concrete

1. The first batch on any bed shall be tested and if this requires no adjustment to the mix, a further test shall be made after approximately 25 cubic yards has been poured. If the first batch requires adjustment to the mix each subsequent batch shall be tested until no further adjustment is necessary and then a further batch shall be tested after approximately 25 cubic yards has been poured.
2. Slump: When measured in accordance with ASTM C143/C143M, the slump must not exceed 2 inches when concrete is placed in the forms.
3. Air Content: When measured in accordance with ASTM C231, the range of air content in the plastic concrete shall ensure a minimum 3.5 percent air void content in the hardened concrete.
4. Temperature: The temperature of freshly mixed concrete must not exceed 90 degrees F.

H. Curing

1. Immediately after placing and consolidating the concrete, the exposed surface shall be covered with impermeable sheeting.
2. Concrete must not be placed in forms whose temperature is less than 40 degrees F and the concrete temperature must not be allowed to fall below 50 degrees F between casting and transfer of prestress.

**Hamilton Station Stabilization
C20046F**

3. The rate of temperature rise in the concrete must not exceed 35 degrees F per hour and the maximum concrete temperature must not exceed 175 degrees F. Transfer of prestress must not be carried out at a concrete temperature above 135 degrees F. The heating method used shall be such that ties in a bed are at a similar temperature.
 4. Curing shall be done in accordance with established procedures to produce concrete strength as specified.
- I. Detensioning. Stress transfer shall be performed in a controlled manner with hydraulic jacks. The forms shall be free to move and the stress in wires shall be transferred at the same time and same rate. No wire shall be cut until it is completely detensioned.

3.06 REMOVAL OF TIES FROM FORMS AND FINISHING

- A. Ties shall be removed from forms in a manner such as to avoid damage.
- B. Surface Finishing
1. Formed surfaces of the finished tie shall have a uniformly dense surface. The surface of the railseat shall have a smooth finish and be free from honeycomb, surface irregularities, and air holes more than 1/8-inch diameter. Other surfaces shall have a smooth finish that may contain honeycomb not to exceed 2 percent of the surface and a maximum void diameter of 1/4 inch.
 2. Two ties, which show the required surface finish, and two ties, which show the maximum allowable rail seat defects, shall be set aside as comparison standards for acceptance of ties. These four ties shall be in addition to those for bottom finish comparison.
- C. Inspection and Repair of Surface Defects
1. Every tie produced shall be visually inspected by the manufacturer.
 2. The surface of the rail seat shall have a smooth, formed finish not inferior to the comparison standards. No rubbing, brushing or other treatment shall be used on the rail seat.
 3. Surface conditioning with a mixture of 3 parts sand and 1 part cement mixed with 1 part latex cement mix and 1 part water shall be undertaken on surfaces containing air pockets. The maximum size of any one pocket must not exceed 3/8-inch diameter by 1/4 inch deep.
 4. Ties with voids not deeper than 3/4 inch around not more than 2 end wires shall be repaired with a silicone rubber sealant. Ties with voids beyond this limit will be rejected.
 5. Corner breakage less than 1/2 inch deep and 1-1/2 inches along the end faces need not be repaired providing reinforcing wire is not exposed. If the wire is exposed the breakage shall be repaired.
 6. Corner breakage from 1/2 to 1-1/2 inches in depth shall be repaired. Corner breakage more than that will be rejected.
 7. Prestressing wires protruding more than 1/4 inch beyond the concrete surface of the end of the tie shall be cut back. Sharp ends, which would be hazardous in handling, shall be smoothed or cut back.

3.07 ACCEPTANCE OF DESIGN TESTS FOR CONCRETE TIES

- A. Design Tests

**Hamilton Station Stabilization
C20046F**

1. Prior to approval of the concrete tie design, the following tests shall be performed. The tie samples submitted will be subjected to testing for compliance with these Specifications.
 2. From a lot of not less than five ties produced, three ties shall be selected at random for laboratory testing. If required for design testing of the fastening system, the producer shall also furnish a section of a tie or a concrete block with railseat and fastening system identical to the concrete ties furnished for testing. A separate test series shall be conducted for the standard cross tie and the restraining rail cross tie.
 3. Each of the three ties and, if required, the tie block submitted for testing shall be carefully measured and examined to determine their compliance with the requirements specified below. Upon satisfactory completion of the examination, two ties, designated as Tie No. 1 and Tie No. 2, shall be subjected to the specified performance tests. The remaining tie, which will be designated as Tie No. 3, will be retained for further test use and as a control for dimensional tolerances and surface appearance of ties subsequently produced.
- B. Sequence of Design Tests (Tie No. 1)
1. The sequence of design performance tests using Tie No. 1 shall be as follows:
 - a. Railseat positive bending moment test shall be performed on the two railseats designated "A" and "B";
 - b. Center Negative Bending Moment Test;
 - c. Bond Development, Tendon Anchorage, and Ultimate Load Test shall be performed on Railseat A.
- C. Rail Seat Positive Bending Moment Test
1. Test procedure and acceptance criteria are shown in Figure 1.
 2. Summary of Test: With the tie supported and loaded as shown in Figure 1, a load shall be applied in such a manner as to avoid shock until the stated load is obtained. This load shall be held for not less than three minutes, during this time an inspection shall be made to determine if structural cracking has occurred. A five-power magnifying glass may be used to locate cracks. If structural cracking has not occurred, the requirements of this test will have been met.
 3. This test shall be performed on both rail seats on Tie No. 1.
- D. Tie Center Negative Bending Moment Test
1. Test procedure and acceptance criteria are shown in Figure 2.
 2. Summary of Test: With the tie supported and loaded as shown in Figure 2, a load shall be applied at a uniform rate and in such a manner to avoid shock until the stated load is obtained. This load shall be held for not less than three minutes, during this time an inspection shall be made to determine if structural cracking has occurred. A five-power magnifying glass may be used to locate cracks. If structural cracking has not occurred, the requirements of this test will have been met.
- E. Bond Development and Ultimate Load Test
1. Test procedure and acceptance criteria are shown in Figure 3.

**Hamilton Station Stabilization
C20046F**

2. Summary of Test: With the tie supported and loaded as shown in Figure 3, load shall be applied at a uniform rate and in such a manner to avoid shock and increased until the stated load is obtained. The load shall be held for not less than three minutes. If there is no more than 0.001-inch strand slippage determined by an extensometer reading to 0.0001 inch, the requirements of this test will have been met. The measurements shall be made on the outermost tendons of the lower layer. The load shall be increased until ultimate failure occurs. The ultimate failure load so obtained shall exceed 47,800 pounds.
- F. Sequence of Design Tests (Tie No. 2)
1. The sequence of design performance tests using Tie No. 2 shall be as follows:
 - a. Rail Fastening Insert Shoulder Pullout and Torque Test shall be performed on all inserts and shoulders;
 - b. Rail Fastening Uplift Test shall be performed on one rail seat;
 - c. Electrical Resistance and Impedance Test.
- G. Rail Fastening Shoulder and Insert Pullout and Torque Tests
1. Test procedure and acceptance criteria are shown in Figure 4.
 2. Summary of Test: The following test shall be performed on each shoulder and insert as indicated in Figure 4 to determine the ability of shoulder and inserts to resist tension and rotation. The stated axial load shall be applied to each shoulder and insert separately and shall be held for not less than three minutes. Each insert shall then be subjected to the stated torque test. The embedded shoulders and inserts must not move and the concrete must not crack, as observed by visual inspection. Separation of laitance surrounding the insert will not be cause for rejection.
- H. Rail Fastening Uplift Test
1. Test procedure and acceptance criteria are shown in Figure 5.
 2. Summary of Test: A 19 inch section of 115 RE rail shall be secured to one railseat using a complete rail fastening system including pads, clips, and associated hardware, as recommended by the manufacturer of the rail fastening system. In accordance with the loading diagram and method described in Figure 5, an incremental load shall be applied to the tie. The maximum, as determined fastener uplift load, shall then be applied. The inserts must not pull out or loosen in the concrete and no component of the fastening system shall fracture nor shall the rail be released.
- I. Electrical Resistance and Impedance Test (Wet or Dry)
1. Test procedure and acceptance criteria are shown in Figure 6.
 2. Summary of Test: Secure two short pieces of 115 RE rail to the tie using complete concrete tie fastenings. The rail pieces shall be no longer than the width of the tie. Clean contact points on each rail and attach cables. Clean a contact point on a pretensioned tendon near the middle of one end of the tie and attach a cable (hereinafter designated as a ground). Tests, test methods, procedures, and acceptance criteria shall be in accordance with those shown on Figure 6. The minimum resistance for 500 volts dc shall be 10 megohms when dry and 0.4 megohm when wet. The minimum impedance for frequencies between 20 Hertz and 12 kiloHertz with 50 volts ac applied shall be 10,000 ohms when wet.

3.08 ACCEPTANCE OF DESIGN TESTS FOR FASTENING SYSTEM

**Hamilton Station Stabilization
C20046F**

- A. Fasteners shall be subjected to the acceptance tests as specified below. Failure of fastening system to pass tests will be cause for rejection. Certified laboratory test reports shall be submitted in sufficient detail to VTA Representative.
- B. Acceptance of design testing of the fastening system consists of testing of components cast into the concrete tie in addition to tests conducted on the external components.
- C. Acceptance design tests for rail seat pad shall consist of the following:
1. Specimens: Perform the following tests on each of two specimens. The specimens shall be manufactured and cured in the same manner as the final product. Use a separate pair of specimens for each test, except the accelerated aging tests. Prior to testing, condition specimens for at least seven days at 23 degrees C and 50 percent relative humidity. Failure of either of the two specimens to meet requirements will be cause for rejection.
 2. Hardness: Measure the hardness in accordance with ASTM D2240. The reading on each pad shall be between 50 and 80 durometer, Shore A. Average the two readings and record the average for reference in production testing.
 3. Tensile Strength, measured by ASTM D412: 1,500 psi, minimum.
 4. Ultimate Elongation, measured by ASTM D412: 250 percent, minimum.
 5. High Temperature Compression Set: Using Method B of ASTM D395 with a Type 2 specimen, test for 22 hours at 100 degrees C. The compression set must not exceed 25 percent.
 6. Compression Set at Minus 18 degrees C: Using ASTM D1229, test for 22 hours at minus 18 degrees C. The specimen thickness shall be 6.0 plus or minus 0.2 mm. The compression set at 30 minutes after release (t30 reading) must not exceed 40 percent.
 7. Accelerated Aging: Using ASTM D573, age the elastomer for 48 hours at 100 degrees C. Measure and record the change in hardness, tensile strength, and ultimate elongation. The tensile strength must not decrease more than 15 percent. The ultimate elongation after aging shall be at least 200 percent and shall be at least 60 percent of the durometer A scale. The durometer A scale must not vary more than 10 points from pre-aging values.
 8. Resistance to Ozone Cracking: Prepare and test the specimens in accordance with ASTM D1149 at a temperature of 40 degrees C and an ozone concentration of 50 ppm. The elastomer must not exhibit cracking when examined in accordance with ASTM D1149 at the end of a 100-hour exposure.
 9. Oil Absorption: Using ASTM D471, conduct one test with ASTM No. 3 oil at 100 degrees C for 70 hours and conduct another test using a different sample with ASTM No. 1 oil at 100 degrees C for 70 hours to determine the volume change of the elastomer. For No. 1 oil, the volume change must not exceed minus 10 or plus 20 percent. For No. 3 oil, the volume change must not exceed 100 percent.
 10. Volume Resistivity: Apply 100 volts dc for three minutes. The volume resistivity, measured in accordance with ASTM D257, shall be at least 1×10^{12} ohm-cm.
 11. Water Absorption: Using ASTM D471, test 70 hours at 100 degrees C in distilled water. The volume change must not exceed plus 35 or minus zero percent.
- D. Rail Seat Pads - Production Quality Control

**Hamilton Station Stabilization
C20046F**

1. Batch Control: A batch is defined as the rubber mixed, processed and cured together, not exceeding one day's production. Keep the pads segregated by batch. Perform the following tests on two samples chosen from each batch at random. Use two different specimens for each test. If either of the two samples fails a test, the entire batch shall be either rejected or subjected to the test that the sample failed. Prior to testing, condition specimens for at least seven days at 23 degrees C and 50 percent relative humidity.
 2. Hardness: When measured in accordance with ASTM D2240, the hardness shall be within plus or minus five durometer, Shore A, of the average recorded in Article 3.08C.2.
 3. Tensile strength, ultimate elongation, high temperature compression set, volume resistivity and water absorption: Test as specified in Article 3.08C.3, 4, 5, 10 and 11 respectively.
- E. Acceptance Design Tests for Fastening Assembly
1. The sequence of design tests for the fastening assembly, if required to be conducted on the tie block shall be as follows:
 - a. Rail Fastening Repeated Load Test;
 - b. Rail Fastening Longitudinal Restraint Test;
 - c. Rail Fastening Lateral Restraint Test.
- F. Rail Fastening Repeated Load Test
1. Test procedure and acceptance criteria are shown in Figure 7.
 2. Summary of Test: A 19-inch section of 115 RE rail, from which loose mill scale has been removed by wiping with a cloth, shall be secured to the rail seat using a complete rail fastening assembly. Three million cycles of loading shall be applied in accordance with the loading diagram in Figure 7, alternating downward and upward loads at an angle of 20 degrees to the vertical axis of the rail. Rupture failure of any component of the fastening system shall constitute failure of the test.
- G. Rail Fastening Longitudinal Restraint Test
1. Test procedure and acceptance criteria are shown in Figure 8.
 2. Summary of Test: After successful completion of the Rail Fastening Repeated Load Test specified above and without disturbing the rail fastening assembly in any manner, the tie and fastening shall be subjected to a longitudinal restraint test. An increasing longitudinal load shall be applied in 400-pound increments as indicated in Figure 8. The load shall be increased until the stated load is reached. The stated load shall be held for not less than 15 minutes. The fastenings shall meet the requirements of this test in either direction of loading. The fastenings will have successfully passed this test if the rail movement is less than 0.125 inch.
- H. Rail Fastening Lateral Restraint Test
1. Test procedure and acceptance criteria are shown in Figure 9.

**Hamilton Station Stabilization
C20046F**

2. Summary of Test: A 19-inch section of 115 RE rail shall be secured to the rail seat using a complete fastening assembly. The entire assembly shall be supported and loaded as indicated in Figure 9. Both restrained and unrestrained lateral load tests shall be performed as described in Figure 9. Inability of the fastening to carry a 20-kip load with 1/8 inch or less of rail translation shall constitute failure of the restrained lateral load test. Rail rotation, gauge widening less rail translation, greater than 1/4 inch under an applied load of 10 kips shall constitute failure of the unrestrained lateral load test. Complete failure of any component of the tie or fastening is cause for rejection.

3.09 DAILY PRODUCTION QUALITY CONTROL TESTS

A. Acceptance Tests

1. At the start of production, a minimum of 6 railseat positive, 6 tie center negative, and 6 shoulder pull-out tests shall be undertaken by the manufacturer on randomly selected ties to establish compliance with these Specifications. After the acceptance test load results are checked, additional loading shall be applied to the ties to produce the first crack greater than 1 inch in vertical length and these loads and crack lengths recorded.

B. Routine Production Testing

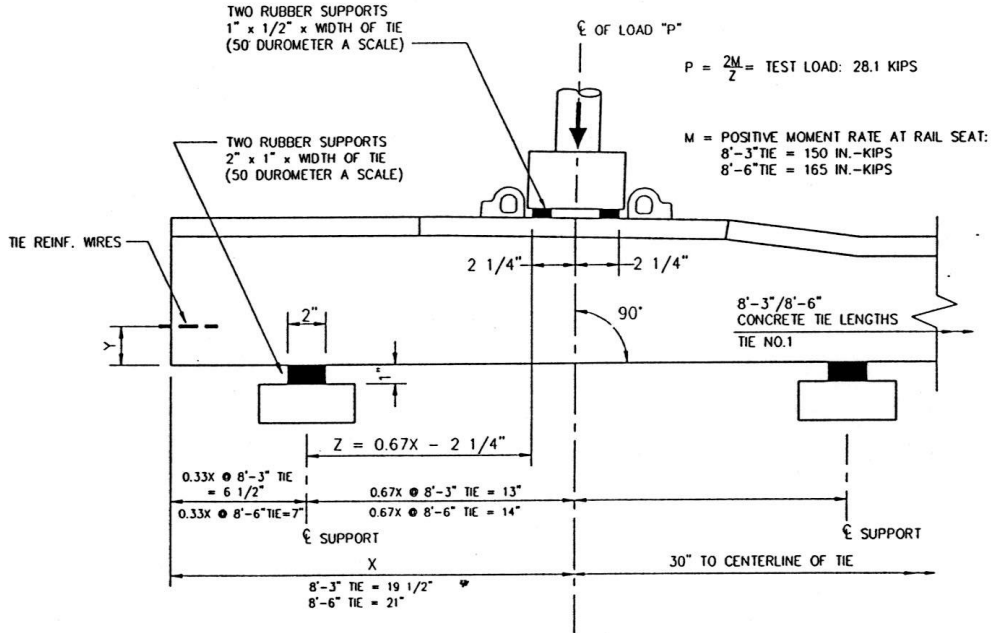
1. Routine acceptance testing shall be carried out on all beds cast. One tie selected from every 200 ties or fraction thereof from one form, selected at random from each bed cast, shall be load tested as follows:
 - a. Rail Seat Positive Bending Moment Test - Figure 1, at both seats.
2. If structural cracking occurs in the tests, two additional ties from the same lot shall be subjected to the same test and acceptance of the lot shall be based on the following conditions:
 - a. If both retest ties meet the test requirements, the lot will be accepted;
 - b. If either of the retest ties fails to meet the test requirements, the remaining ties shall be tested in accordance with a statistical sampling plan.
3. One tie selected at random from every 200 ties or fraction thereof produced each day shall be subjected to testing the distance from the center of track to the center of rail seats by use of a template, the rail seat configuration and shoulder insert location shall be verified.
4. One tie per 1000 cast shall be selected at random from those ties previously subjected to the Rail Seat Positive Bending Moment Test (one of every five of such ties) shall additionally be tested for Bond Development.
 - a. If strand slippage does not exceed 0.001 inch, the requirements of this test will have been met.
 - b. If strand slippage exceeds 0.001 inch, three additional ties shall be tested. If any of the three ties does not meet the requirements of the test, the remaining ties in the lot shall be tested in accordance with a statistical sampling plan.

PART 4 MEASUREMENT AND PAYMENT

GENERAL: Concrete ties, including clips and rail pads, will not be measured separately for payment, and all cost in connection therewith is included in the applicable Contract lump sum price or Contract unit price for trackwork in which the concrete ties are installed as indicated in the Contract Price Schedule.

3.07.C RAIL SEAT POSITIVE BENDING MOMENT TEST

3.07.C.1 THE CONCRETE TIE SHALL BE SUPPORTED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH LOADING POINTS SO ARRANGED THAT THE LOAD IS APPLIED AT RIGHT ANGLES TO THE BASE OF THE TIE MIDWAY BETWEEN THE SUPPORTING PADS. (THE "Y" DIMENSION REPRESENTS THE DISTANCE FROM BOTTOM OF TIE TO BOTTOM ROW OF PRESTRESSING WIRES.)



3.07.C.2 A TEST LOAD OF 28.1 KIPS SHALL BE APPLIED AT A RATE NOT EXCEEDING 5 KIPS PER MINUTE. THE LOAD SHALL BE HELD FOR 3 MINUTES, DURING WHICH TIME THE INSPECTION SHALL BE MADE TO DETERMINE IF STRUCTURAL CRACKING HAS OCCURRED. BOTH SIDES OF THE TIE SHALL BE INSPECTED FOR CRACKS. BOTH RAIL SEATS OF THE TIE SHALL BE TESTED.

3.07.C.3 ACCEPTANCE CRITERIA

IF STRUCTURAL CRACKING HAS NOT OCCURRED WHEN VIEWED UNDER 5 POWER MAGNIFICATION, THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET. THE ILLUMINATION AT THE SURFACE DURING INSPECTION SHALL BE NOT LESS THAN 125 FOOT CANDLES.

FIGURE 1

3.07.D TIE CENTER NEGATIVE BENDING MOMENT TEST

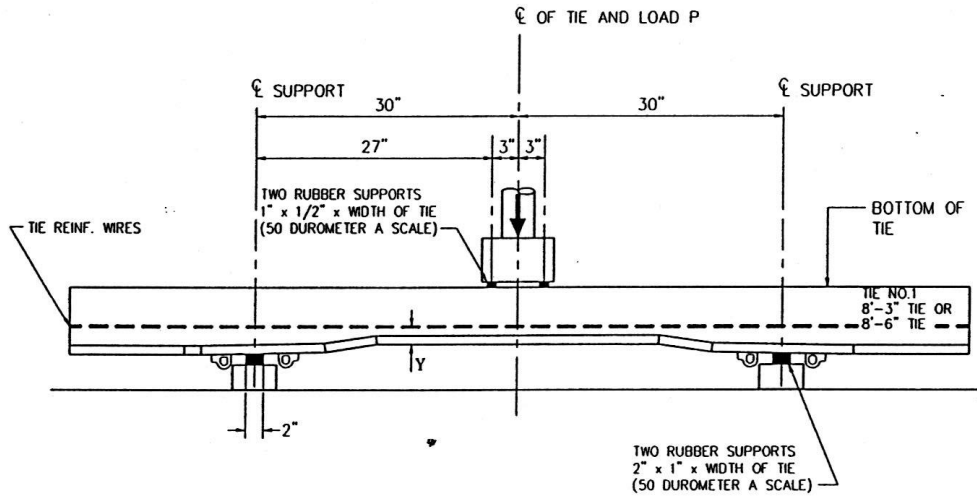
3.07.D.1 THE CONCRETE TIE SHALL BE SUPPORTED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH LOADING POINTS SO ARRANGED THAT THE LOAD IS APPLIED AT RIGHT ANGLES TO THE BASE OF THE TIE MIDWAY BETWEEN THE SUPPORTING PADS.

$$P = \frac{2M}{27} = \text{TEST LOAD:}$$

8'-3" TIE = 8.9 KIPS
8'-6" TIE = 8.0 KIPS

$$M = \text{NEGATIVE MOMENT RATE AT THE CENTER OF TIE:}$$

8'-3" TIE = 120 IN.-KIPS
8'-6" TIE = 108 IN.-KIPS



3.07.D.2 A TEST LOAD OF 8.0 OR 8.9 KIPS (DEPENDING ON TIE LENGTH) SHALL BE APPLIED AT A RATE NOT EXCEEDING 5 KIPS PER MINUTE. THE LOAD SHALL BE HELD FOR 3 MINUTES, DURING WHICH TIME THE INSPECTION SHALL BE MADE TO DETERMINE IF STRUCTURAL CRACKING HAS OCCURRED. BOTH SIDES OF THE TIE SHALL BE INSPECTED.

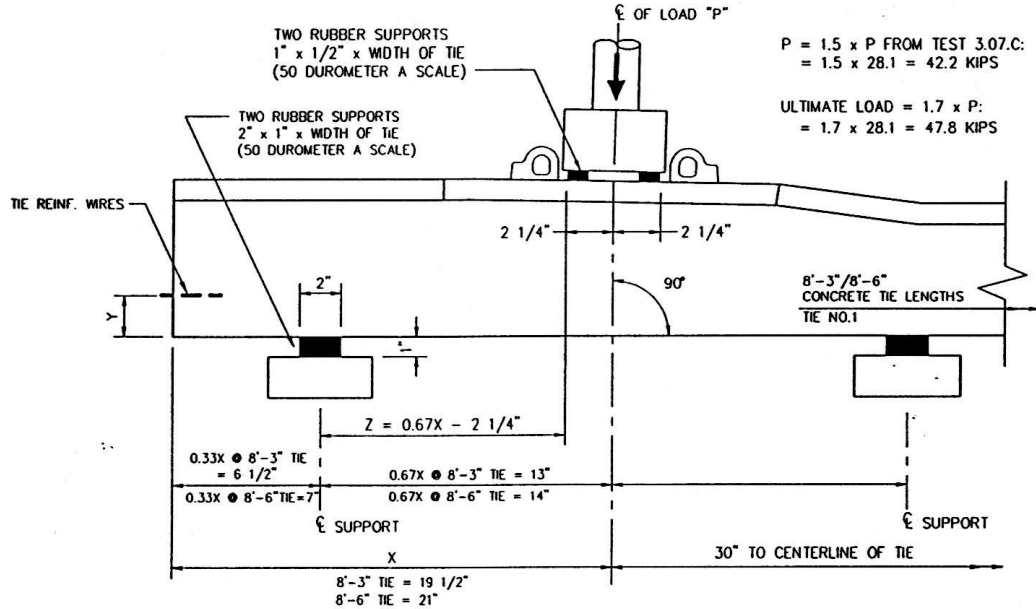
3.07.D.3 ACCEPTANCE CRITERIA

IF STRUCTURAL CRACKING HAS NOT OCCURRED WHEN VIEWED UNDER 5 POWER MAGNIFICATION, THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET. THE ILLUMINATION AT THE SURFACE DURING INSPECTION SHALL BE NOT LESS THAN 125 FOOT CANDLES.

FIGURE 2

3.07.E BOND DEVELOPMENT AND ULTIMATE LOAD TEST

3.07.E.1 THE CONCRETE TIE SHALL BE SUPPORTED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH LOADING POINTS SO ARRANGED THAT THE LOAD IS APPLIED AT RIGHT ANGLES TO THE BASE OF THE TIE MIDWAY BETWEEN THE SUPPORTING PADS. (THE "Y" DIMENSION REPRESENTS THE DISTANCE FROM BOTTOM OF TIE TO BOTTOM ROW OF PRESTRESSING WIRES.)



3.07.E.2 BOND DEVELOPMENT TEST

A TEST LOAD OF 42.2 KIPS SHALL BE APPLIED AT A RATE NOT EXCEEDING 5 KIPS PER MINUTE. THE LOAD SHALL BE HELD FOR 3 MINUTES DURING WHICH TIME THE TWO INSPECTION MEASUREMENTS SHALL BE MADE TO DETERMINE IF STRAND SLIPPAGE OCCURS. MEASUREMENTS SHALL BE MADE ON THE OUTERMOST TENDONS OF THE LOWER LAYER USING AN EXTENSOMETER READING TO 0.0001 OF AN INCH.

3.07.E.3 ACCEPTANCE CRITERIA

IF THERE IS NO MORE THAN 0.00001 INCH TENDON SLIPPAGE THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET.

3.07.E.4 ULTIMATE LOAD TEST

CONTINUING FROM THE ABOVE TEST THE LOAD SHALL BE INCREASED UNTIL ULTIMATE FAILURE OCCURS AND THE MAXIMUM LOAD OBTAINED AT ULTIMATE FAILURE SHALL BE RECORDED.

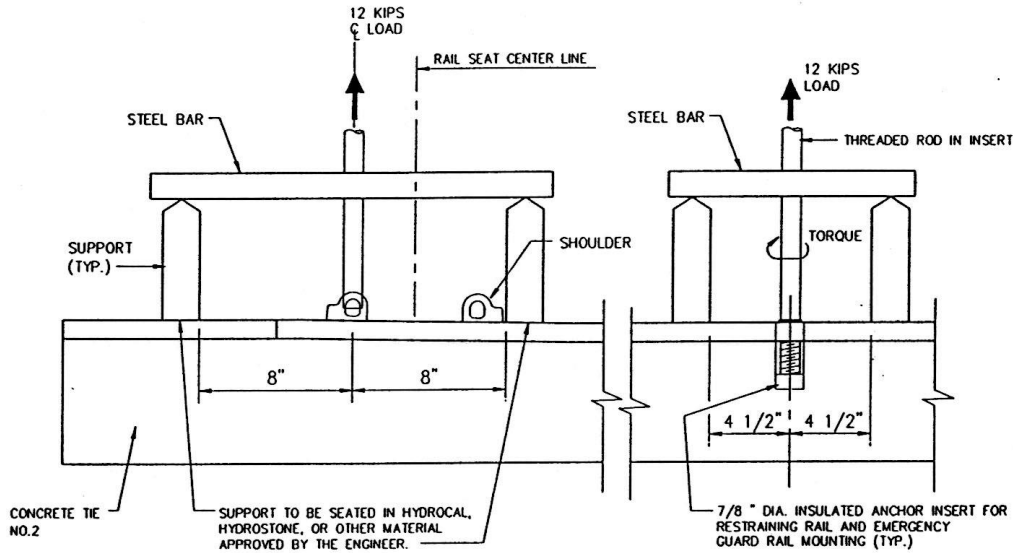
3.07.E.5 ACCEPTANCE CRITERIA

THE MAXIMUM LOAD AT ULTIMATE FAILURE SHALL EXCEED 47.8 KIPS.

FIGURE 3

3.07.G RAIL FASTENING SHOULDER & INSERT PULLOUT & TORQUE TESTS

3.07.G.1 THE CONCRETE TIE SHALL BE SUPPORTED ON A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH LOADING POINTS SO ARRANGED THAT THE LOAD IS APPLIED AT RIGHT ANGLES TO THE RAIL SEAT OF THE TIE. THE TEST SHALL BE APPLIED TO EACH ANGLES INSERT AND SHOULDER SEPARATELY.



3.07.G.2 PULL OUT TEST

A VERTICAL TEST LOAD OF 12 KIPS SHALL BE APPLIED TO EACH SHOULDER AND INSERT AT A RATE NOT EXCEEDING 5 KIPS PER MINUTE. THE LOAD SHALL BE HELD FOR 3 MINUTES, DURING WHICH TIME THE INSPECTION SHALL BE MADE TO DETERMINE IF THE SHOULDER OR INSERT HAS MOVED OR DEFORMED.

3.07.G.3 TORQUE TEST

A TORQUE OF 250 FOOT POUNDS SHALL BE APPLIED TO EACH INSERT. THE LOAD SHALL BE HELD FOR 3 MINUTES DURING WHICH TIME THE INSPECTION SHALL BE MADE TO DETERMINE IF THE INSERT MOVED.

3.07.G.4 ACCEPTANCE CRITERIA

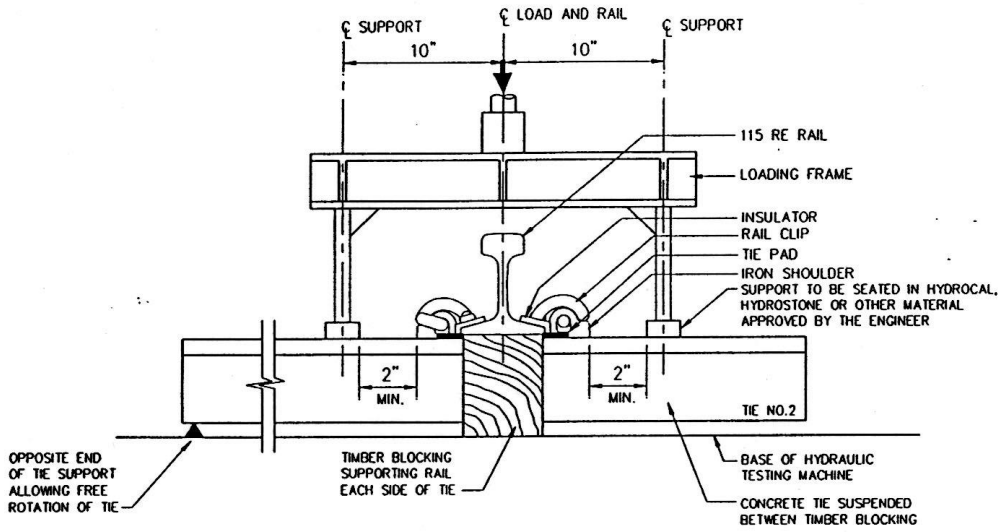
IF SLIPPAGE OF THE SHOULDER OR INSERT, OR ANY CRACKING OF THE CONCRETE, HAS NOT OCCURRED THE REQUIREMENT OF THE TESTS WILL HAVE BEEN MET. MORTAR CRACKING AND SEPARATION OF LAITANCE IN THE VICINITY OF THE INSERT WILL NOT BE CAUSE FOR REJECTION. INABILITY OF THE SHOULDERS OR INSERTS THEMSELVES TO RESIST BOTH THE 12 KIP VERTICAL LOAD AND THE 250 FT. LB. AXIAL TORQUE TESTS WITHOUT PERMANENT DEFORMATION SHALL CONSTITUTE FAILURE OF THE TEST.

117708
FIGURE 4

3.07.H RAIL FASTENING UPLIFT TEST

3.07.H.1 AN 19 INCH LONG SECTION OF 115 RE RAIL SHALL BE SECURED TO ONE RAILSEAT USING A COMPLETE RAIL FASTENING SYSTEM INCLUDING PADS, CLIPS, AND ASSOCIATED HARDWARE, AS RECOMMENDED BY THE MANUFACTURER OF THE RAIL FASTENING SYSTEM.

THE CONCRETE TIE WITH FASTENING SHALL BE SUSPENDED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH LOADING POINTS SO ARRANGED ON THE TIE THAT THE LOAD IS APPLIED AT RIGHT ANGLES TO THE BASE OF THE TIE MIDWAY BETWEEN THE LOAD APPLICATION PADS.



3.07.H.2 AN INCREMENTAL LOAD SHALL BE APPLIED TO THE TIE TO DETERMINE THE LOAD "P" (PLUS THE UNSUPPORTED CONCRETE TIE WEIGHT AND FRAME WEIGHT) AT WHICH SEPARATION OF THE RAIL FROM THE TIE PAD OR TIE PAD FROM THE CONCRETE TIE SEAT OCCURS. THIS LOAD "P" SHALL BE RECORDED. THE LOAD SHALL THEN BE COMPLETELY RELEASED.

3.07.H.3 AN UPLIFT TEST LOAD OF THE LESSER OF EITHER 1.5P OR 10 KIPS SHALL THEN BE APPLIED.

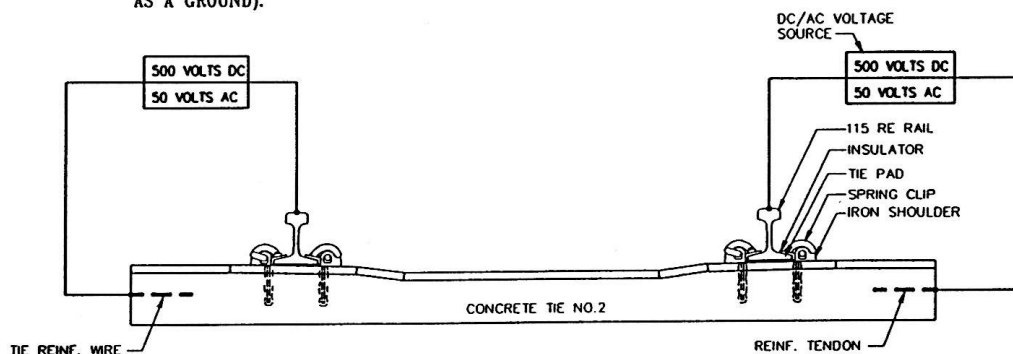
3.07.H.4 ACCEPTANCE CRITERIA

IF THE INSERTS DO NOT PULL OUT OR LOOSEN IN THE CONCRETE AND NO COMPONENT OF THE FASTENING SYSTEM FRACTURES AND THE RAIL IS NOT RELEASED, THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET.

FIGURE 5

3.07.1 ELECTRICAL RESISTANCE AND IMPEDANCE TEST

- 3.07.1.1 SECURE TWO SHORT PIECES OF 115 RE RAIL TO THE TIE USING COMPLETE CONCRETE TIE FASTENINGS. THE RAIL PIECES SHALL BE NO LONGER THAN THE WIDTH OF THE TIE. CLEAN CONTACT POINTS ON EACH RAIL AND ATTACH CABLES. CLEAN A CONTACT POINT ON A PRETENSIONED TENDON NEAR THE MIDDLE OF ONE END OF THE TIE AND ATTACH A CABLE (HEREINAFTER DESIGNATED AS A GROUND).



3.07.1.2 DRY DC RESISTANCE TEST

- APPLY 500 VOLTS DC FROM EACH RAIL TO GROUND WITH AN ACCURACY OF PLUS OR MINUS TWO PERCENT.

3.07.1.3 ACCEPTANCE CRITERIA

THE MINIMUM RESISTANCE FOR 500 VOLTS DC SHALL BE 10 MEGOHM (DRY).

3.07.1.4 PREPARATION FOR WET ELECTRICAL TEST

THE COMPLETE RAIL AND TIE FASTENINGS ASSEMBLY SHALL BE IMMERSSED IN WATER FOR A MINIMUM OF 6 HOURS AT ROOM TEMPERATURE.

3.07.1.5 WET DC RESISTANCE TEST

WITHIN ONE HOUR AFTER REMOVAL FROM THE WATER, WITHOUT DRYING, TEST THE ASSEMBLY FOR ELECTRICAL RESISTANCE. APPLY 500 VOLTS DC FROM EACH RAIL TO GROUND FOR THREE MINUTES EACH. MEASURE THE RESISTANCE FROM EACH RAIL TO GROUND WITH AN ACCURACY OF PLUS OR MINUS TWO PERCENT.

3.07.1.6 WET AC IMPEDANCE TEST

IMMEDIATELY AFTER REMOVAL FROM THE WATER AND WITHOUT DRYING, TEST THE ASSEMBLY FOR ELECTRICAL IMPEDANCE. APPLY A POTENTIAL OF 50 VOLTS AC FROM EACH RAIL TO GROUND FOR THREE MINUTES AT FREQUENCIES FROM 20 HERTZ TO 12 KILOHERTZ IN INCREMENTS OF 20 HERTZ UP TO 100 HERTZ, THEN IN INCREMENTS OF 200 HERTZ FROM 200 HERTZ TO 1,000 HERTZ AND IN INCREMENTS OF 2 KILOHERTZ FROM 2 KILOHERTZ UP TO 12 KILOHERTZ. THE IMPEDANCE AFTER THREE MINUTES SHALL BE MEASURED WITH AN ACCURACY OF PLUS OR MINUS TWO PERCENT AND RECORDED FOR EACH FREQUENCY.

3.07.1.7 ACCEPTANCE CRITERIA

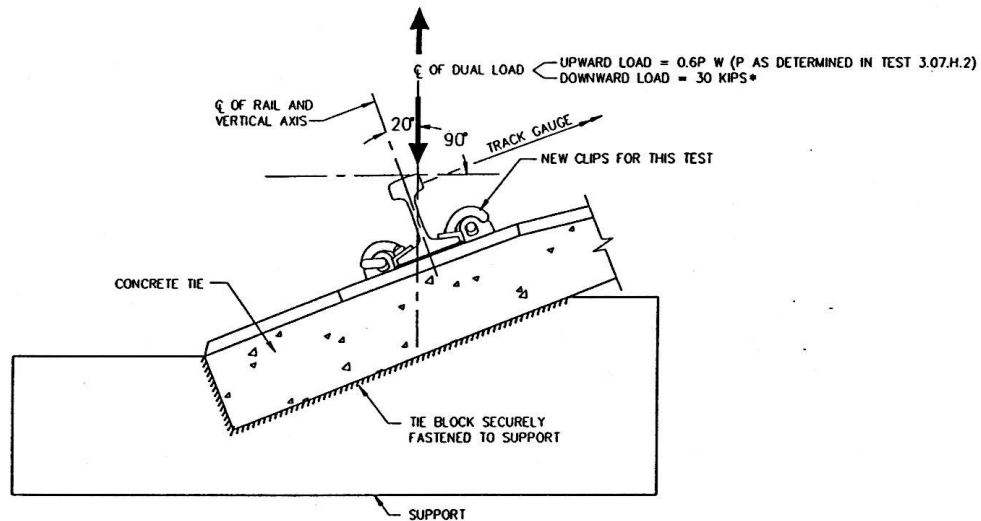
THE MINIMUM FOR 500 VOLTS DC SHALL BE 0.4 MEGOHM (WET). THE MINIMUM IMPEDANCE FOR ANY FREQUENCY BETWEEN 20 HERTZ AND 12 KILOHERTZ WITH 50 VOLTS AC APPLIED SHALL BE 10,000 OHMS.

FIGURE 6

3.08.F RAIL FASTENING REPEATED LOAD TEST

3.08.F.1 A CONCRETE TIE WITH A NEW COMPLETE FASTENING ASSEMBLY AND A 19 INCH SECTION OF NEW RAIL, WITH MILL SCALE REMOVED, SHALL BE INSTALLED AT THE RAIL SEAT.

THE CONCRETE TIE WITH FASTENING SHALL BE SUPPORTED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH UPWARD AND DOWNWARD LOADING SO ARRANGED THAT THE LOAD IS APPLIED AT AN ANGLE OF 20° TO THE VERTICAL AXIS OF THE RAIL.



3.08.F.2 A DUAL TEST LOAD OF 30° KIPS AND 0.6P SHALL BE APPLIED ALTERNATING DOWNWARD AND UPWARD RESPECTIVELY, AT A RATE NOT EXCEEDING 300 CYCLES PER MINUTE. THE RAIL SHALL BE FREE TO ROTATE UNDER THE APPLIED LOADS. ONE CYCLE SHALL CONSIST OF BOTH A DOWNWARD AND UPWARD LOAD. TEST SHALL CONSIST OF 3,000,000 CYCLES.

THIS REPEATED LOAD TEST MAY GENERATE HEAT IN ELASTOMERIC RAIL SEAT PADS. PAD TEMPERATURE SHALL NOT BE ALLOWED TO EXCEED 120° F. HEAT BUILD-UP SHALL BE CONTROLLED BY REDUCING THE RATE OF LOAD APPLICATION OR BY PROVIDING PERIODS OF REST TO ALLOW COOLING OF THE PAD TO TAKE PLACE.

3.08.F.3 ACCEPTANCE CRITERIA

IF RUPTURE FAILURE OF ANY COMPONENT OF THE FASTENING SYSTEM DOES NOT OCCUR, THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET.

- IF SPRINGS ARE USED TO GENERATE UPWARD LOAD THE DOWNWARD LOAD SHALL BE 30 KIPS PLUS 0.6P. IF A DOUBLE ACTING HYDRAULIC RAM IS USED TO GENERATE BOTH UPWARD AND DOWNWARD LOAD, USE LOADS AS SPECIFIED.

FIGURE 7

3.08.G RAIL FASTENING LONGITUDINAL RESTRAINT TEST

3.08.G.1 SUPPORT A SUCCESSFUL CONCRETE TIE WITH FASTENING ASSEMBLY FROM TEST 3.08.F - REPEATED LOAD TEST (WITHOUT DISTURBING THE RAIL FASTENING ASSEMBLY) IN A HYDRAULIC TESTING MACHINE AS SHOWN ON THE RIGHT, WITH TWO DIAL GAGES, AND LOADING POINT SO ARRANGED THAT THE LOAD IS APPLIED LONGITUDINAL TO THE BASE AND CENTERLINE AXIS OF THE RAIL.

3.08.G.2 THE TEST LOADING SHALL BE APPLIED IN INCREMENTS OF 400 POUNDS. LONGITUDINAL RAIL DISPLACEMENT READINGS SHALL BE RECORDED AT EACH INCREMENT. RECORDED READINGS TO 0.001 INCH SHALL BE THE AVERAGE OF THE TWO GAGES.

3.08.G.3 THE TEST LOAD SHALL BE INCREASED INCREMENTALLY TO A LOAD OF 2.4 KIPS AND HELD FOR NOT LESS THAN 15 MINUTES, UNLESS RAIL MOVEMENT EXCEEDS 0.125 INCHES AT A LESSER LOADING.

3.08.G.4 ACCEPTANCE CRITERIA

IF THE RAIL MOVEMENT IS LESS THAN 0.125 INCHES DURING THIS TEST PERIOD THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET. THE FASTENING ASSEMBLY SHALL MEET THE REQUIREMENTS OF THIS TEST WITH LOADING IN EITHER DIRECTION.

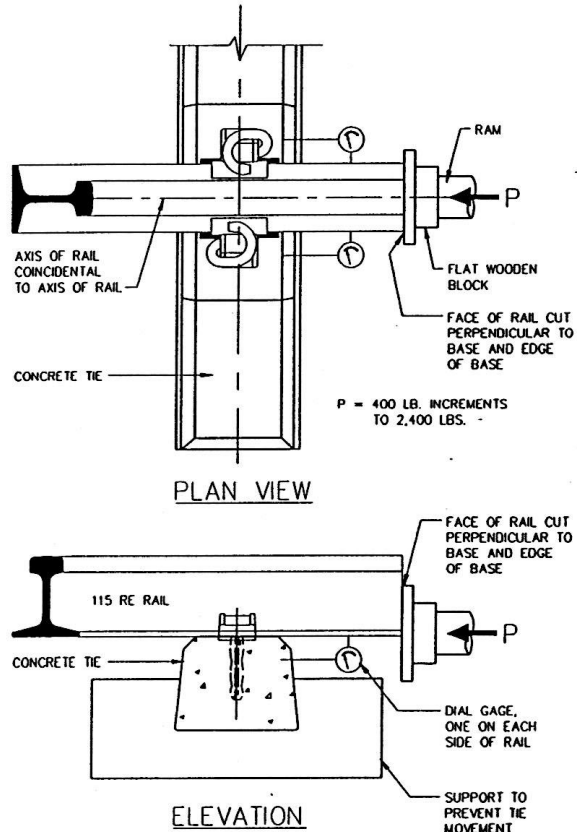
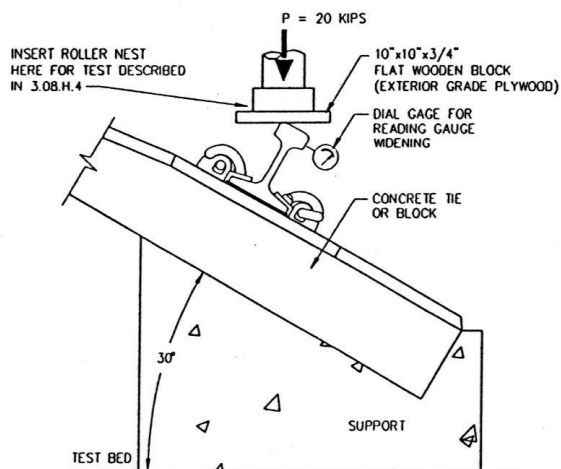


FIGURE 8

3.08.H RAIL FASTENING LATERAL RESTRAINT TEST

3.08.H.1 A CONCRETE TIE WITH A NEW COMPLETE FASTENING ASSEMBLY AND A 19 INCH SECTION OF NEW RAIL, WITH MILL SCALE REMOVED, SHALL BE INSTALLED AT THE RAIL SEAT.

THE CONCRETE TIE WITH FASTENING SHALL BE SUPPORTED IN A HYDRAULIC TESTING MACHINE AS SHOWN BELOW WITH THE LOADING HEAD FIXED AGAINST TRANSLATION AND ROTATION.



3.08.H.2 RESTRAINED LATERAL LOAD TEST

A PRELOAD OF 10 KIPS SHALL BE APPLIED TO THE RAIL TO SEAT THE RAIL IN THE FASTENING. UPON RELEASE OF THE PRELOAD, A ZERO READING SHALL BE TAKEN ON THE DIAL GAGE INDICATORS THAT MEASURE RAIL TRANSLATION. LOAD SHALL BE APPLIED AT A RATE NOT TO EXCEED 5 KIPS PER MINUTE UNTIL EITHER 20 KIPS HAVE BEEN APPLIED OR THE RAIL BASE HAS TRANSLATED 1/8 INCH, WHICHEVER OCCURS FIRST.

3.08.H.3 ACCEPTANCE CRITERIA, RESTRAINED LATERAL LOAD TEST

IF THE FASTENING SYSTEM AND THE TIE SUPPORTS THE 20 KIP LOAD WITH 1/8 INCH OR LESS OF RAIL TRANSLATION THE REQUIREMENT OF THE TEST WILL HAVE BEEN MET. FAILURE OF ANY COMPONENT OF THE FASTENING SYSTEM OR TIE SHALL CONSTITUTE FAILURE OF THE TEST.

3.08.H.4 UNRESTRAINED LATERAL LOAD TEST

WITH ALL LOAD REMOVED FROM THE RAIL, A ROLLER NEST SHALL BE PLACED BETWEEN THE FIXED LOADING HEAD AND THE WOOD BLOCK ON THE RAIL HEAD. THE ROLLER NEST SHALL NOT OFFER RESISTANCE TO LATERAL MOVEMENT OF THE RAIL HEAD. AFTER TAKING ZERO READINGS ON THE DIAL GAGE INDICATORS, THAT MEASURE GAUGE WIDENING AND RAIL TRANSLATION, A LOAD OF 10 KIPS SHALL BE APPLIED AT A RATE NOT TO EXCEED 5 KIPS PER MINUTE.

3.08.H.5 ACCEPTANCE CRITERIA, UNRESTRAINED LATERAL LOAD TEST

RAIL ROTATION, DEFINED AS GAUGE WIDENING LESS RAIL TRANSLATION, GREATER THAN 1/4 INCH SHALL CONSTITUTE FAILURE OF THIS TEST.

FIGURE 9

END OF SECTION 34 11 31

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 34 11 93

MISCELLANEOUS TRACKWORK ELEMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes requirements for furnishing all other miscellaneous trackwork elements.
- B. Miscellaneous trackwork elements include, but not limited to, the following items:
 - 1. Track inspection tools.

1.02 REFERENCES

- A. Association of American Railroads (AAR).
- B. American Railway Engineering and Maintenance-of-Way Association (AREMA):
 - 1. Manual of Railway Engineering (AREMA Manual).

1.03 SUBMITTALS

- A. Submit:
 - 1. Submit catalog cuts and detailed descriptions for the following track inspection tools: Rail thermometer, 36-inch (915 mm) straightedge, taper gauge, combination track level and gauge, torque wrench, multiplier and square nut sockets. Sales brochures that do not provide technical details are not acceptable.
 - 2. Provide additional submittals as required herein.

1.04 MEASUREMENT AND PAYMENT

- A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection therewith are incidental to the item of work to which they pertain and no separate payment will be made therefor.

PART 2 PRODUCTS

2.01 TRACK INSPECTION TOOLS

- A. Inspection tools shall be furnished by Contractor for use by VTA inspection and quality assurance personnel, and shall be delivered to VTA within 30 days following approval of required submittals. Inspection tools shall be as specified by the recommended practices of the AREMA Manual of Railway Engineering as appropriate, or general construction industry standards. Contractor may request and obtain information on tools presently used for inspecting trackwork construction. Inspection tools shall be provided by Contractor at their sole cost and shall be provided to VTA as a condition of final acceptance and part of the work specified herein.
 - 1. Three rail thermometers shall be railroad industry standard with magnetic back, enclosed face, temperature range of approximately -18°C to 71°C, and of durable construction. Glass thermometer core is not acceptable.

**Hamilton Station Stabilization
C20046F**

2. Three 36-inch straightedges for inspection of rails, special trackwork and rail welds; 7/32 inch x 2-3/8 inch x 36 inch, machinist quality, with or without dimensional scales.
3. Three steel taper gauges, capable of reading in decimal units, inches and millimeters (0 inch to 5/32 inch), of machinist quality.
4. Two 2-piece combination track level and track gauge shall be railroad industry standard for track gauge 56-1/2 inch (1435 mm), and shall be capable of reading to accuracy of not less than +/- 1/16 inch (1.5 mm) for each function. Integral capabilities shall be provided for reading flangeway width at restraining rails, guard rails, and track frogs. Track level component shall provide range of +/- 150 mm of track cross-level provided by shock-proof spirit level. Rigid carrying case, care and use instructions, repair parts list and factory authorized source for repair and parts shall be provided for each level-gauge.
5. Two heavy-duty torque wrenches shall include torque wrench with or without multiplier, capable of reading 0 kN·m to not less than 3.8 kN·m. Torque wrench and multiplier shall use the same size square drive. Three square drive sockets of the same size as torque multiplier shall be provided for square nuts of sizes 1-1/4 inch (6-point), 1-1/2 inch (8-point), and 2 inch (8-point) Single carrying case for torque wrench, multiplier, and at least 3 sockets noted above shall be provided.

END OF SECTION 34 11 93

**Hamilton Station Stabilization
C20046F**

THIS PAGE LEFT BLANK

SECTION 9 CONTRACT DRAWINGS / PLANS

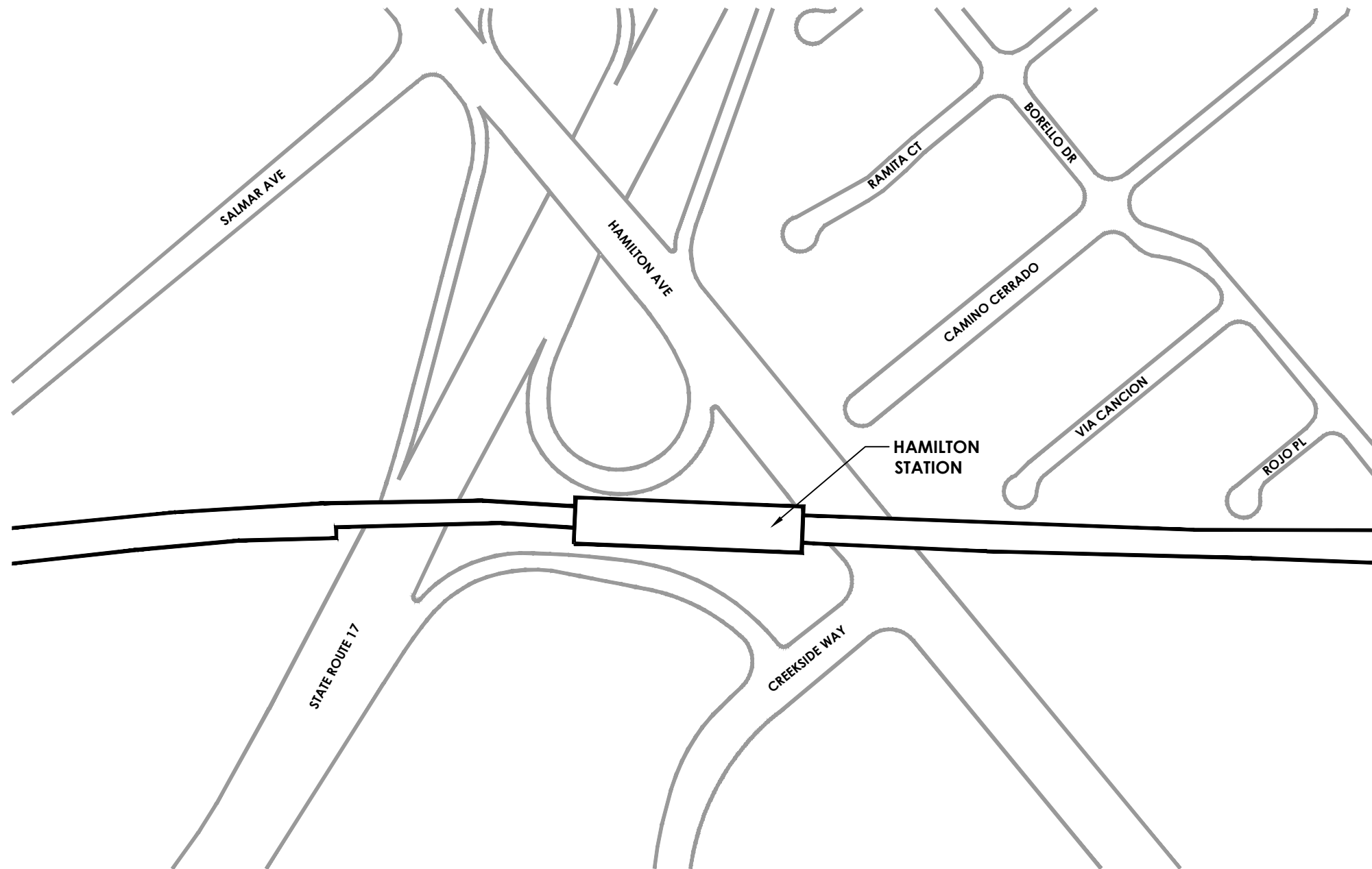
The Contract Drawings/Plans are provided in the following pages.

Hamilton Station Stabilization
Contract C20046F

[This Page Intentionally Left Blank]

HAMILTON STATION STABILIZATION PROJECT

CONTRACT NO. C20046F



DRAWING INDEX

G001	DRAWING INDEX
G002	ABBREVIATIONS SYMBOLS AND LEGEND CIVIL AND TRACK
V101	SURVEY CONTROL PLAN
T101	TRACK PLAN AND PROFILE
CS101	CONSTRUCTION STAGING
SP101	EXISTING CONDITION/DEMOLITION PLAN SHEET 1 OF 2
SP102	EXISTING CONDITION/DEMOLITION PLAN SHEET 2 OF 2
SP103	PLATFORM PLAN SHEET 1 OF 2
SP104	PLATFORM PLAN SHEET 2 OF 2
SR101	EXISTING STATION PLATFORM SECTIONS
SR102	EXISTING STATION PLATFORM SECTIONS AND DETAILS
SR103	STATION PLATFORM SECTIONS AND DETAILS - SHEET 1 OF 3
SR104	STATION PLATFORM SECTIONS AND DETAILS - SHEET 2 OF 3
SR105	STATION PLATFORM SECTIONS AND DETAILS - SHEET 3 OF 3
SW101	RETAINING WALL GENERAL PLAN NO. 1
SW102	RETAINING WALL GENERAL PLAN NO. 2
SW103	RETAINING WALL DETAILS

ISSUED FOR BID

PROJECT ADMINISTERED BY:



PREPARED BY:



DATE: OCTOBER 6, 2020



DRAWING INDEX

SHT. NO.	DWG NO.	TITLE	SHT. NO.	DWG NO.	TITLE	SHT. NO.	DWG NO.	TITLE	SHT. NO.	DWG NO.	TITLE
INDEX											
1	G000	COVER									
2	G001	DRAWING INDEX									
3	G002	ABBREVIATIONS, SYMBOLS AND LEGEND CIVIL AND TRACK									
4	V101	SURVEY CONTROL PLAN									
5	T101	TRACK PLAN AND PROFILE									
6	CS101	CONSTRUCTION STAGING									
7	SP101	EXISTING CONDITION/DEMOLITION PLAN SHEET 1 OF 2									
8	SP102	EXISTING CONDITION/DEMOLITION PLAN SHEET 2 OF 2									
9	SP103	PLATFORM PLAN SHEET 1 OF 2									
10	SP104	PLATFORM PLAN SHEET 2 OF 2									
11	SR101	EXISTING STATION PLATFORM SECTIONS									
12	SR102	EXISTING STATION PLATFORM SECTIONS AND DETAILS									
13	SR103	STATION PLATFORM SECTIONS AND DETAILS – SHEET 1 OF 3									
14	SR104	STATION PLATFORM SECTIONS AND DETAILS – SHEET 2 OF 3									
15	SR105	STATION PLATFORM SECTIONS AND DETAILS – SHEET 3 OF 3									
16	SW101	RETAINING WALL GENERAL PLAN NO.1									
17	SW102	RETAINING WALL GENERAL PLAN NO.2									
18	SW103	RETAINING WALL DETAILS									

c:\cheuk Sep 30, 2020 4:27pm H:\Projects\VT160821\04-CAD\Sheets\G001.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
SUBMITTED DESIGNED J. CHUNG DRAWN K. WONG	CHECKED P. LEONG CADD FILE NAME G001






RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
APPROVED CADD FILE DATE 10/06/20 SUBMITTAL DATE 10/06/20	SCALE NONE BOARD APPROVAL DATE

HAMILTON STATION STABILIZATION PROJECT		
DRAWING INDEX		
PCA NO.	CONTRACT NO. C20046F	FILE LOCATION

SHEET OF 2 DRAWING NO. G001 REVISION 0


ABBREVIATIONS, SYMBOLS AND LEGEND

<p>& AND</p> <p>Δ_c CENTRAL ANGLE OF CIRCULAR CURVE</p> <p>Δ_s CENTRAL ANGLE OF SPIRAL</p> <p>ϵ CENTERLINE</p> <p>AB AGGREGATE BASE</p> <p>AC ASPHALT CONCRETE</p> <p>APPROX APPROXIMATELY</p> <p>AVE AVENUE</p> <p>BEG BEGIN</p> <p>BJ BOLTED JOINT</p> <p>BVC BEGIN VERTICAL CURVE</p> <p>C&G CURB AND GUTTER</p> <p>CL CLEAR</p> <p>CONC CONCRETE</p> <p>CS CURVE TO SPIRAL</p> <p>CT COURT</p> <p>D_c DEGREE OF CURVATURE</p> <p>DR DRIVE</p> <p>DWG DRAWING</p> <p>(E) EXISTING</p> <p>EB EASTBOUND</p> <p>EG EXISTING GROUND</p> <p>EL ELEVATION</p> <p>EQ EQUAL</p> <p>EXP EXPANSION</p> <p>EVC END VERTICAL CURVE</p> <p>FDN FOUNDATION</p> <p>FG FINAL GROUND</p> <p>FOC FACE OF CURB</p> <p>GALV GALVANIZED</p> <p>GRND GROUND</p> <p>H HORIZONTAL</p> <p>HG HALF GRAND</p> <p>HGU HALF GRAND UNION</p> <p>JF JOINT FILLER</p> <p>JT JOINT</p> <p>L_c LENGTH OF CIRCULAR CURVE</p> <p>LF LINEAR-FOOT</p> <p>LH LEFT-HAND</p> <p>LRT LIGHT RAIL TRANSIT</p> <p>LRV LIGHT RAIL VEHICLE</p> <p>L_s LENGTH OF SPIRAL</p> <p>LVC LENGTH OF VERTICAL CURVE</p> <p>MAX MAXIMUM</p> <p>MH MANHOLE</p> <p>MIN MINIMUM</p> <p>ML MAINLINE</p> <p>MO MIDDLE ORDINATE</p> <p>MSE MECHANICALLY STABILIZED EARTH</p> <p>MTL METAL</p> <p>(N) NEW</p> <p>NB NORTHBOUND</p>	<p>NO NUMBER</p> <p>NTS NOT TO SCALE</p> <p>OC ON CENTER</p> <p>OCS OVERHEAD CONTACT SYSTEM</p> <p>OTM OTHER TRACK MATERIALS</p> <p>PC POINT OF CURVE</p> <p>PI POINT OF INTERSECTION</p> <p>PITO POINT OF INTERSECTION OF TURNOUT</p> <p>PIVC POINT OF INTERSECTION OF TWO PROFILE TANGENTS</p> <p>PL PLACE</p> <p>PS POINT OF SWITCH</p> <p>PT POINT OF TANGENT</p> <p>R_c RADIUS OF CIRCULAR CURVE</p> <p>REINF REINFORCEMENT</p> <p>RH RIGHT-HAND</p> <p>ROW RIGHT-OF-WAY</p> <p>SB SOUTHBOUND</p> <p>SC SPIRAL TO CURVE</p> <p>SCCTA SANTA CLARA COUNTY TRANSPORTATION AGENCY (VTA)</p> <p>SS SPIRAL TO SPIRAL</p> <p>SSMH SANITARY SEWER MANHOLE</p> <p>SST SPIRAL TO SPIRAL TO TANGENT</p> <p>ST SPIRAL TO TANGENT</p> <p>STA STATION</p> <p>TCL TRACK CENTERLINE</p> <p>TF TRACK-FOOT</p> <p>TO TURNOUT</p> <p>TOR TOP OF RAIL</p> <p>TS TANGENT TO SPIRAL</p> <p>TYP TYPICAL</p> <p>UPRR UNION PACIFIC RAILROAD</p> <p>V VERTICAL</p> <p>VC VERTICAL CURVE</p> <p>VTA SANTA CLARA VALLEY TRANSPORTATION AUTHORITY</p> <p>VTA-C VTA COMMUNICATIONS PULLBOX</p> <p>W/ WITH</p> <p>WB WESTBOUND</p> <p>WJ WELDED JOINT</p>	<p>ENLARGED AREA</p>  <p>DETAIL</p>  <p>SECTION</p> 	<p>==== (E) TRACK</p> <p>==== (N) TRACK</p> <p>----- (E) TRACK CENTERLINE</p> <p>----- (N) TRACK CENTERLINE</p> <p>◆ WELDED JOINT</p> <p>⊕ BOLTED JOINT</p> <p> INSULATED RAIL JOINT</p> <p>/// /// (E) ABANDONED LINE</p> <p>---CS--- (E) COMBINED SYSTEM DUCT</p> <p>---FO--- (E) FIBER OPTIC CABLE</p> <p>---G--- (E) GAS LINE</p> <p>---IR--- (E) IRRIGATION LINE</p> <p>---JT--- (E) JOINT TRENCH</p> <p>---SS--- (E) SANITARY SEWER LINE</p> <p>---SD--- (E) STORM DRAIN LINE</p> <p>---SL--- (E) STREET LIGHTING</p> <p>---T--- (E) TELEPHONE LINE</p> <p>---TS--- (E) TRAFFIC SIGNAL CABLE</p> <p>---U--- (E) UNDERDRAIN</p> <p>---E--- (E) UNDERGROUND ELECTRICAL LINE</p> <p>---UNK--- (E) UNKNOWN UTILITY</p> <p>---SIG--- (E) VTA SIGNAL CONDUIT</p> <p>---W--- (E) WATER LINE</p> <p>====CS==== (N) COMBINED SYSTEM DUCT</p> <p>====FO==== (N) FIBER OPTIC CABLE</p> <p>====G==== (N) GAS LINE</p> <p>====IR==== (N) IRRIGATION LINE</p> <p>====JT==== (N) JOINT TRENCH</p> <p>====SS==== (N) SANITARY SEWER LINE</p> <p>====SD==== (N) STORM DRAIN LINE</p> <p>====SL==== (N) STREET LIGHTING</p> <p>====T==== (N) TELEPHONE LINE</p> <p>====TS==== (N) TRAFFIC SIGNAL CABLE</p> <p>====U==== (N) UNDERDRAIN</p> <p>====E==== (N) UNDERGROUND ELECTRICAL LINE</p> <p>====SIG==== (N) VTA SIGNAL CONDUIT</p> <p>====W==== (N) WATER LINE</p>
--	---	--	--


c:\cheuk Sep 30, 2020 4:27pm H:\Projects\VT160021\04-CAD\Sheets\G002.dwg

0	100620	ISSUED FOR BID
NO.	DATE	REVISIONS



 <p>RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM</p>	
SUBMITTED DESIGNED J. CHUNG DRAWN K. WONG	CHECKED P. LEONG CADD FILE NAME G002

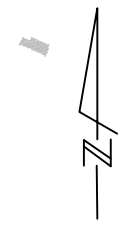
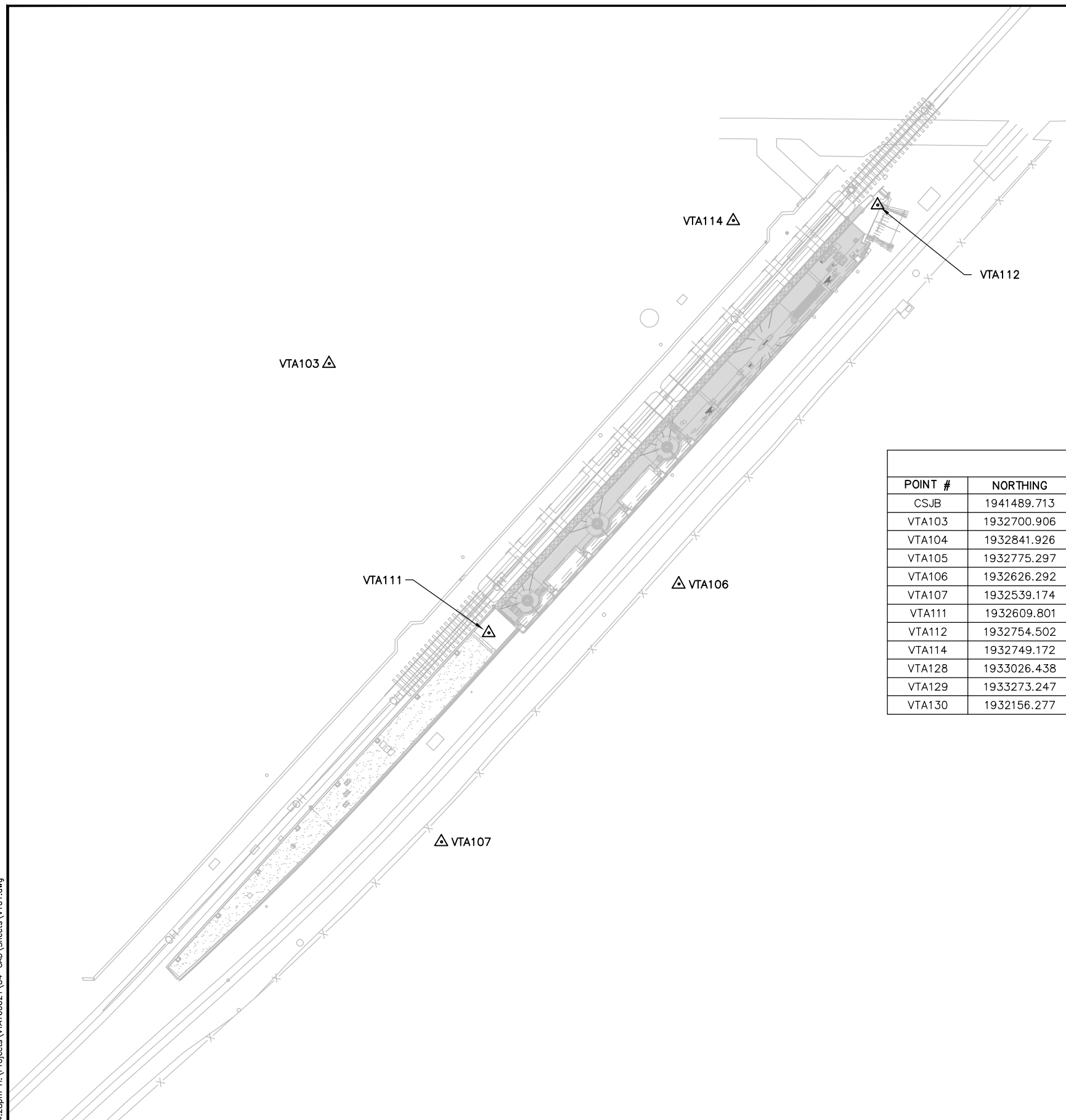


 <p>RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM</p>	
APPROVED CADD FILE DATE 10/06/20 SUBMITTAL DATE 10/06/20	SCALE NONE BOARD APPROVAL DATE

HAMILTON STATION STABILIZATION PROJECT			SHEET 3 OF 18
ABBREVIATIONS, SYMBOLS AND LEGEND CIVIL AND TRACK			DRAWING NO. G002 REVISION 0
PCA NO.	CONTRACT NO. C20046F	FILE LOCATION	

LEGEND:

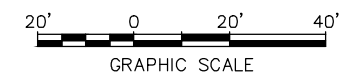
△ PROJECT CONTROL POINT



PROJECT CONTROL POINTS				
POINT #	NORTHING	EASTING	HEIGHT	DESCRIPTION
CSJB	1941489.713	6166245.591	65.610	LEICA SmartNet REF STA. "CSJB"; SAN JOSE, CA
VTA103	1932700.906	6143731.790	78.717	REBAR AND CAP SET EASTERLY NORTHBOUND HWY 17 ON-RAMP NORTHWESTERLY VTA OVERPASS
VTA104	1932841.926	6143712.873	81.484	SCRIBED 'X' MEDIAN HAMILTON 250' EASTERLY VTA OVERPASS
VTA105	1932775.297	6143997.696	77.473	SCRIBED 'X' TOP OF CURB @ BACK OF SIDEWALK NORTHERLY PED. BRIDGE ELEVATOR
VTA106	1932626.292	6143849.977	76.753	REBAR AND CAP SOUTHEASTERLY UPRR TRACK 140' SOUTHWESTERLY PED. BRIDGE
VTA107	1932539.174	6143769.718	77.548	REBAR AND CAP SOUTHEASTERLY UPRR TRACK 260' SOUTHWESTERLY PED. BRIDGE
VTA111	1932609.801	6143785.755	98.351	SCRIBED 'X' HAMILTON STA. PLATFORM SOUTHWESTERLY PASSENGER SHELTER
VTA112	1932754.502	6143917.229	102.215	SCRIBED 'X' NORTHEAST END HAMILTON STA. PLATFORM
VTA114	1932749.172	6143868.412	75.438	SCRIBED 'X' BETWEEN POWER POLE & VTA OVERPASS SOUTHERLY SIDEWALK HAMILTON
VTA128	1933026.438	6144163.469	74.942	REBAR AND CAP BETWEEN VTA OVERPASS & UPRR TRACK NORTHEASTERLY HAMILTON
VTA129	1933273.247	6144402.089	72.739	REBAR AND CAP BETWEEN VTA & UPRR TRACKS @ NORTHEAST END GRADE SEP
VTA130	1932156.277	6143385.891	83.431	REBAR AND CAP BETWEEN VTA & UPRR TRACKS @ SOUTHWEST END GRADE SEP

BASIS OF COORDINATES:

ALL COORDINATES LISTED HEREON ARE BASED UPON THE NORTH AMERICAN DATUM OF 1983 (NAD83 2011) EPOCH 2014.25 AND ARE LISTED IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM ZONE 3, US SURVEY FEET, REFERENCING SMARTNET NORTH AMERICA STATION CSJB. ALL ELEVATIONS LISTED ARE ELLIPSOIDAL HEIGHTS BASED UPON THE GEODETIC REFERENCE SYSTEM OF 1980 (GRS80) AND ARE LISTED IN FEET.



Sep 30, 2020 4:28pm H:\Projects\VTA160621\04-CAD\Sheets\V101.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

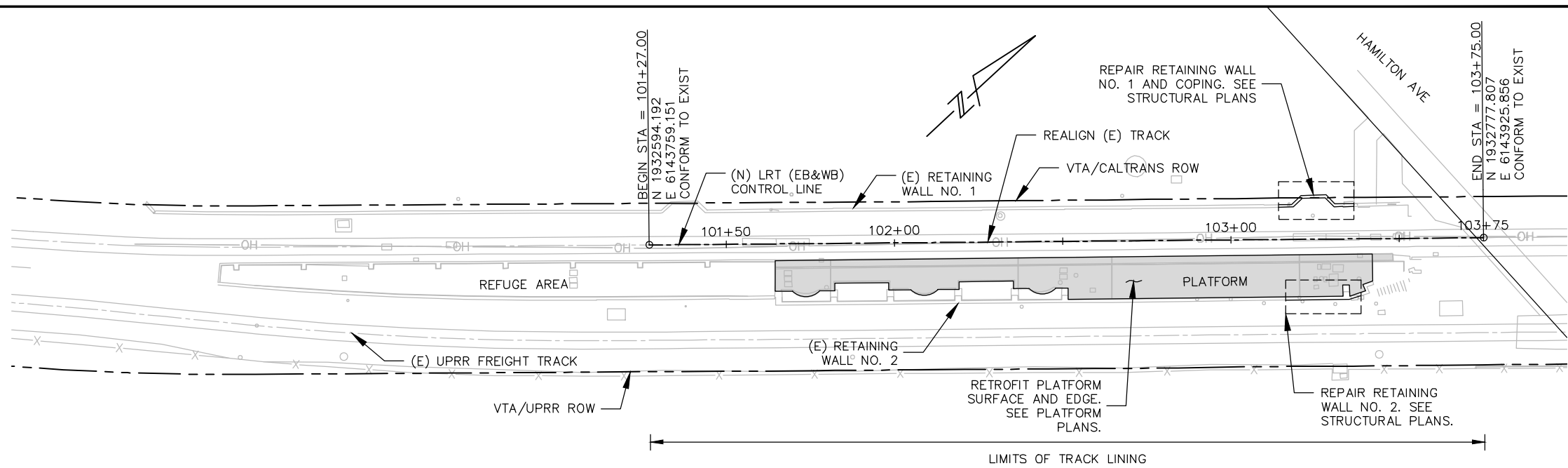


SUBMITTED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	C. FESTA	CHECKED	J. CHUNG
DRAWN	K. WONG	CADD FILE NAME	V101

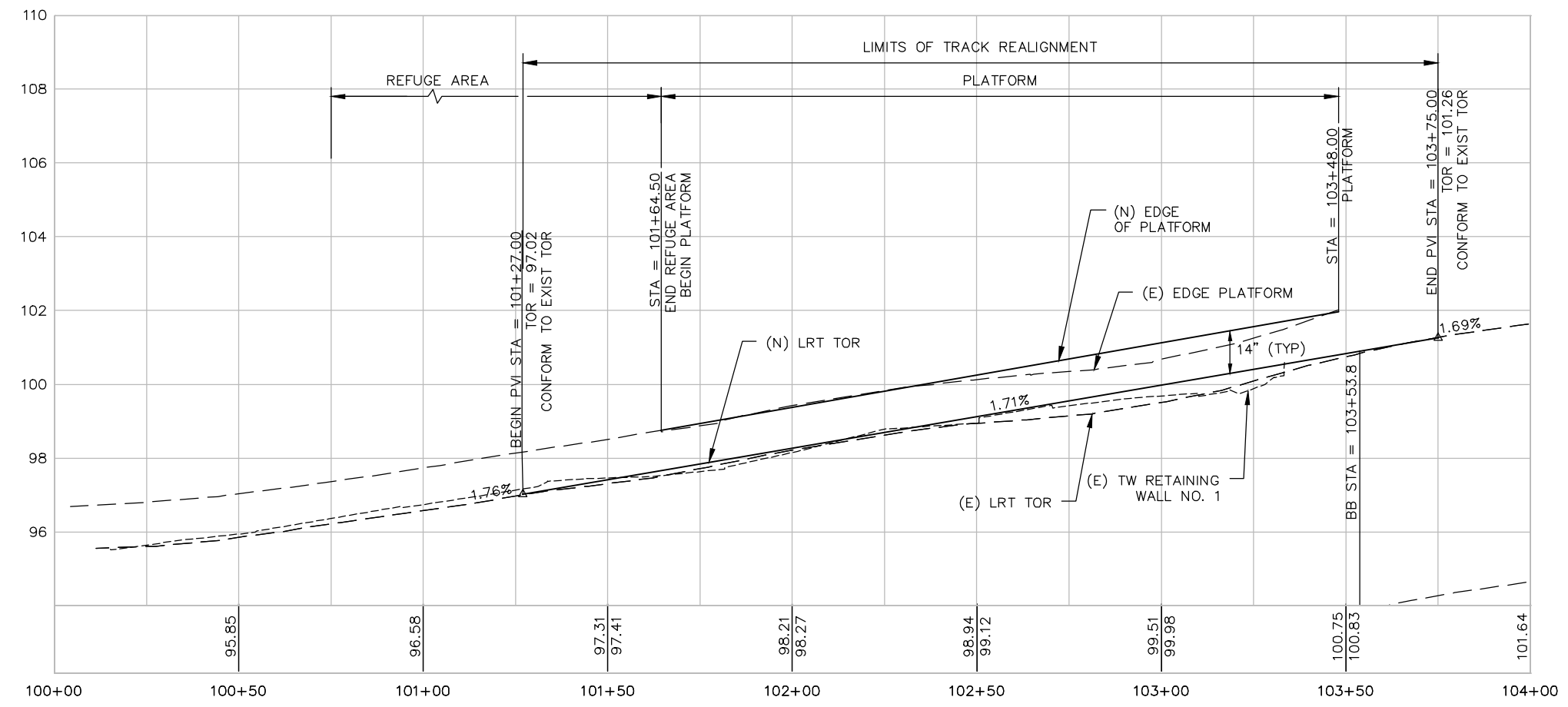


APPROVED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	10/06/20	SCALE	1"=20'
SUBMITTAL DATE	10/06/20	BOARD APPROVAL DATE	

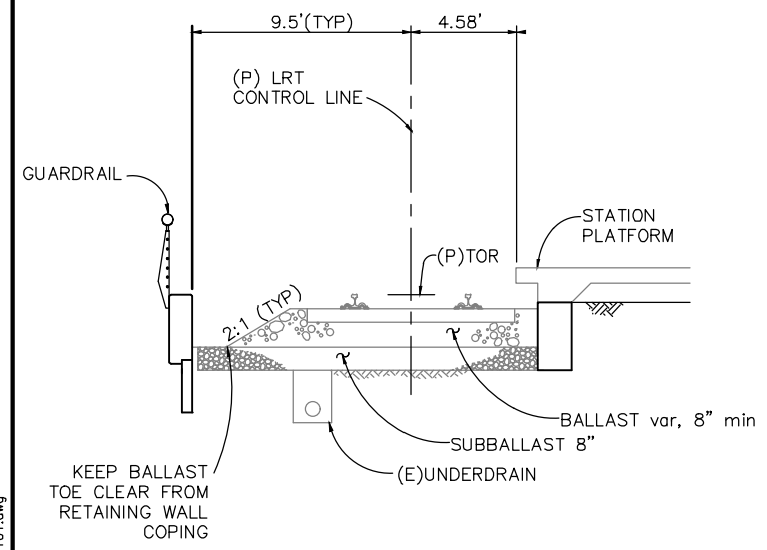
HAMILTON STATION STABILIZATION PROJECT			SHEET	4
			OF	18
SURVEY CONTROL PLAN			DRAWING NO.	V101
			REVISION	0
PCA NO.	CONTRACT NO.	FILE LOCATION		
	C20046F			



PLAN
SCALE: 1"=20'



PROFILE
SCALE: H: 1"=20' V: 1"=2'



TYPICAL SECTION
SCALE: NTS

Sep 30, 2020 4:30pm H:\Projects\160821\04-CAD\Sheets\T101.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



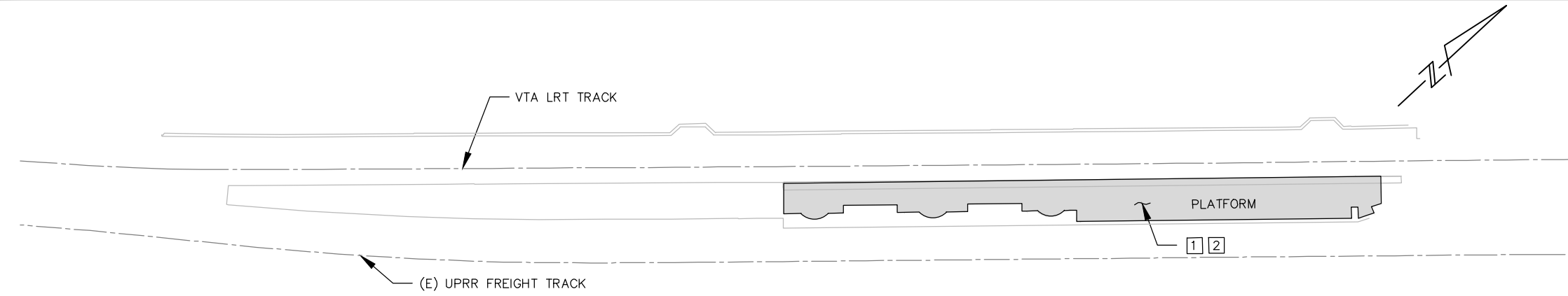
SUBMITTED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	J. CHUNG	CHECKED	P. LEONG
DRAWN	K. WONG	CADD FILE NAME	T101



APPROVED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	10/06/20	SCALE	AS SHOWN
SUBMITTAL DATE	10/06/20	BOARD APPROVAL DATE	

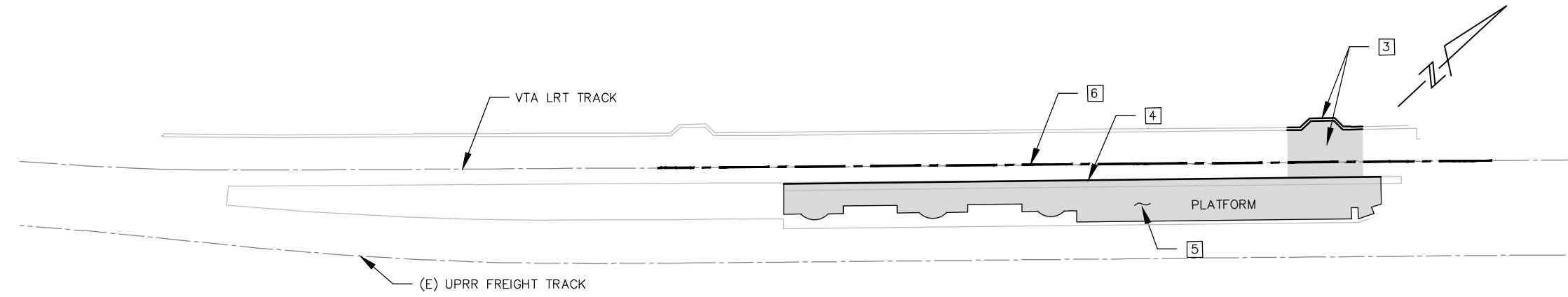
HAMILTON STATION STABILIZATION PROJECT		
SHEET 5 OF 18		
TRACK PLAN AND PROFILE		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	

DRAWING NO.	T101
REVISION	0



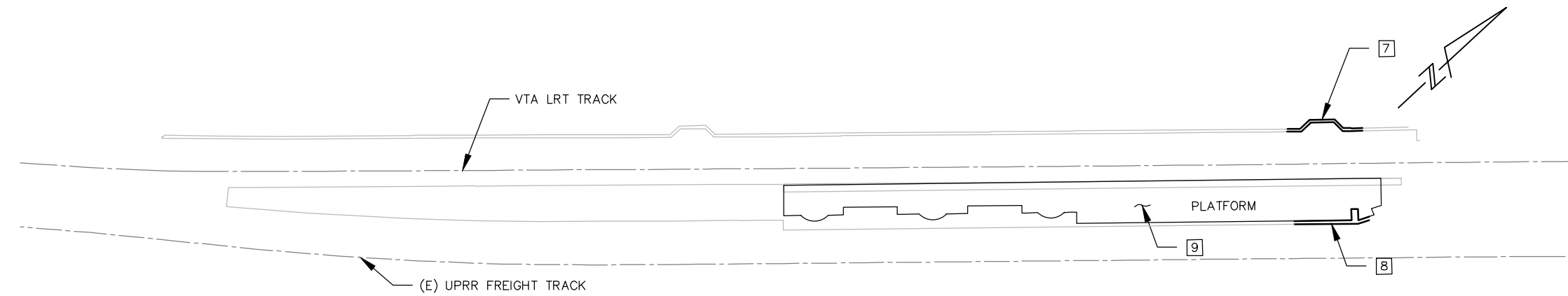
STAGE 1:
OPERATION:
 •STATION TO BE CLOSED
 •TRAINS TO RUN THROUGH STATION
CONSTRUCTION:
 1. DISASSEMBLE AND REMOVE STATION FACILITIES TO BE RECONSTRUCTED.
 2. REMOVE PLATFORM ARCHITECTURE CONCRETE TOPPING SLAB.

STAGE 1



STAGE 2:
OPERATION:
 •STATION TO REMAIN CLOSED
 •TRAINS NOT IN OPERATION
CONSTRUCTION:
 3. CONSTRUCT WALERS AND TIEBACK ASSEMBLY.
 4. REMOVE PLATFORM EDGE CONCRETE.
 5. CONSTRUCT PLATFORM CONCRETE & ADJUST STATION FACILITIES TO FINISHED GRADE.
 6. REALIGN TRACK.

STAGE 2



STAGE 3:
OPERATION:
 •STATION TO REMAIN CLOSED
 •TRAINS TO RUN THROUGH STATION
CONSTRUCTION:
 7. REALIGN RETAINING WALL NO. 1 PANELS AND REPAIR SPALL.
 8. GROUT RETAINING WALL NO. 2 PANELS AND REPAIR SPALL.
 9. RECONSTRUCT STATION FACILITIES.

STAGE 3

c:\cheuk Sep 30, 2020 4:31pm H:\Projects\VT160821\04-CAD\Sheets\CS101.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



SUBMITTED	
	RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM
DESIGNED	CHECKED
J. CHUNG	P. LEONG
DRAWN	CADD FILE NAME
K. WONG	CS101

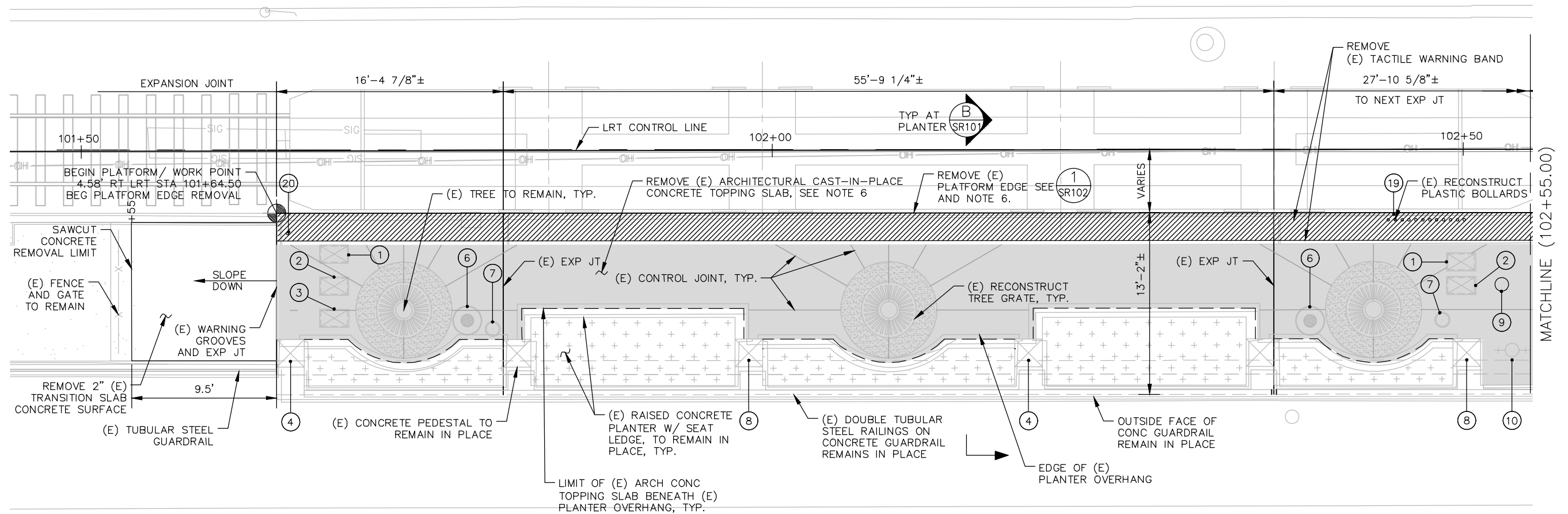


APPROVED	
	RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM
CADD FILE DATE	SCALE
10/06/20	1" = 20'
SUBMITAL DATE	BOARD APPROVAL DATE
10/06/20	

HAMILTON STATION STABILIZATION PROJECT		
CONSTRUCTION STAGING		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	
SHEET OF	6 OF 18	DRAWING NO. CS101
REVISION	0	

SCHEDULE			
MARK	EXISTING ITEM	DISPOSITION	QUANTITY
1	ELECTRICAL BOX	ADJUST TO FG	2
2	COMM BOX	ADJUST TO FG	6
3	TELEPHONE BOX	ADJUST TO FG	2
4	LIGHT ON CONC PEDESTAL	REMAIN IN PLACE	2
5	NOT USED		
6	TRASH RECEPTACLE	RECONSTRUCT	3
7	WATER HOSE BIB COVER	ADJUST TO FG	4
8	LIGHT AND VMS ON CONC PEDESTAL	REMAIN IN PLACE	2
9	CO BOX	ADJUST TO FG	1
10	FIRE HYDRANT	ADJUST TO FG	2




SCHEDULE			
MARK	EXISTING ITEM	DISPOSITION	QUANTITY
11	EMERGENCY PHONE STANCHION	RECONSTRUCT - SEE NOTE 1	1
12	TICKET VENDING MACHINE	RECONSTRUCT - SEE NOTE 1	2
13	INFORMATION KIOSK	RECONSTRUCT - SEE NOTE 2	1
14	SHELTER BENCH	RECONSTRUCT - SEE NOTE 3	2
15	TRANSLINK CID	RECONSTRUCT - SEE NOTE 1	1
16	NOT USED		
17	IRRIGATION BOX	ADJUST TO FG	1
18	WATER METER BOX	ADJUST TO FG	1
19	PLASTIC BOLLARDS SET	RECONSTRUCT	1
20	SIGN POST	RECONSTRUCT - SEE NOTE 4	1
21	SIGN POST	RECONSTRUCT - SEE NOTE 4	1



NOTES:

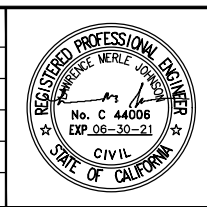
- RECONSTRUCT EXISTING FACILITIES, ANCHORAGES AND CONNECTIONS TO PLATFORMS. PROVIDE ANCHORAGES AND CONNECTIONS PER MANUFACTURER'S REQUIREMENTS.
- RECONSTRUCT KIOSK PLATFORM CONSTRUCTION WITH FOUR EXPANSION ANCHORS PER MOUNTING PLATE. ANCHORS SHALL BE 1/2" Ø X 3-1/4" MIN. EMBEDMENT, GALVANIZED HILTI KWIK BOLT-3, OR APPROVED EQUAL. PROVIDE NON-SHRINK GROUT AS REQUIRED TO LEVEL.
- RECONSTRUCT BENCH PLATFORM CONNECTIONS WITH GALVANIZED EXPANSION ANCHORS. ANCHORS TO MATCH EXISTING IN SIZE.
- REMOVE EXISTING ANCHOR BOLTS AND REPLACE WITH NEW, GALVANIZED ANCHOR BOLTS TO MATCH EXISTING SIZE AND TYPE. PAINT ANCHORS AT MOUTHING PLATE WITH ACRYLIC POLYURETHANE FINISH, COLOR TO MATCH EXISTING.
- RECONSTRUCTING AND ADJUSTING TO FINISHED GRADE SHALL RESTORE THE EXISTING FACILITIES TO THE ORIGINAL LOCATIONS ON THE FINAL GRADE.
- REMOVAL SHALL BE CONSIDERED AS INCLUDED IN "SELECTIVE STRUCTURAL DEMOLITION (PLATFORM)".


LEGEND

-  (E) CONCRETE AND RIVER ROCK PLANTER FILL
-  REMOVE (E) ARCHITECTURAL CONCRETE TOPPING SLAB. SEE NOTE 6.
-  PLATFORM EDGE REMOVAL. SEE NOTE 6.


Sep 30, 2020 4:32pm H:\Projects\160621\04-CAD\Sheets\SP101-102.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

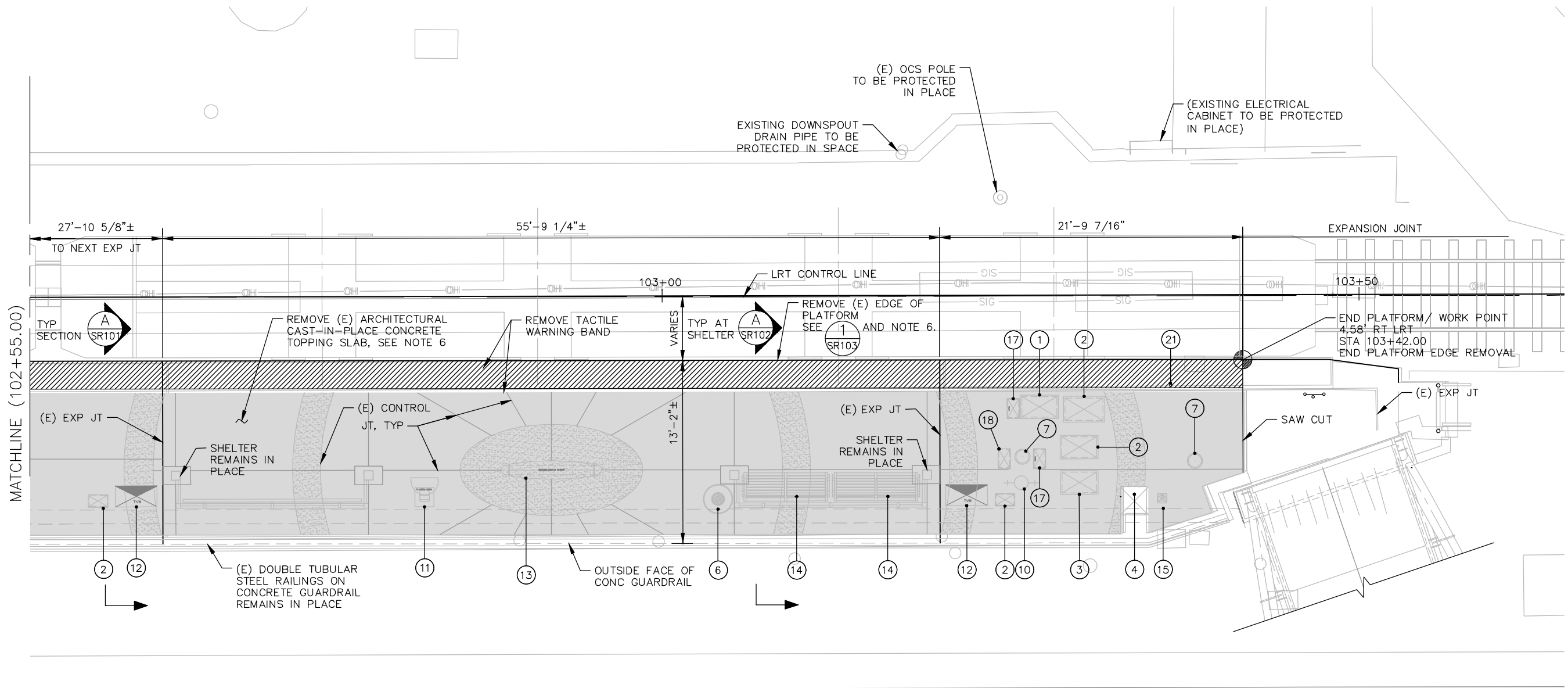


SUBMITTED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	L. JOHNSON	CHECKED	J. CHUNG
DRAWN	K. WONG	CADD FILE NAME	SP101-102



APPROVED		 RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	10/06/20	SCALE	1/4"=1'-0"
SUBMITTAL DATE	10/06/20	BOARD APPROVAL DATE	

HAMILTON STATION STABILIZATION PROJECT			SHEET	7
			OF	18
EXISTING CONDITION/DEMOLITION PLAN			DRAWING NO.	SP101
SHEET 1 OF 2			REVISION	0
PCA NO.	CONTRACT NO.	FILE LOCATION		
	C20046F			



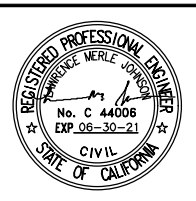
LEGEND
 1. FOR NOTES AND SCHEDULE, SEE DWG SP101.

LEGEND

- (E) CONCRETE AND RIVER ROCK PLANTER FILL
- REMOVE (E) ARCHITECTURAL CONCRETE TOPPING SLAB. SEE NOTE 6.
- PLATFORM EDGE REMOVAL. SEE NOTE 6.

c:\cheuk Sep_30_2020 4:32pm H:\Projects\160621\04-CAD\Sheets\SP101-102.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

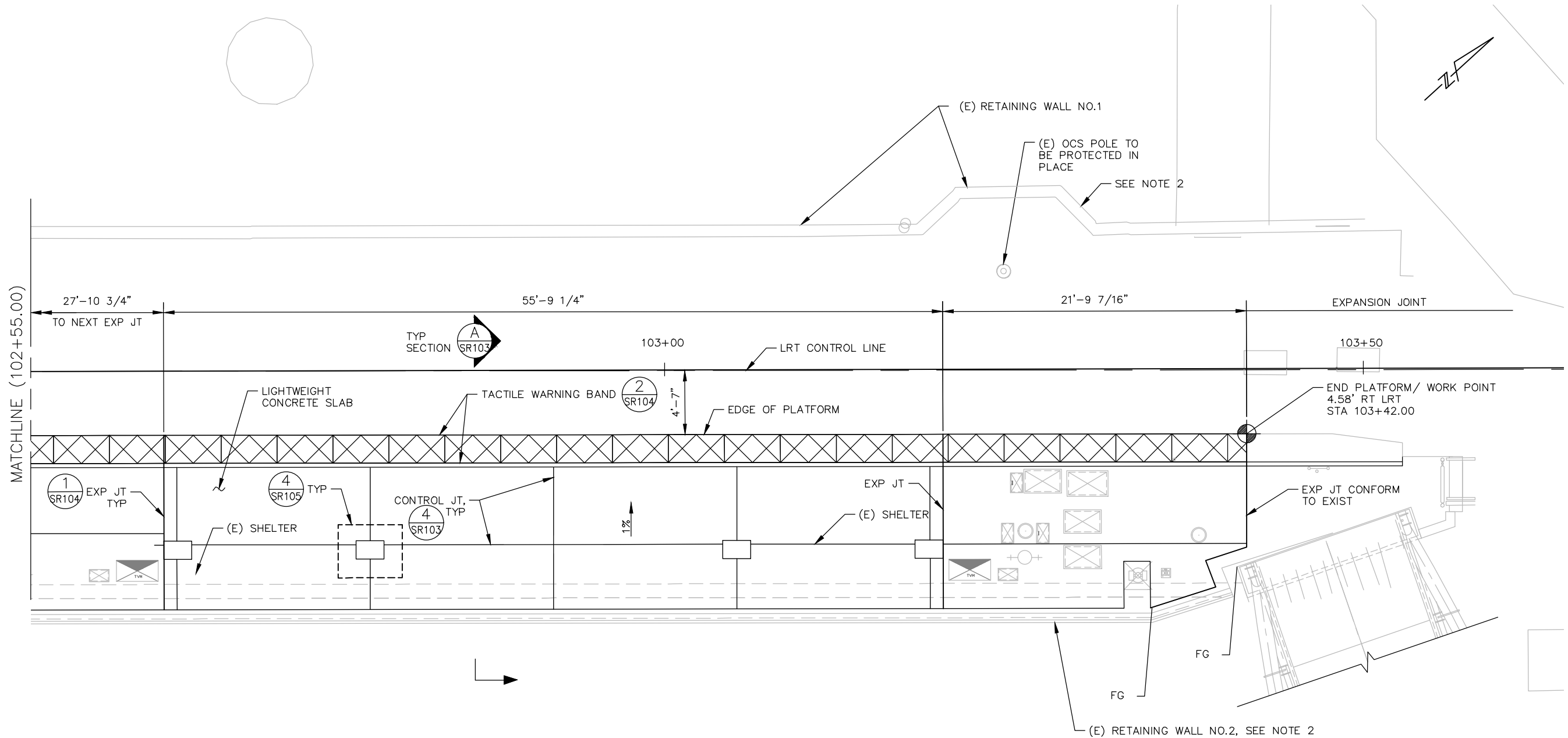


SUBMITTED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	CHECKED
L. JOHNSON	J. CHUNG
DRAWN	CADD FILE NAME
K. WONG	SP101-102



APPROVED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	SCALE
10/06/20	1/4"=1'-0"
SUBMITTAL DATE	BOARD APPROVAL DATE
10/06/20	

HAMILTON STATION STABILIZATION PROJECT		
EXISTING CONDITION/DEMOLITION PLAN		
SHEET 2 OF 2		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	
SHEET OF	DRAWING NO.	
8 OF 18	SP102	
REVISION	0	




NOTE:

1. FOR NOTES SEE DWG SP103
2. SEE SW101, SW102 & SW103 FOR MSE WALLS REPAIRS AND TIE BACK INSTALLATION.


Sep 30, 2020 4:34pm H:\Projects\160821\04-CAD\Sheets\SP103-104.dwg
 ccheuk

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



SUBMITTED  RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED L. JOHNSON	CHECKED J. CHUNG
DRAWN K. WONG	CADD FILE NAME SP103-104

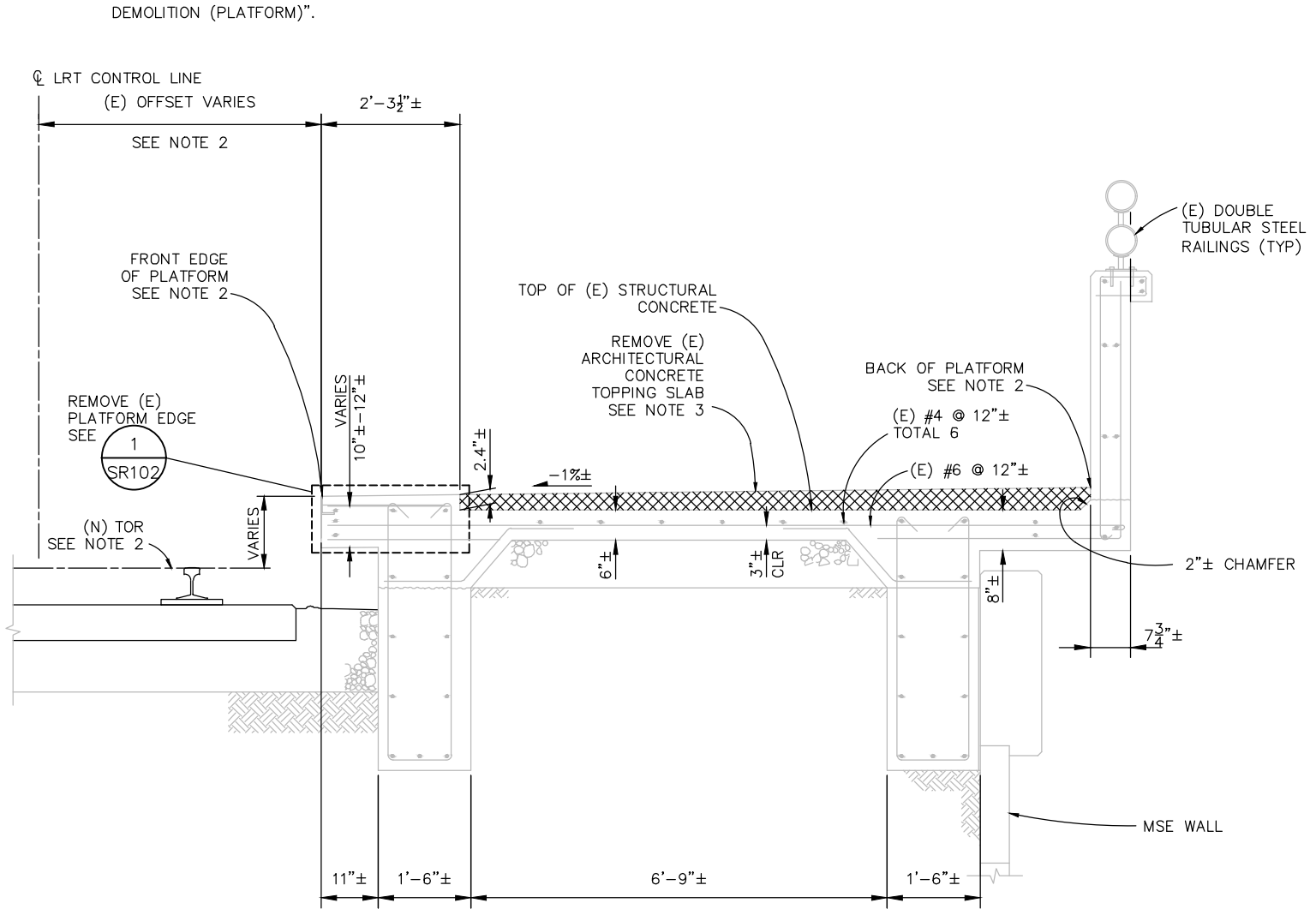


APPROVED  RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE 10/06/20	SCALE 1/4"=1'-0"
SUBMITTAL DATE 10/06/20	BOARD APPROVAL DATE

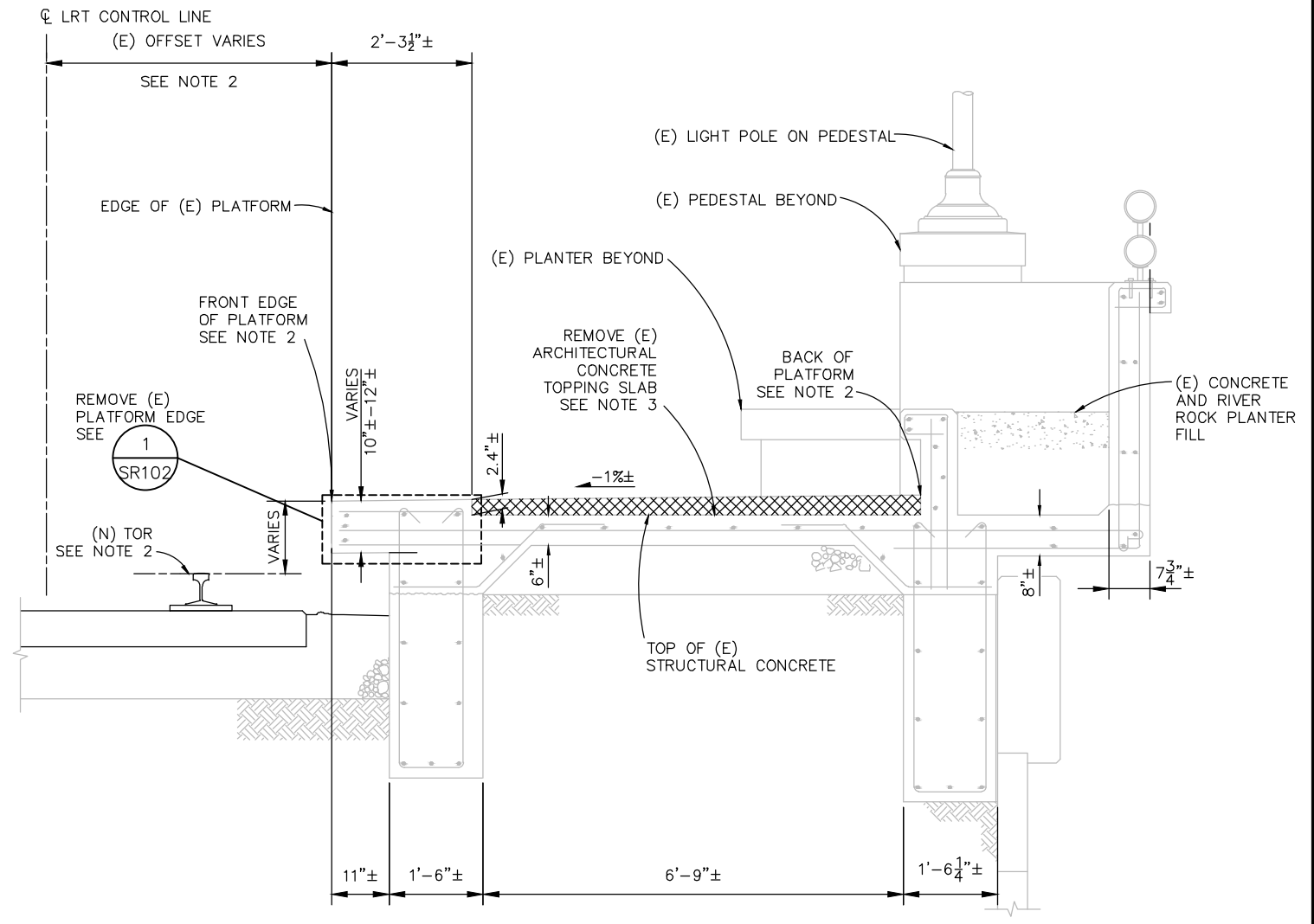
HAMILTON STATION STABILIZATION PROJECT		
PLATFORM PLAN		
SHEET 2 OF 2		
PCA NO.	CONTRACT NO. C20046F	FILE LOCATION

SHEET OF	10
DRAWING NO.	SP104
REVISION	0

- NOTE:
1. SEE T101 FOR TRACK TAMPING.
 2. SEE TABLE A ON SR102 FOR THE EXISTING OFFSETS AND GRADES AT THE FRONT EDGE AND BACK OF PLATFORM AND NEW TOP OF RAIL GRADES.
 3. REMOVAL SHALL BE CONSIDERED AS INCLUDED IN "SELECTIVE STRUCTURE DEMOLITION (PLATFORM)".



A EXISTING TYPICAL SECTION
3/4" = 1'-0"



B EXISTING PLANTER SECTION
3/4" = 1'-0"

LEGEND
 REMOVE (E) ARCHITECTURAL CONCRETE TOPPING SLAB.

c:\cheuk Sep 30, 2020 4:34pm H:\Projects\VA160821\04-CAD\Sheets\SR101-103.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



SUBMITTED	
	RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM
DESIGNED	CHECKED
L. JOHNSON	J. CHUNG
DRAWN	CADD FILE NAME
K. WONG	SR101-103

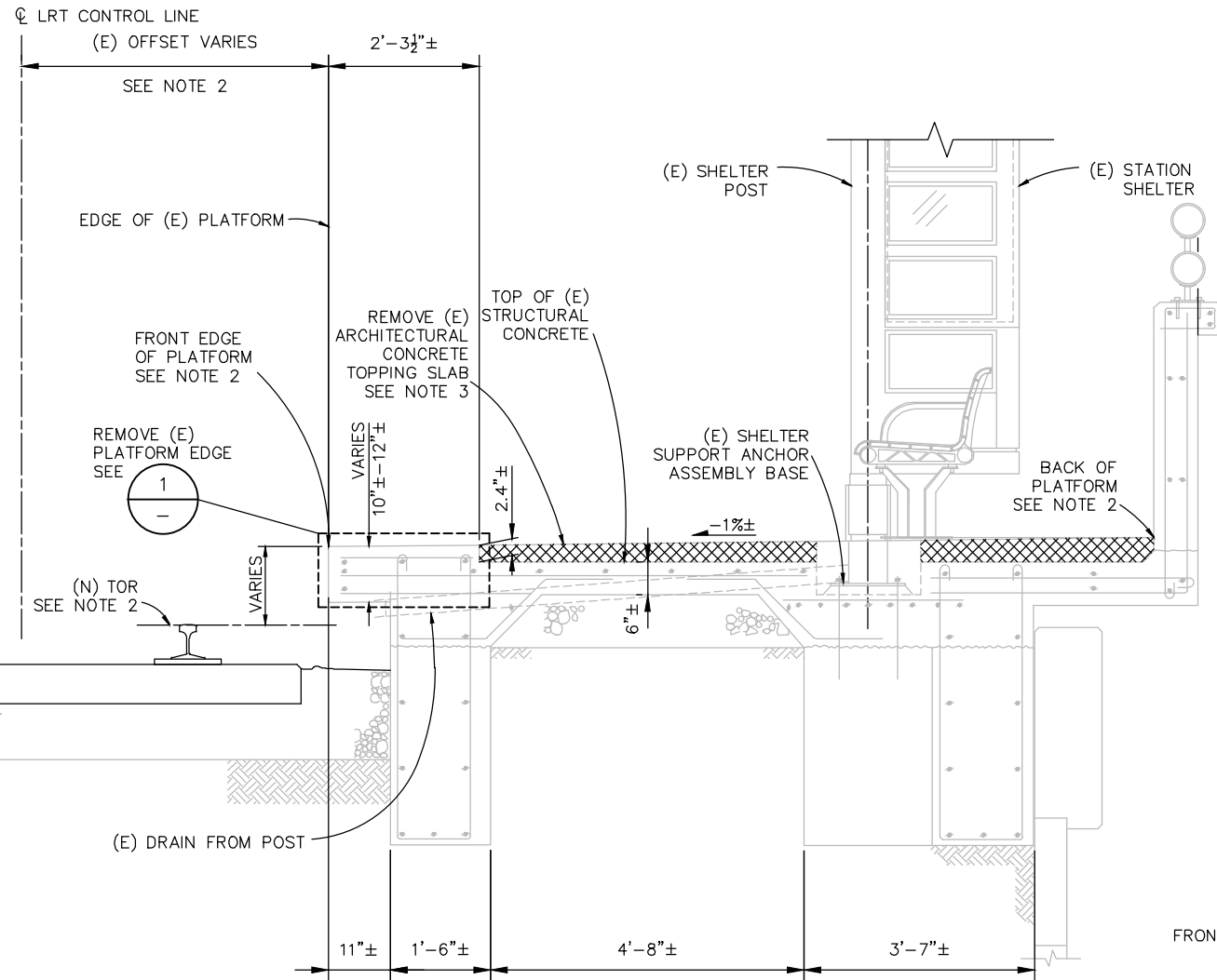


APPROVED	
	RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM
CADD FILE DATE	SCALE
10/06/20	AS SHOWN
SUBMITTAL DATE	BOARD APPROVAL DATE
10/06/20	

HAMILTON STATION STABILIZATION PROJECT		
STRUCTURAL EXISTING STATION PLATFORM SECTIONS		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	

SHEET	11
OF	18
DRAWING NO.	SR101
REVISION	0

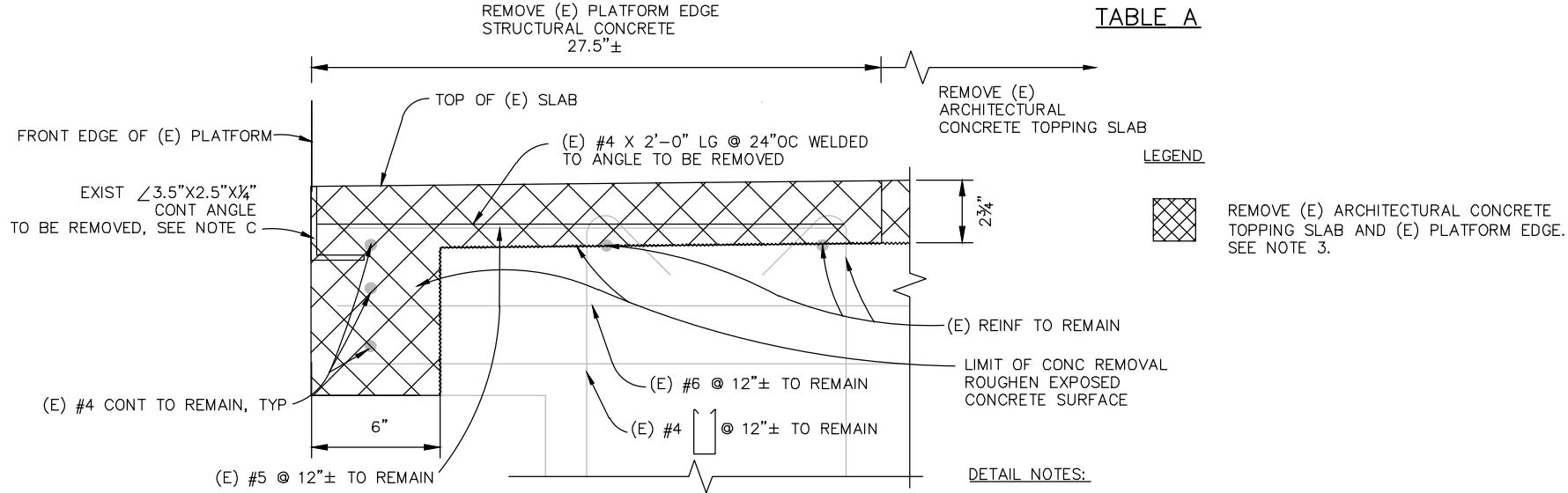
- NOTE:
 1. SEE T101 FOR TRACK TAMPING.
 2. SEE TABLE A FOR EXISTING OFFSETS AND GRADES AT THE FRONT EDGE AND BACK OF PLATFORM AND NEW TOP OF RAIL GRADES.
 3. REMOVAL SHALL BE CONSIDERED AS INCLUDED IN "SELECTIVE STRUCTURE DEMOLITION (PLATFORM)".



A EXISTING SHELTER SECTION
 3/4" = 1'-0"

STA	TOR	FRONT EDGE OF PLATFORM				BACK OF PLATFORM			
		EX OFFSET	EG	NEW OFFSET	FG	EX OFFSET	EG	NEW OFFSET	FG
101+64.50	97.66	4.67	98.67	4.58	98.83	13.81	98.69	13.81	98.92
101+70.00	97.76	4.69	98.76	4.58	98.93	13.78	98.81	13.78	99.02
101+75.00	97.84	4.70	98.84	4.58	99.01	14.48	98.87	14.48	99.11
101+80.00	97.93	4.69	98.93	4.58	99.10	13.45	98.99	13.45	99.19
101+85.00	98.01	4.68	99.08	4.58	99.18	11.18	99.09	11.18	99.25
101+90.00	98.10	4.70	99.19	4.58	99.27	11.15	99.20	11.15	99.34
101+95.00	98.18	4.70	99.29	4.58	99.35	11.18	99.30	11.18	99.42
102+00.00	98.27	4.69	99.40	4.58	99.44	13.46	99.40	13.46	99.53
102+10.00	98.44	4.70	99.57	4.58	99.61	14.91	99.53	14.91	99.71
102+15.00	98.52	4.69	99.65	4.58	99.69	13.48	99.64	13.48	99.78
102+20.00	98.61	4.71	99.73	4.58	99.78	11.19	99.74	11.19	99.85
102+25.00	98.70	4.70	99.81	4.58	99.87	11.17	99.83	11.17	99.94
102+30.00	98.78	4.72	99.88	4.58	99.95	11.16	99.91	11.16	100.02
102+35.00	98.87	4.72	99.96	4.58	100.04	11.19	99.98	11.19	100.11
102+40.00	98.95	4.75	100.01	4.58	100.12	14.06	100.03	14.06	100.21
102+45.00	99.04	4.75	100.05	4.58	100.21	14.36	100.11	14.36	100.31
102+50.00	99.12	4.78	100.09	4.58	100.29	13.63	100.17	13.63	100.38
102+55.00	99.21	4.78	100.16	4.58	100.38	17.14	100.19	17.14	100.51
102+60.00	99.29	4.76	100.23	4.58	100.46	17.15	100.26	17.15	100.59
102+65.00	99.38	4.78	100.27	4.58	100.55	17.15	100.31	17.15	100.68
102+70.00	99.46	4.78	100.26	4.58	100.63	17.13	100.37	17.13	100.76
102+75.00	99.55	4.76	100.29	4.58	100.72	17.11	100.44	17.11	100.85
102+80.00	99.64	4.74	100.35	4.58	100.81	17.09	100.50	17.09	100.94
102+85.00	99.72	4.71	100.42	4.58	100.89	17.08	100.58	17.08	101.01
102+90.00	99.81	4.71	100.49	4.58	100.98	17.07	100.65	17.07	101.10
102+95.00	99.89	4.71	100.55	4.58	101.06	17.07	100.73	17.07	101.18
103+00.00	99.98	4.68	100.64	4.58	101.15	17.06	100.82	17.06	101.27
103+05.00	100.06	4.66	100.75	4.58	101.23	17.06	100.91	17.06	101.35
103+10.00	100.15	4.64	100.86	4.58	101.32	17.03	101.04	17.03	101.44
103+15.00	100.23	4.63	100.97	4.58	101.40	17.00	101.15	17.00	101.52
103+20.00	100.32	4.60	101.08	4.58	101.49	16.96	101.25	16.96	101.61
103+25.00	100.41	4.56	101.26	4.58	101.58	16.94	101.50	16.94	101.70
103+30.00	100.49	4.56	101.39	4.58	101.66	16.93	101.70	16.93	101.78
103+35.00	100.58	4.56	101.55	4.58	101.75	13.65	101.83	13.65	101.84

TABLE A



REMOVAL AT EXISTING PLATFORM EDGE

1 DETAIL
 3" = 1'-0"

- DETAIL NOTES:**
- A. TACTILE WARNING BAND NOT SHOWN.
 - B. EXISTING REINFORCEMENT SHALL REMAIN UNLESS NOTED OTHERWISE.
 - C. REMOVAL SHALL BE CONSIDERED AS INCLUDED IN "SELECTIVE STRUCTURE DEMOLITION (PLATFORM)".

Sep 30, 2020 4:34pm H:\Projects\VI160821\04-CAD\Sheets\SR101-103.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

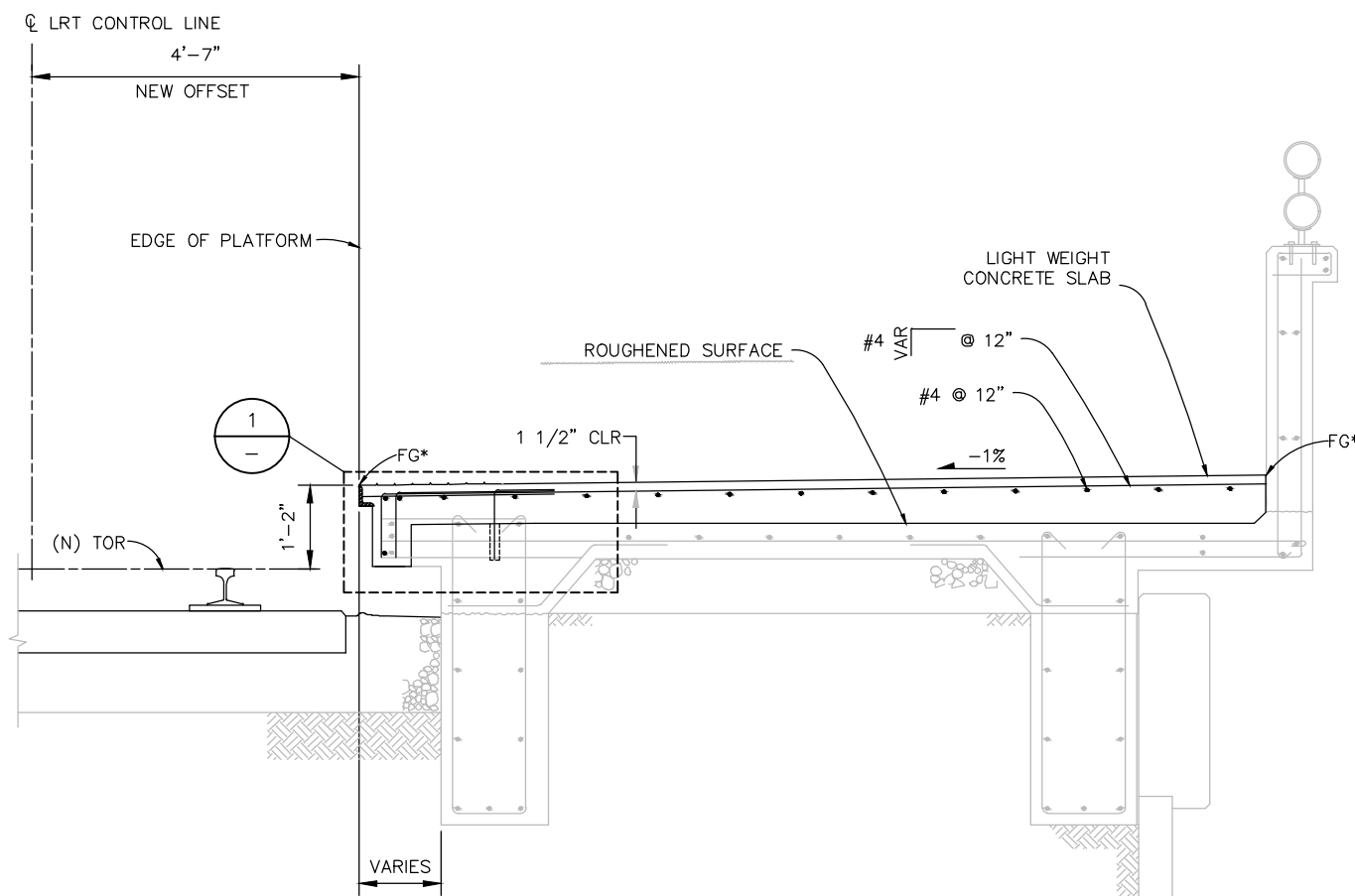


SUBMITTED		RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	L. JOHNSON	CHECKED	J. CHUNG
DRAWN	K. WONG	CADD FILE NAME	SR101-103



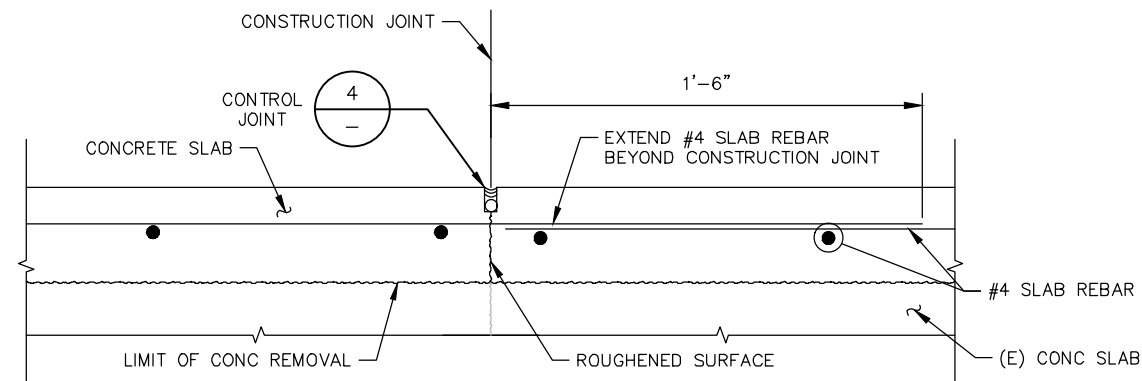
APPROVED		RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	10/06/20	SCALE	AS SHOWN
SUBMITTAL DATE	10/06/20	BOARD APPROVAL DATE	

HAMILTON STATION STABILIZATION PROJECT			SHEET	12
			OF	18
STRUCTURAL EXISTING STATION PLATFORM SECTIONS AND DETAILS			DRAWING NO.	SR102
			REVISION	0
PCA NO.	CONTRACT NO.	FILE LOCATION		
	C20046F			

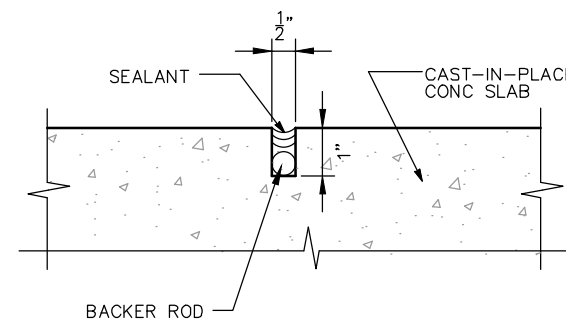


A TYPICAL SECTION
3/4" = 1'-0"

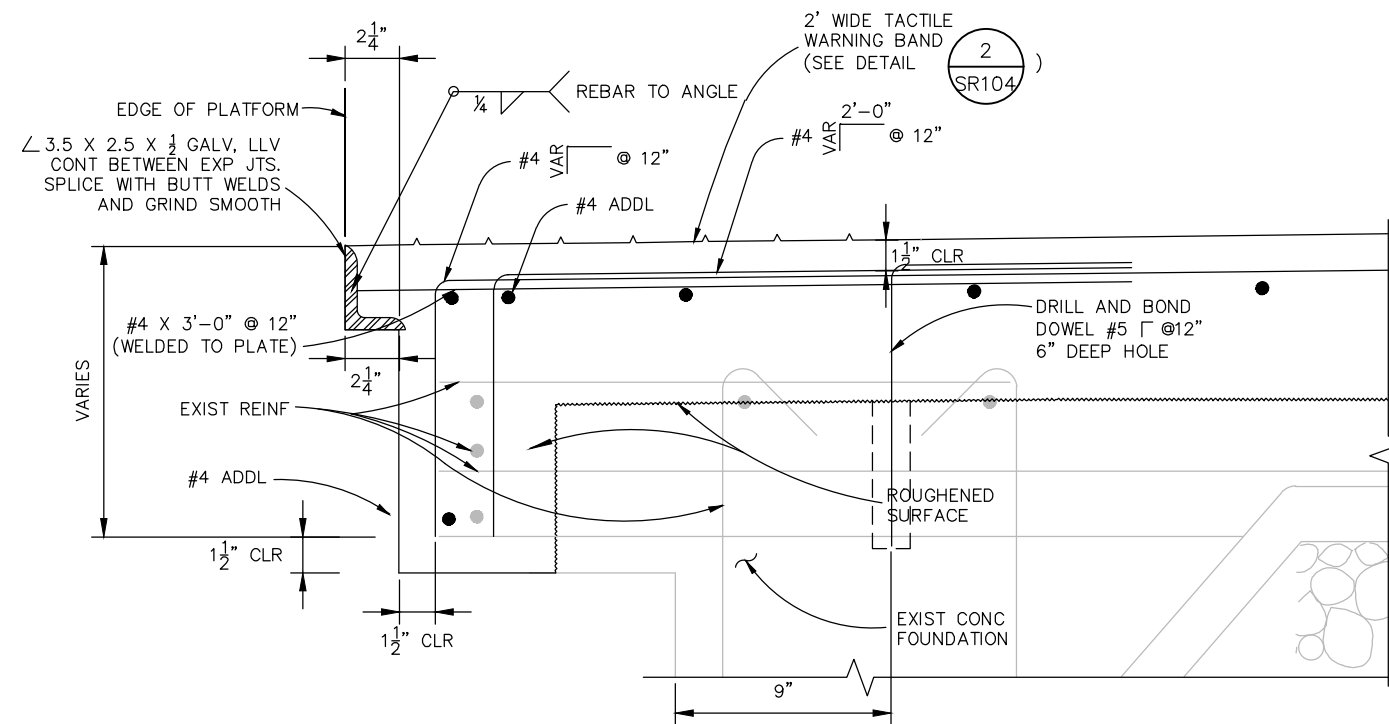
*NOTES: SEE TABLE A ON SR102 FOR FINISHED GRADES AT THE EDGE AND BACK OF PLATFORM UNLESS NOTED ON PLAN OTHERWISE.



3 CONSTRUCTION JOINT
3" = 1'-0"



4 CONTROL JOINT
6" = 1'-0"



1 DETAIL
3" = 1'-0"

Sep 30, 2020 4:34pm H:\Projects\VT160821\04-CAD\Sheets\SR101-103.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

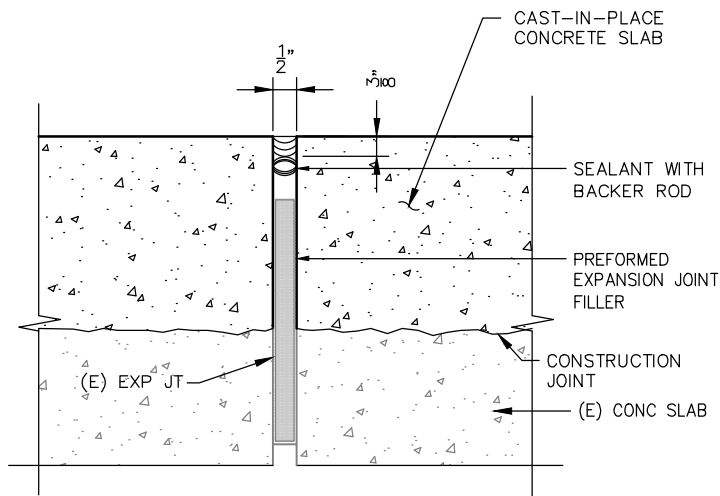


SUBMITTED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	CHECKED
L. JOHNSON	J. CHUNG
DRAWN	CADD FILE NAME
K. WONG	SR101-103

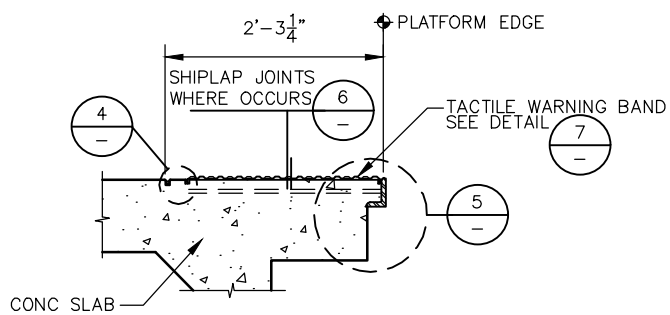


APPROVED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	SCALE
10/06/20	AS SHOWN
SUBMITTAL DATE	BOARD APPROVAL DATE
10/06/20	

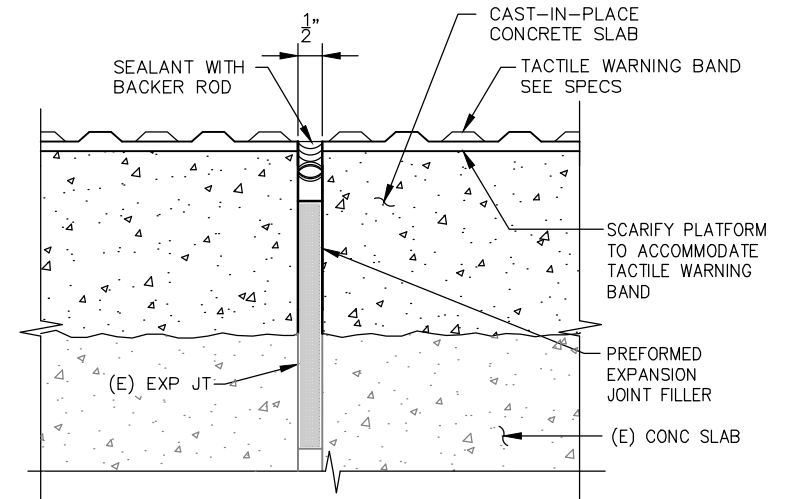
HAMILTON STATION STABILIZATION PROJECT		
STRUCTURAL STATION PLATFORM SECTIONS AND DETAILS - SHEET 1 OF 3		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	
SHEET OF	13 OF 18	DRAWING NO. SR103
REVISION	0	



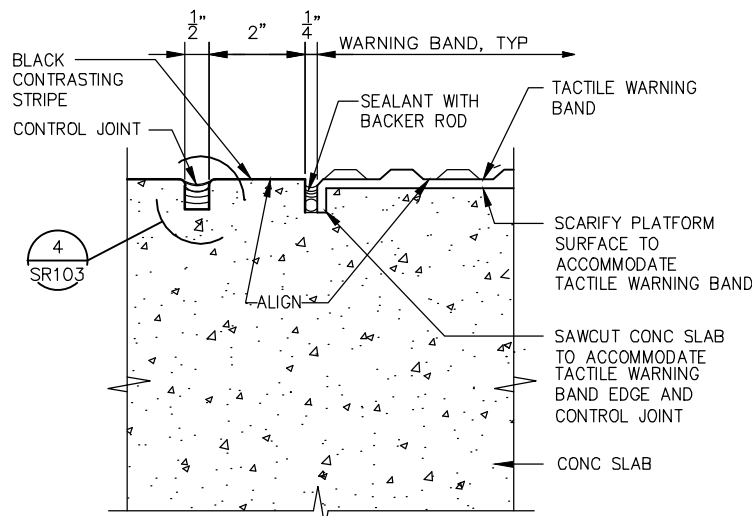
1 CONCRETE EXPANSION JOINT
6" = 1'-0"



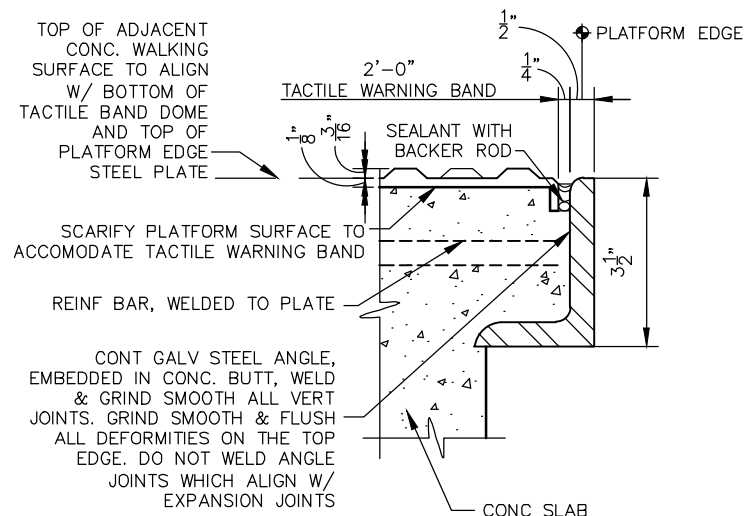
2 TACTILE WARNING BAND
1" = 1'-0"



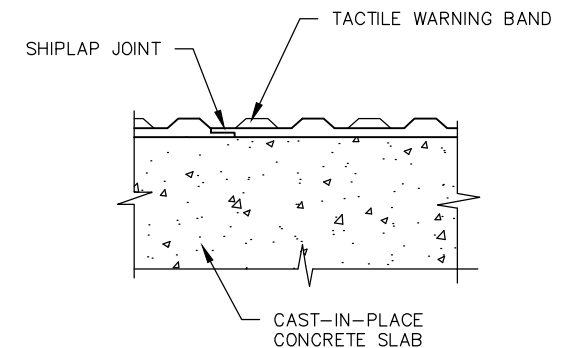
3 EXP JT AT WARNING BAND
6" = 1'-0"



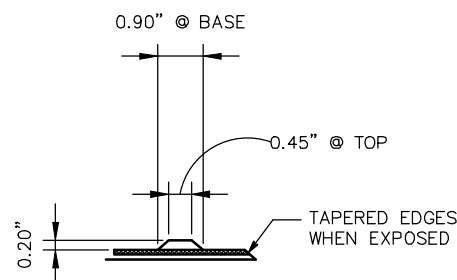
4 WARNING BAND EDGE
6" = 1'-0"



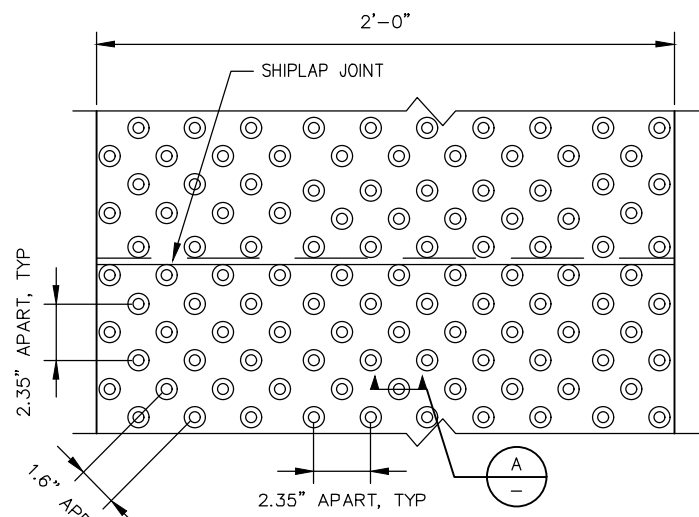
5 WARNING BAND EDGE
6" = 1'-0"



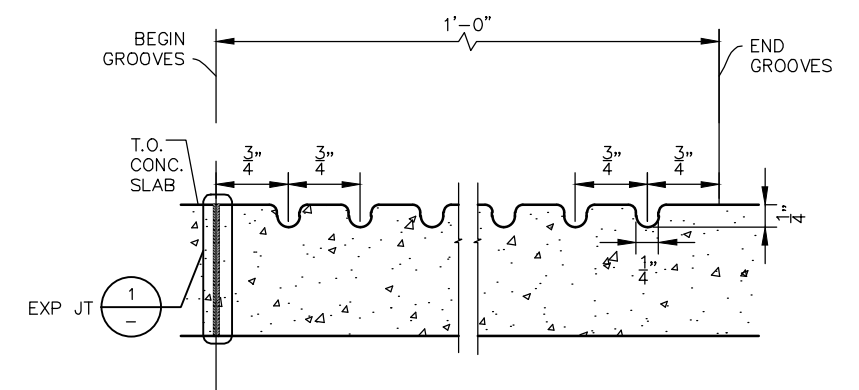
6 WARNING BAND JOINT
6" = 1'-0"



A SECTION
NTS



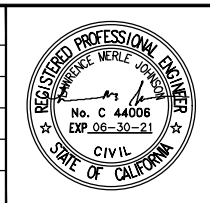
7 TACTILE WARNING BAND
3" = 1'-0"



8 WARNING GROOVES
12" = 1'-0"

Sep 30, 2020 4:34pm H:\Projects\VI160821\04-CAD\Sheets\SR104.dwg ccheuk

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

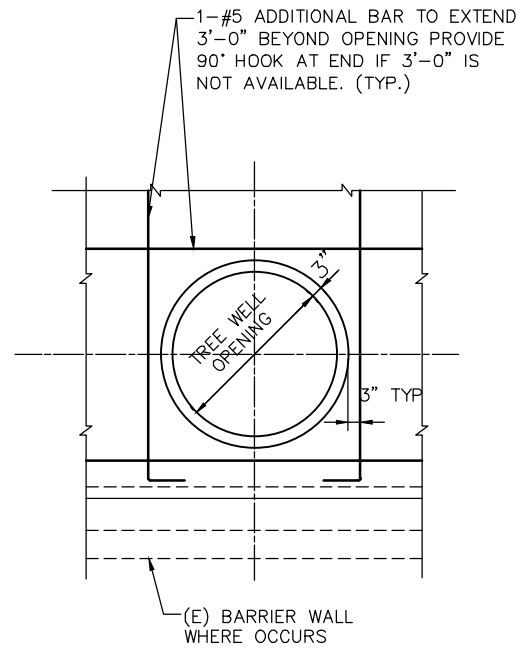


SUBMITTED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	CHECKED
L. JOHNSON	J. CHUNG
DRAWN	CADD FILE NAME
K. WONG	SR104

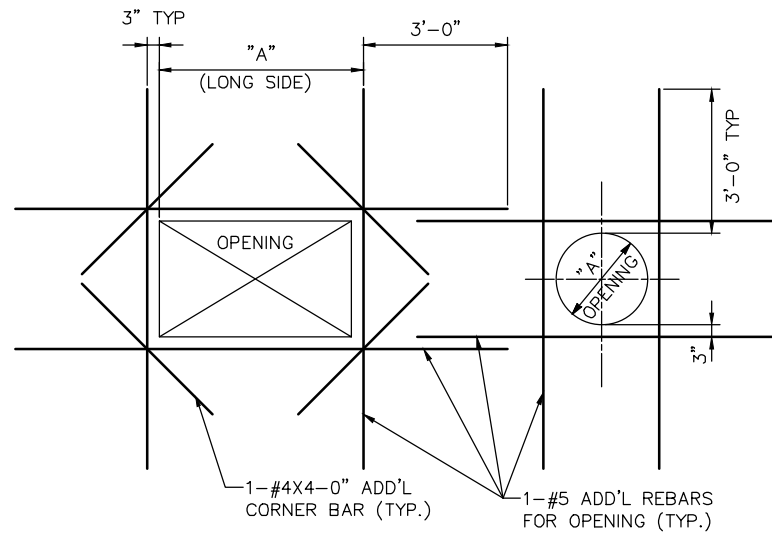


APPROVED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	SCALE
10/06/20	AS SHOWN
SUBMITTAL DATE	BOARD APPROVAL DATE
10/06/20	

HAMILTON STATION STABILIZATION PROJECT		
STRUCTURAL STATION PLATFORM SECTIONS AND DETAILS - SHEET 2 OF 3		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	
SHEET OF	14 OF 18	DRAWING NO. SR104
REVISION	0	

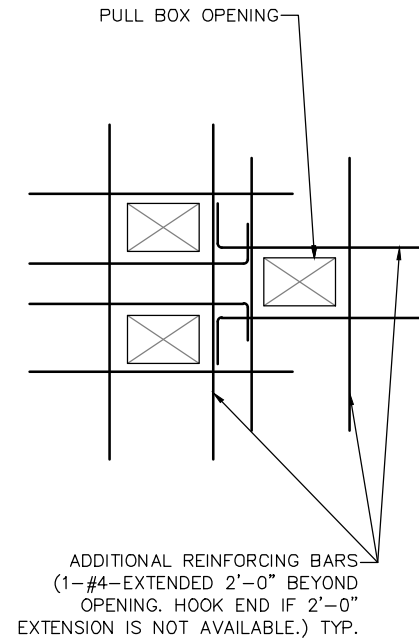


1 TREE WELL OPENING REINFORCEMENT
- NTS

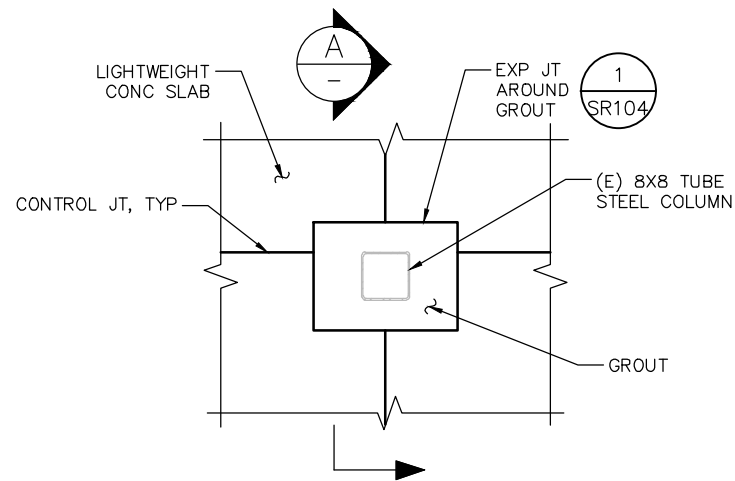


NOTES: 1. WHEN "A" GREATER THAN OR EQUAL TO 1'-0", PROVIDE ADD'L BARS AS SHOWN.
2. HOOK END IF 3'-0" EXTENSION IS NOT AVAILABLE.
3. SEE ARCH. DWGS. FOR DIMENSION OF OPENING.

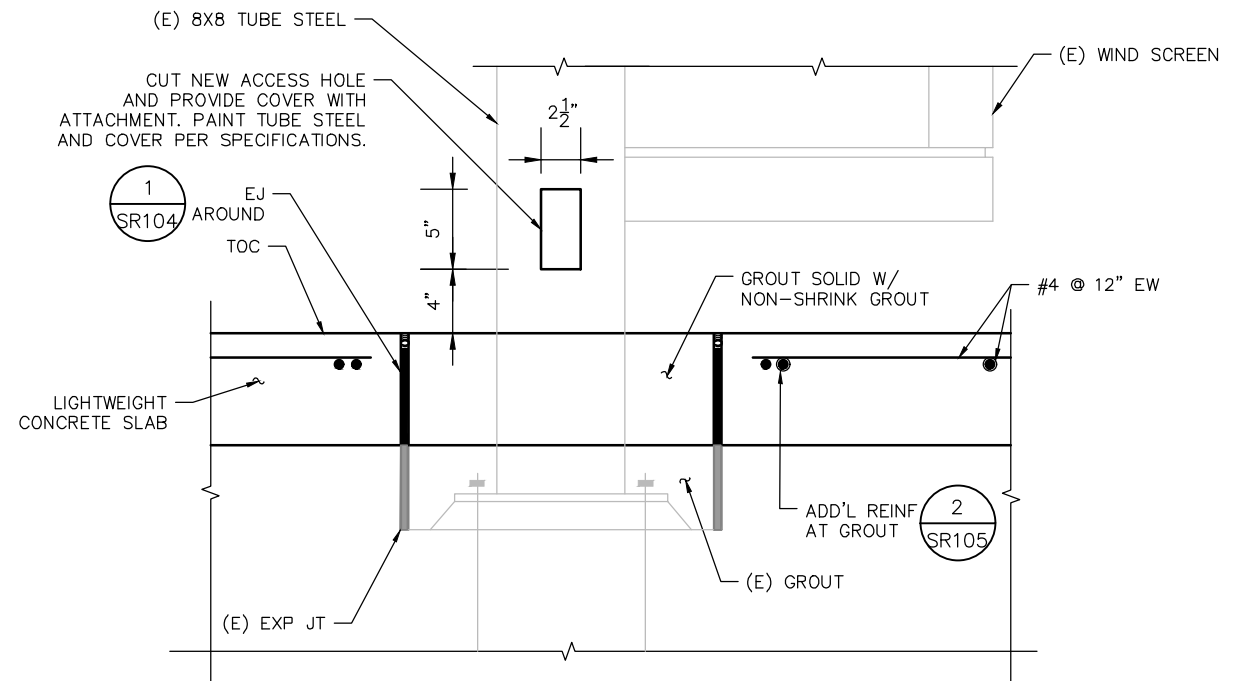
2 TYPICAL SLAB OPENING REINFORCEMENT
- NTS



3 TYPICAL REINFORCEMENT AT PULL BOX OPENINGS
- NTS



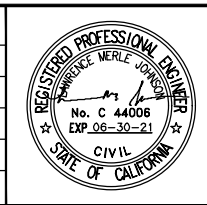
4 DETAIL
- 3/4" = 1'-0"



A SECTION
- 2" = 1'-0"

Sep 30, 2020 4:35pm H:\Projects\160821\04-CAD\Sheets\SR105.dwg

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



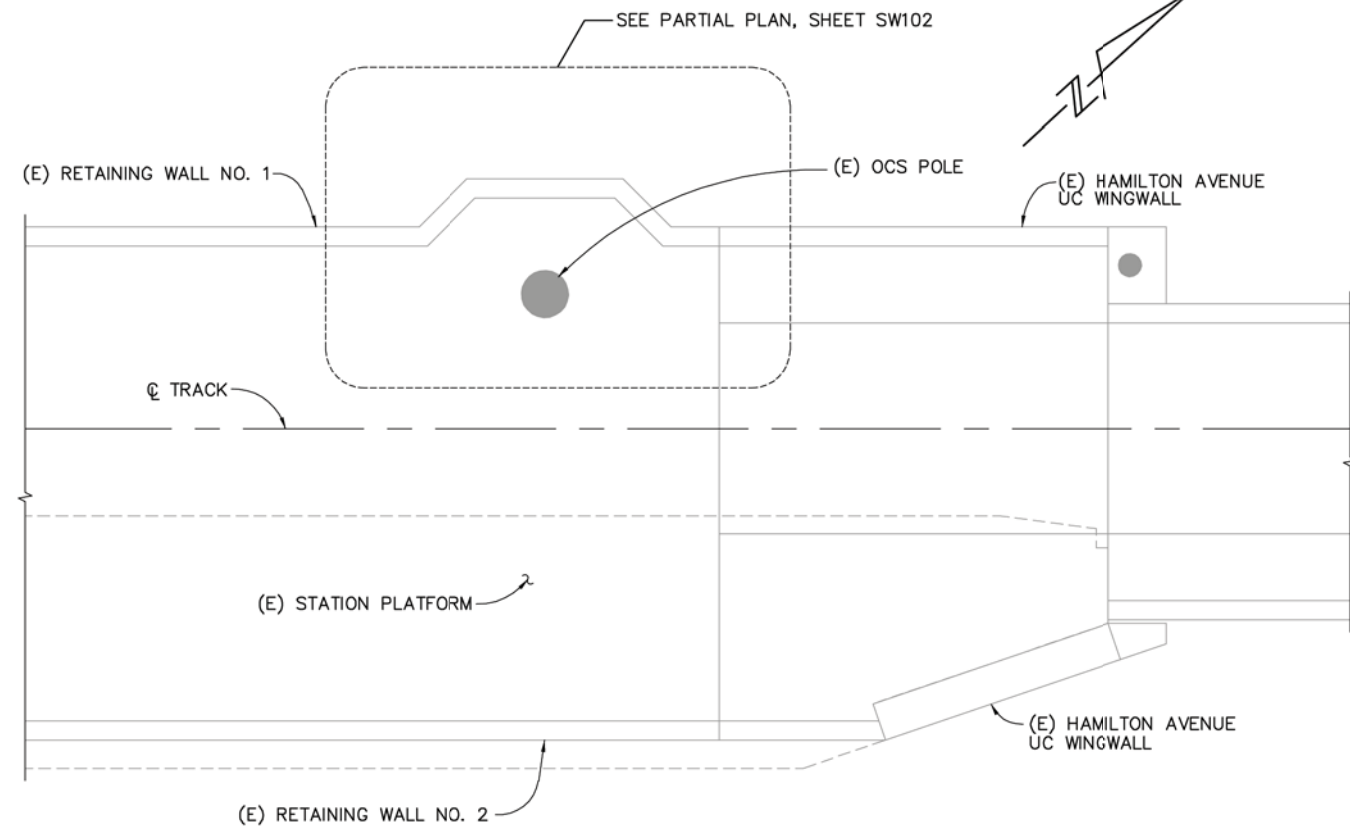
SUBMITTED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
DESIGNED	CHECKED
L. JOHNSON	J. CHUNG
DRAWN	CADD FILE NAME
K. WONG	SR105



APPROVED	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM	
CADD FILE DATE	SCALE
10/06/20	AS SHOWN
SUBMITTAL DATE	BOARD APPROVAL DATE
10/06/20	

HAMILTON STATION STABILIZATION PROJECT		
STRUCTURAL STATION PLATFORM SECTIONS AND DETAILS - SHEET 3 OF 3		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	

SHEET OF	15 18
DRAWING NO.	SR105
REVISION	0



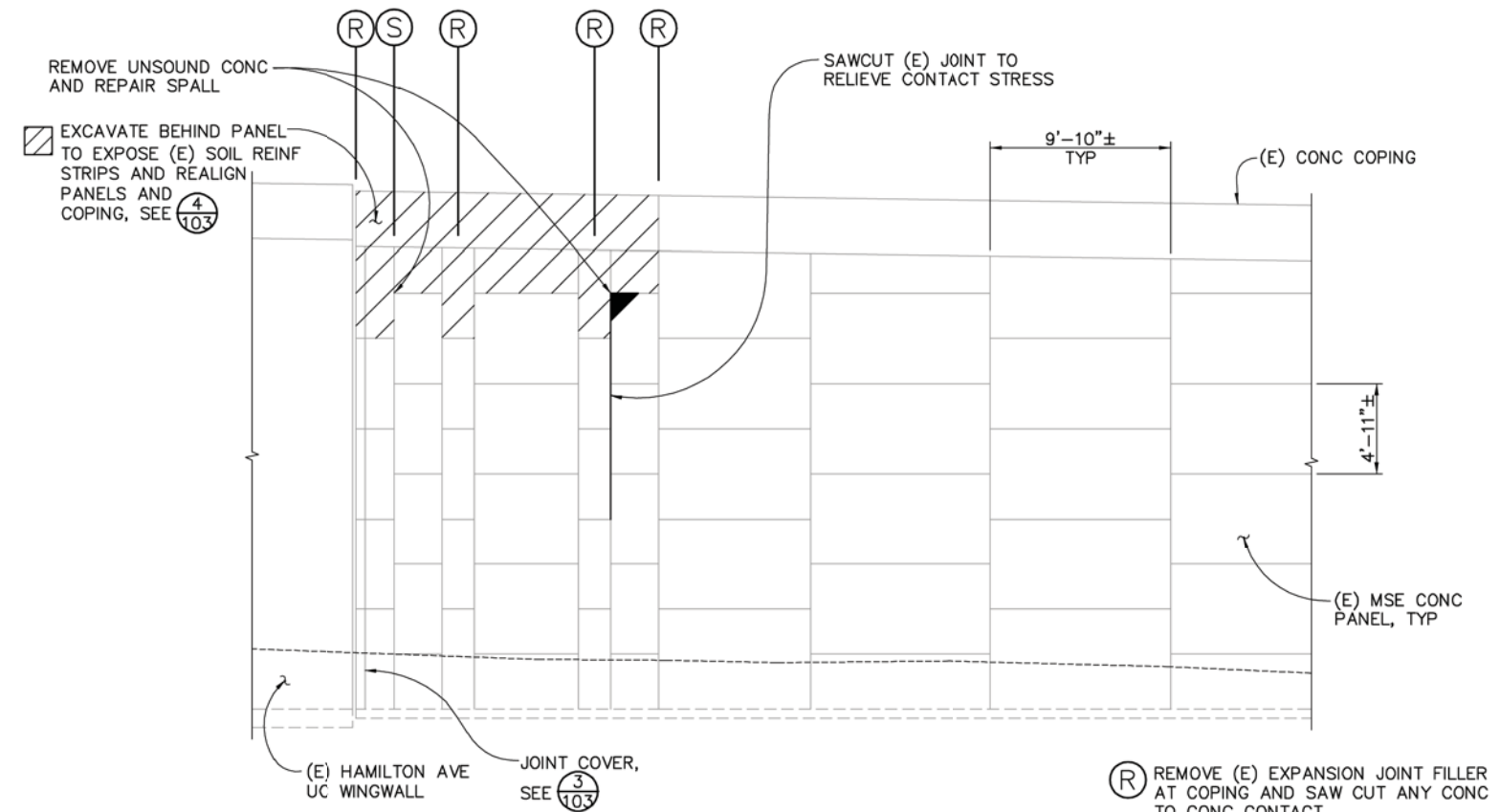
PLAN
1" = 5'

LEGEND

- REALIGN PANEL AND COPING TO PLUMB
- ADD LOW-PRESSURE GROUT BEHIND PANEL

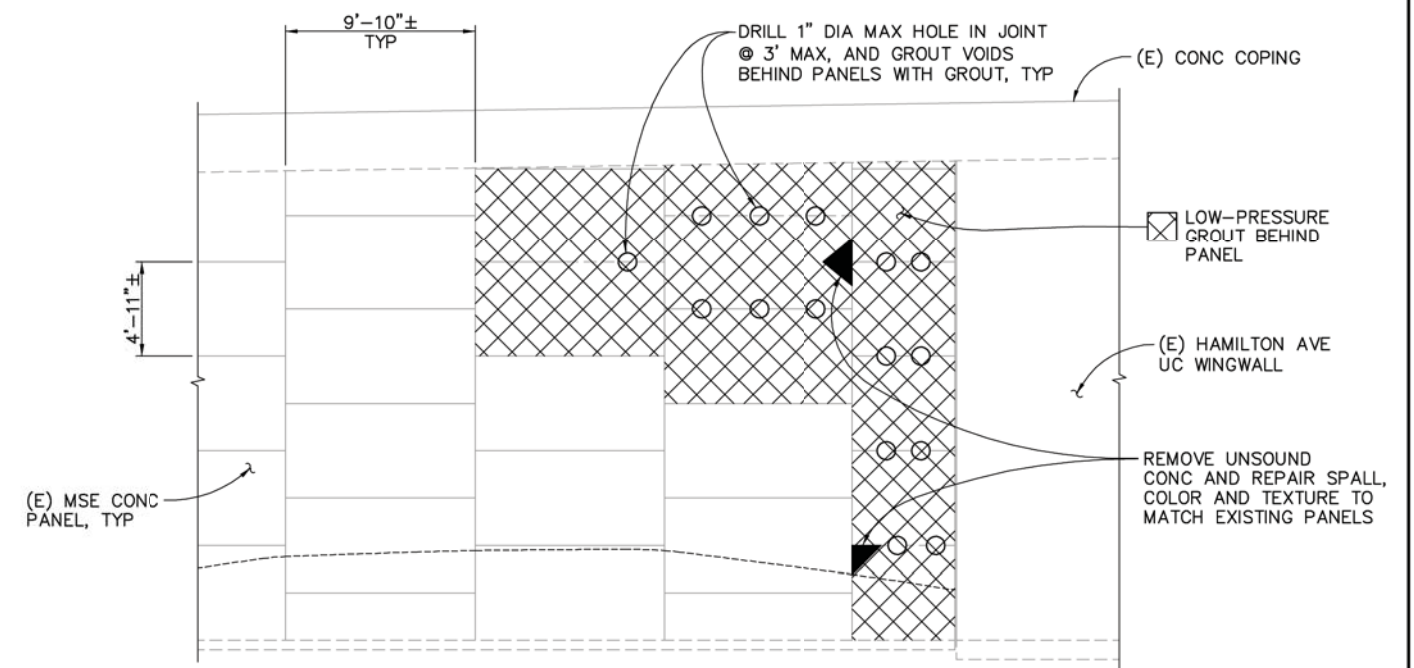
ABBREVIATIONS

- DIA DIAMETER
- (E) EXISTING
- GALV GALVANIZE
- HSS HOLLOW STRUCTURAL SECTION
- MIN MINIMUM
- (N) NEW
- PL PLATE



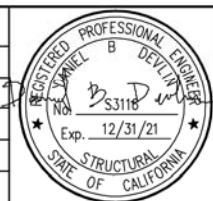
RETAINING WALL No. 1 - ELEVATION
1" = 5'

- (R) REMOVE (E) EXPANSION JOINT FILLER AT COPING AND SAW CUT ANY CONC TO CONC CONTACT
- (S) SAWCUT (E) JOINT TO ELIMINATE CONC TO CONC CONTACT



RETAINING WALL No. 2 - ELEVATION
1" = 5'

NO.	DATE	REVISIONS
0	10/06/20	ISSUED FOR BID



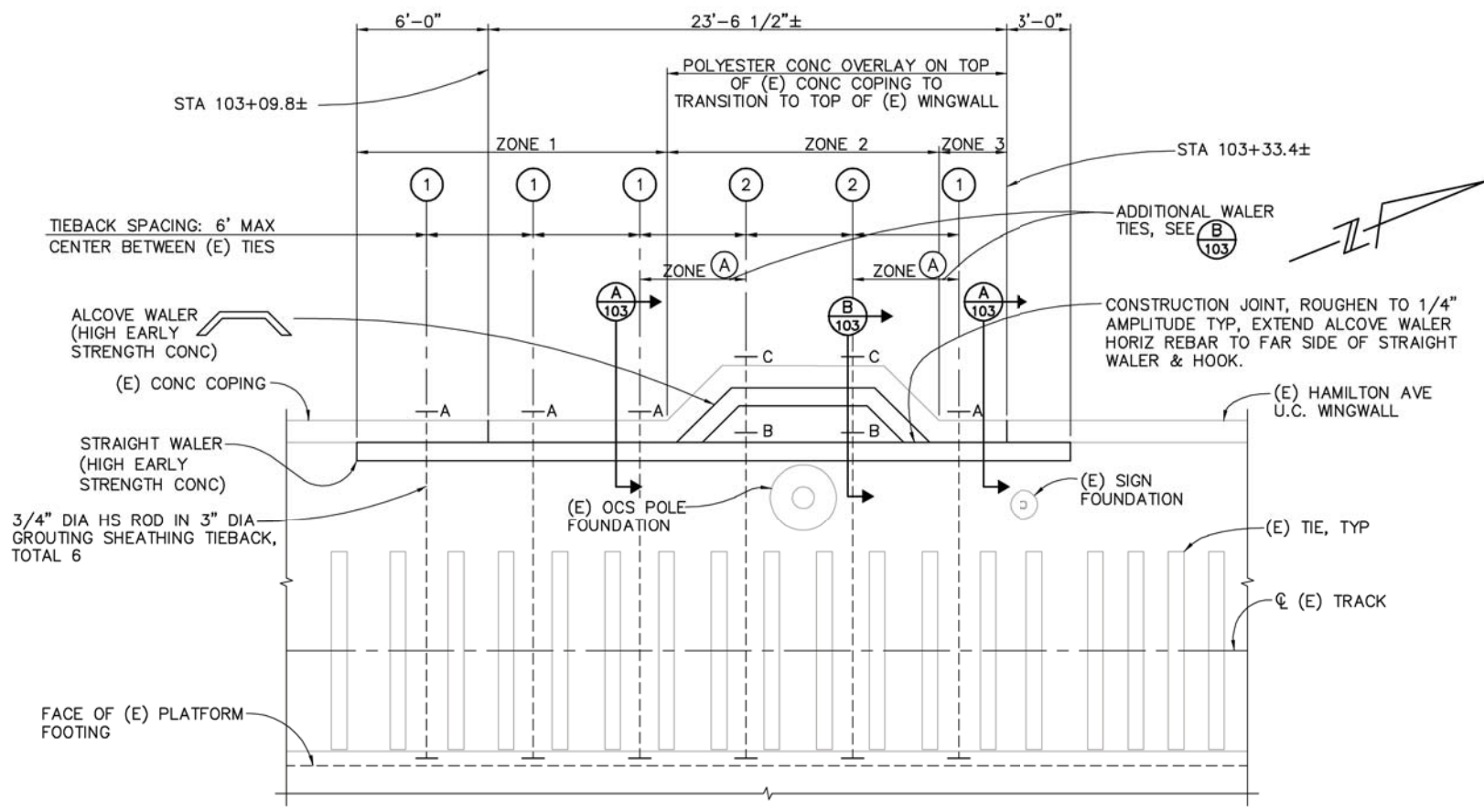
SUBMITTED		DESIGNED	
BIGGS CARDOSA ASSOCIATES INC STRUCTURAL ENGINEERS		DBD	
365 The Alameda San Jose, California 95126 408-296-5515		CHECKED	
DRAWN		MDS	
DM		CADD FILE NAME	

APPROVED		SCALE	
RSE, INC. 1075 OLD COUNTY ROAD BELMONT, CA 94002 WWW.RSERAIL.COM		AS NOTED	
CADD FILE DATE		BOARD APPROVAL DATE	
10/06/20			
SUBMITTAL DATE			
10/06/20			

HAMILTON STATION STABILIZATION PROJECT		
STRUCTURAL		
RETAINING WALL No. 1 & 2		
GENERAL PLAN No. 2		
PCA NO.	CONTRACT NO.	FILE LOCATION
	C20046F	W:\2016\2016117

SHEET	16
OF	18
DRAWING NO.	SW101
REVISION	0

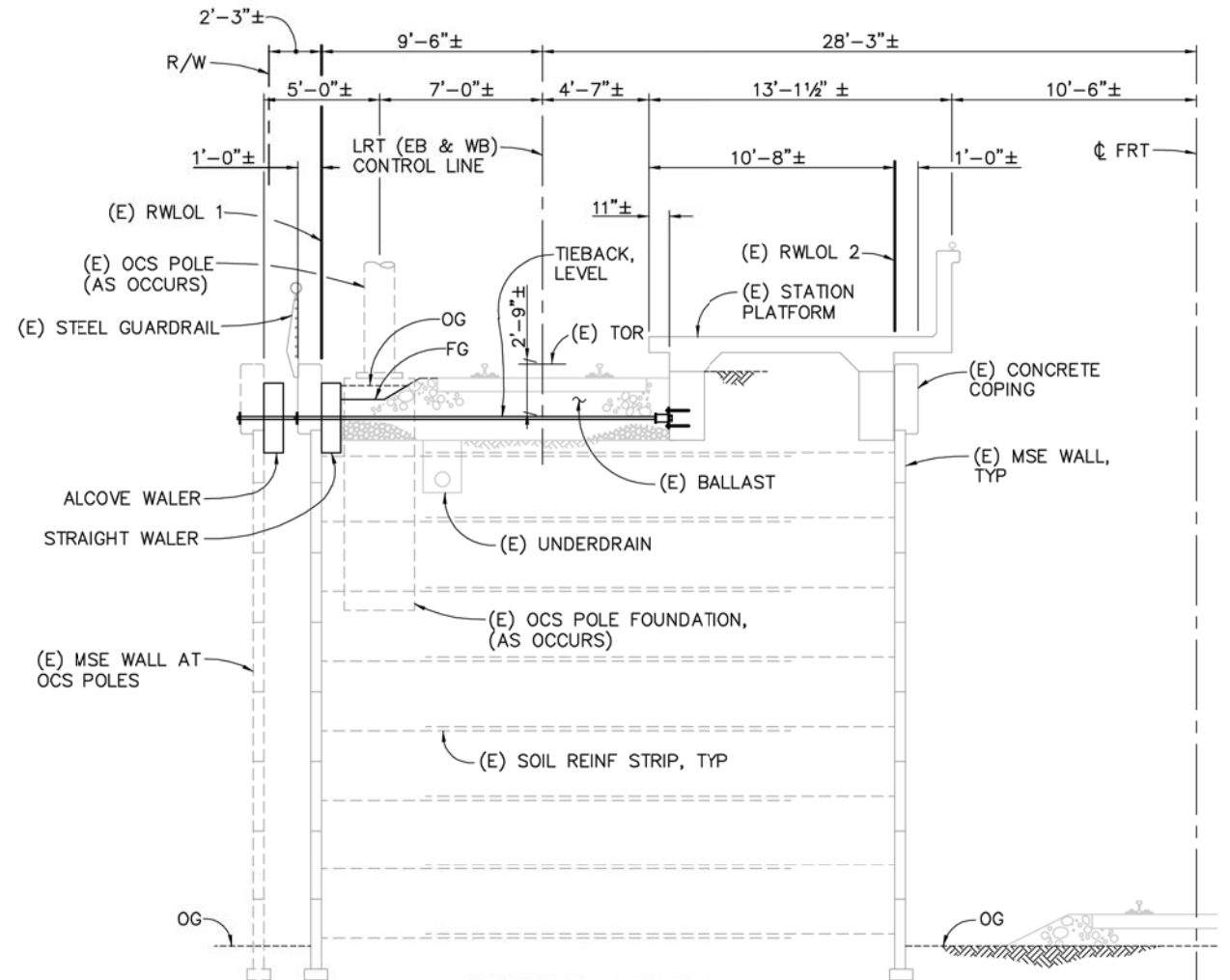
2016117(SW101) 2016117



PARTIAL PLAN
1/4" = 1'-0"

- LEGEND:**
- ① TIEBACK TYPE, SEE CONSTRUCTION SEQUENCE.
 - A TIEBACK NUT TIGHTENING SEQUENCE, SEE CONSTRUCTION SEQUENCE.
 - ① TIEBACK ROD ANCHORAGE, SEE ①/103

- CONSTRUCTION SEQUENCE:**
1. OVER THE LENGTH OF THE STRAIGHT WALER, EXCAVATE FOR STRAIGHT WALER CONSTRUCTION. REALIGN (E) PANELS IN ZONES 1 & 3 TO PLUMB.
 2. CONSTRUCT STRAIGHT WALER AND BACKFILL TO 95% COMPACTION
 3. EXCAVATE AND INSTALL TIEBACKS. FILL CORRUGATED WITH NON-SHRINK GROUT. BACKFILL W/ 95% COMPACTION. AFTER WALER CONCRETE HAS REACHED MIN 80% COMPRESSIVE STRENGTH & 8 HOURS MINIMUM, TIGHTEN TIEBACK 'A' & 'B' NUTS TO SNUG TIGHT. BACKFILL EAST SIDE OF STRAIGHT WALER TIGHTENING 'A' & 'B' NUTS AS REQUIRED TO MAINTAIN WALER PLUMB.
 4. TENSION TIEBACKS TO 1500 LBS EACH BY ANCHORING TIEBACKS TYPE ① TO COPING AND TIEBACK TYPE ② TO STRAIGHT WALER.
 5. EXCAVATE WEST OF STRAIGHT WALER AND REALIGN/REPAIR ALCOVE PANELS/COPING TO PLUMB AND INSTALL 'C' NUTS SNUG TIGHT. CONSTRUCT ALCOVE WALER.
 6. AFTER ALCOVE WALER CONCRETE HAS REACHED MIN 80% COMPRESSIVE STRENGTH & 7 DAYS MINIMUM BACKFILL BETWEEN WALERS, TENSION TIEBACK TYPE ② TO 1200 LBS WITH 'C' NUTS AND ANCHOR TO COPING. PRESSURE GROUT CORRUGATED SHEATHING.



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

NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID



SUBMITTED
BIGGS CARDOSA ASSOCIATES INC
STRUCTURAL ENGINEERS
885 The Alameda
San Jose, California 95126
408-296-5515

DESIGNED: DBD
CHECKED: MDS
DRAWN: DM
CADD FILE NAME:

BGR



APPROVED
RSE, INC.
1075 OLD COUNTY ROAD
BELMONT, CA 94002
WWW.RSERAIL.COM

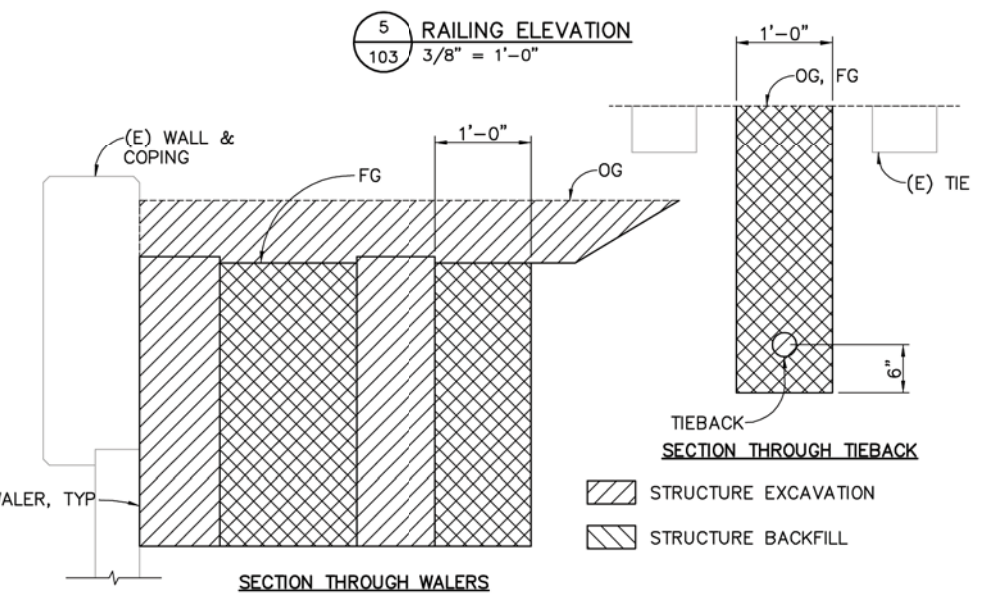
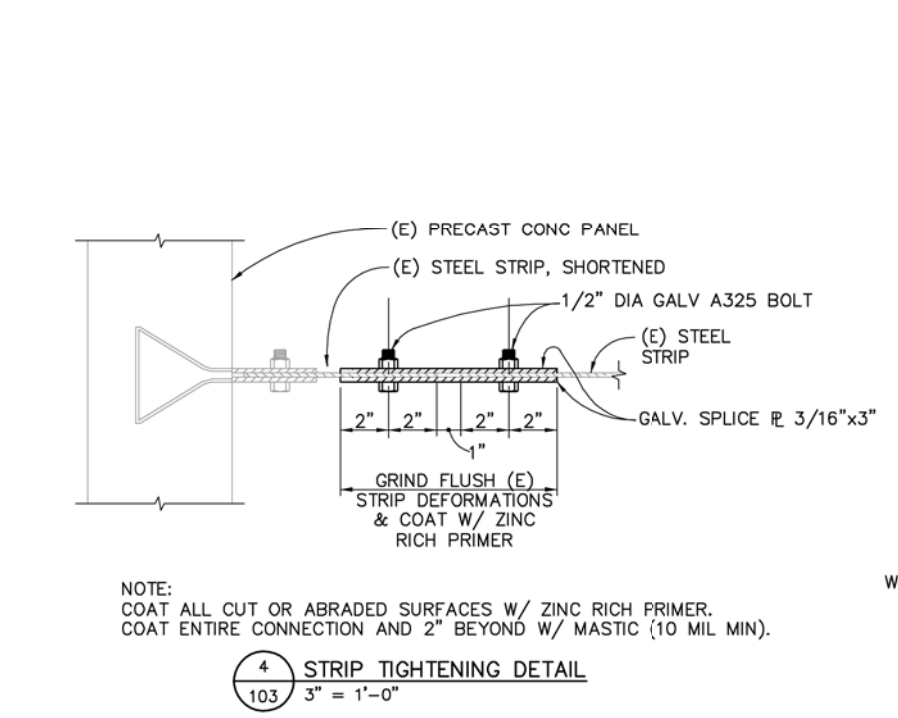
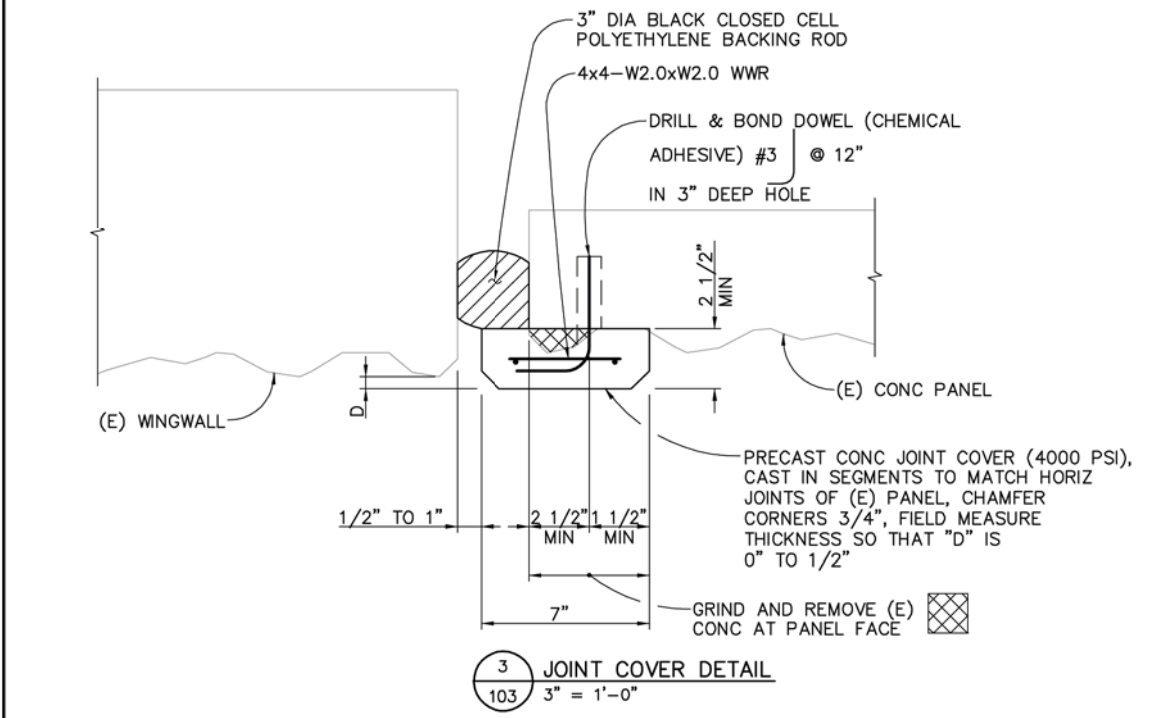
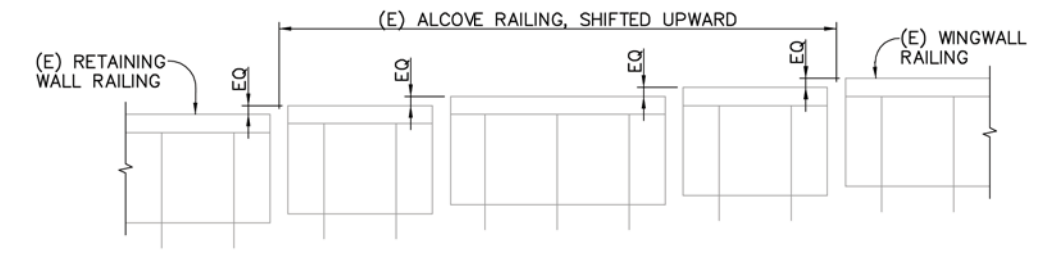
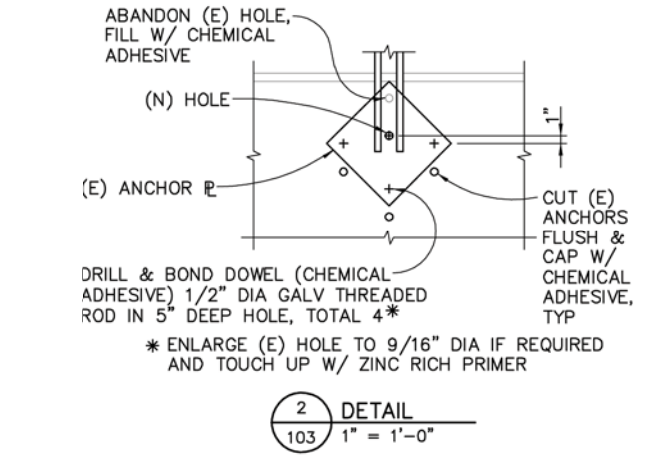
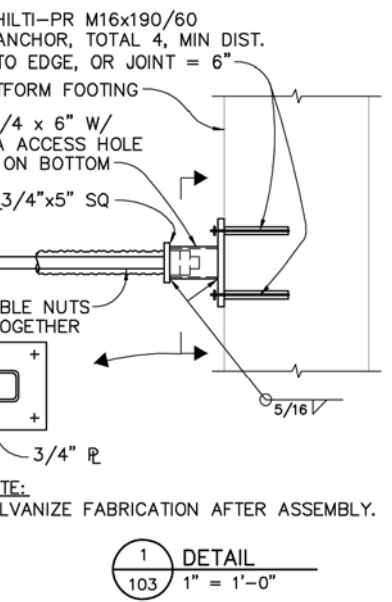
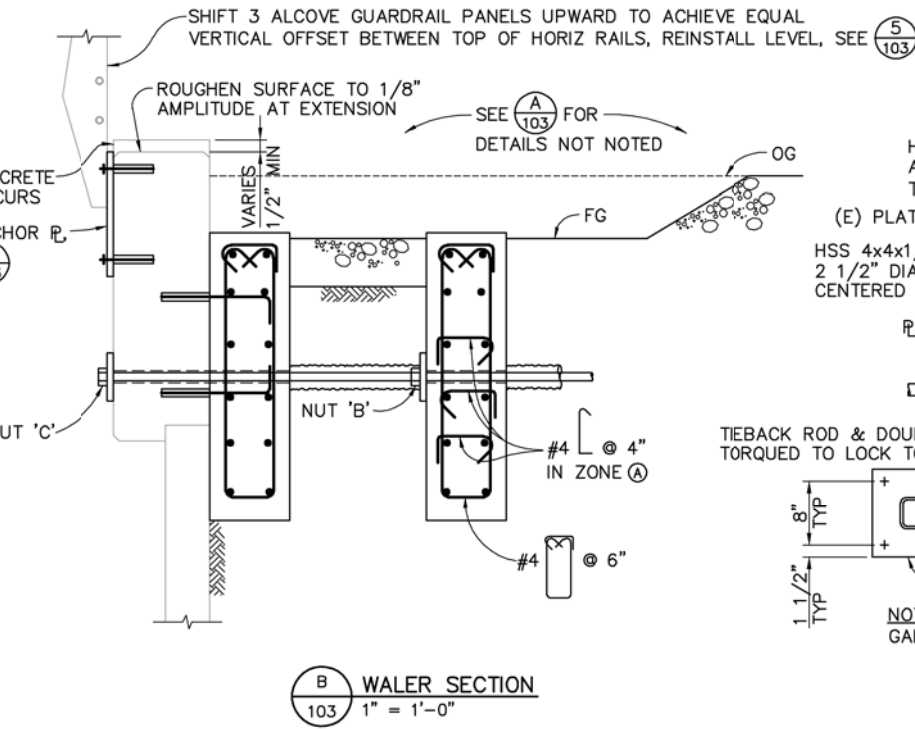
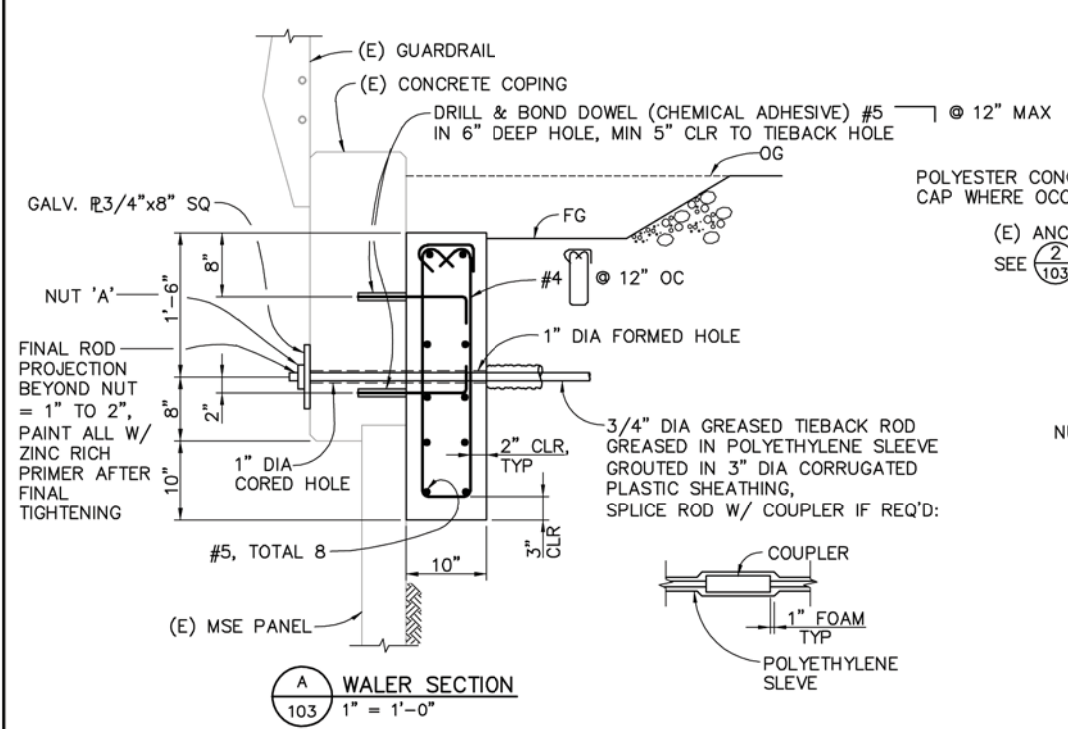
CADD FILE DATE: 10/06/20
SCALE: AS NOTED
SUBMITTAL DATE: 10/06/20
BOARD APPROVAL DATE:

HAMILTON STATION STABILIZATION PROJECT
STRUCTURAL
RETAINING WALL No. 1 & 2
GENERAL PLAN No. 2

PCA NO.:
CONTRACT NO.: C20046F
FILE LOCATION: W:\2016\2016117

SHEET	17
OF	18
DRAWING NO.	SW102
REVISION	0

2016117SM02 2016117



NO.	DATE	REVISIONS
0	100620	ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL ENGINEER
B
S3118
Exp. 12/31/21
STATE OF CALIFORNIA

SUBMITTED
BIGGS CARDOSA ASSOCIATES INC
STRUCTURAL ENGINEERS
365 The Alameda
San Jose, California 95126
408-296-5515

DESIGNED DBD
DRAWN DM

CHECKED MDS
CADD FILE NAME

BGR

Santa Clara Valley Transportation Authority
VA
Solutions that move you

APPROVED
RSE, INC.
1075 OLD COUNTY ROAD
BELMONT, CA 94002
WWW.RSERAIL.COM

CADD FILE DATE 10/06/20
SCALE AS NOTED
SUBMITTAL DATE 10/06/20
BOARD APPROVAL DATE

HAMILTON STATION STABILIZATION PROJECT
STRUCTURAL RETAINING WALL No. 1 & 2
SECTIONS AND DETAILS

PCA NO.
CONTRACT NO. C20046F
FILE LOCATION W:\2016\2016117

SHEET 18 OF 18
DRAWING NO. SW103
REVISION 0

2016117SW103 2016117

APPENDICES

Table of Contents

Appendix A	Insurance Requirements
Appendix B	Contract Data Requirements
Appendix C	Business Diversity Policy and Requirements
Appendix D	Federal Requirements
Appendix E	Policy on the Use of Personal Electronic Devices
Appendix F	VTA Restricted Access
Appendix G	Environmental Coordination and Cooperation
Appendix H	Federal Wage Determination
Appendix I	Reserved
Appendix J	Reserved
Appendix K	VTA Substitutions for Caltrans Specs
Appendix L	Reserved
Appendix M	Quality Assurance and Quality Control Requirements
Appendix N	Reserved
Appendix O	Reserved
Appendix P	Procedure on Reflective Safety Vests
Appendix Q	Light Rail System Safety Program Plan

Hamilton Station Stabilization
Contract C20046F

[This Page Intentionally Left Blank]

APPENDIX A INSURANCE REQUIREMENTS

Without limiting Contractor's indemnification of VTA, Contractor shall procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work by Contractor, its agents, representatives, or employees. The cost of such insurance shall be included in Contractor's Bid.

Certificates of Insurance

Contractor shall furnish VTA with a Certificate of Insurance. The certificates for each insurance policy are to be signed by an authorized representative of that insurer. The certificates will be issued on a standard ACORD Form. Contractor shall instruct their insurance broker/agent to submit all insurance certificates and required notices electronically in PDF format to the designated VTA Contract Administrator and email a copy to Insurance.Certificates@vta.org.

The certificates will:

1. identify the underwriters, the types of insurance, the insurance limits, the deductibles and the policy term;
2. include copies of all the actual policy endorsements required herein; and
3. in the "Certificate Holder" box include:

**Santa Clara Valley Transportation Authority
3331 North First Street
San José, CA 95134-1906
Contract No. C20046F**

In the Description of Operations/Locations/Vehicles/Special Items Box:

1. Certificate Holder shall be named as Additional Insured;
2. VTA contract number shall appear;
3. The list of policies scheduled as underlying on the Umbrella policy shall be listed; and
4. Waiver of Subrogation must be indicated as endorsed to all policies as stated in the Contract Documents.

All certificates and endorsements are to be received and approved by VTA before the Contract is executed. At any time, VTA reserves the rights to receive within three working days of request, complete, certified copies of all insurance policies.

If Contractor receives any notice that any of the insurance policies required by this Appendix A Insurance Requirements may be cancelled or coverage reduced for any reason whatsoever, Contractor or insurer shall immediately provide written notice to the designated VTA Contract Administrator that such insurance policy required by this Appendix A Insurance Requirements is canceled or coverage is reduced.

Maintenance of Insurance

If Contractor fails to maintain such insurance as is called for herein, VTA, at its option, may suspend payment for work performed and/or may order Contractor to suspend work at Contractor's expense until a new policy of insurance is in effect.

Renewal of Insurance

Contractor will provide VTA with a current Certificate of Insurance and endorsements within ten (10) business days from the expiration of insurance.

Contractor shall instruct its insurance broker/agent to:

1. Submit all renewals of insurance certificates and required notices electronically in PDF format to:

Insurance.Certificates@vta.org

2. Provide the following information in the "Certificate Holder" box:

Santa Clara Valley Transportation Authority ("VTA")
3331 North First Street
San José, CA 95134-1906
Contract No. C20046F

A. Liability and Workers' Compensation Insurance

1. Minimum Scope of Coverage

Coverage must be at least as broad as:

- a. General Liability coverage; Insurance Services Office "occurrence" form CG 0001. General Liability insurance written on a "claims made" basis is not acceptable. Completed Operations coverage must be continuously maintained for at least ten (10) years after Final Acceptance of the Work.
- b. Business Auto coverage, Insurance Services Office form number CA 0001, covering Automobile Liability, symbol "1" (Any Auto). Auto Liability written on a "claims made" basis is not acceptable.
- c. Workers' Compensation Insurance, as required by the Labor Code of the State of California, and Employer's Liability insurance.
- d. Contractor's Pollution Liability: covering liability arising out of the treatment, handling, storage, transportation, or accidental release of any hazardous material.
- e. Railroad Protective Liability insurance covering liability for work performed on or adjacent to VTA's light rail line(s) for bodily injury, property damage, including damage to VTA's property, equipment, and facilities; Insurance Services Office form number CG 0035. Contractor must apply for enrollment in VTA's Blanket Railroad Protective Liability program, for which VTA pays the premium directly to the insurer. Contractor must provide all necessary data for enrollment application, including but not limited to total Contract value (including Contractor's profit) on the entire project, and on that portion of the Work performed within 50 feet of the VTA rail Right of Way, measured from the nearest rail.

In the event that Contractor is rejected for enrollment in VTA's program, Contractor must purchase, at its own expense, its own stand-alone project-specific Railroad Protective Liability coverage, showing VTA as the Named Insured on the policy, covering liabilities arising out of work performed by Contractor within 50 feet of the VTA rail Right of Way, measured from the nearest rail, for bodily injury, property damage, including damage to VTA's property, equipment, and facilities, under ISO coverage form CG 00 35 04 13 or equivalent.

2. Minimum Limits of Insurance

- a. Contractor must maintain limits no less than:
 1. General Liability (including umbrella/excess liability): \$5,000,000 limit per occurrence for bodily injury, personal injury, and property damage. If General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit must apply separately to this project/location or the general

Hamilton Station Stabilization
C20046F

aggregate limit must be twice the required occurrence limit. This requirement may be satisfied by a combination of General Liability with Excess or Umbrella, but in no event may the General Liability primary policy limit per occurrence be less than \$5,000,000, unless Umbrella/Excess policies feature inception and expiration dates concurrent with the underlying General Liability policy, "Follow Form" coverage, and a "Drop Down" provision.

2. Automobile Liability (including umbrella/excess liability): \$5,000,000 limit per accident for bodily injury and property damage. This requirement may be satisfied by a combination of Auto with Excess or Umbrella, but in no event may the Automobile Liability primary policy limit per occurrence be less than \$5,000,000, unless Umbrella/Excess policies feature inception and expiration dates concurrent with the underlying auto liability policy, "Follow Form" coverage, and a "Drop Down" provision.
 3. Workers' Compensation and Employer's Liability: Statutory Workers' Compensation limits and Employer's Liability limits of \$1,000,000 per accident.
 4. Contractor's Pollution Liability: \$3,000,000 per occurrence. This requirement may be satisfied by a combination of Pollution Liability with Excess or Umbrella, but in no event may the Pollution Liability primary policy limit per occurrence be less than \$3,000,000, unless Umbrella/Excess policies feature inception and expiration dates concurrent with the underlying Pollution Liability policy, "Follow Form" coverage, and a "Drop Down" provision.
 5. Railroad Protective Liability: if required, \$5,000,000 Combined Single Limit for bodily injury and property damage, with \$10,000,000 annual aggregate.
- b. Notwithstanding any language in this Contract to the contrary, if Contractor carries insurance limits exceeding the minima stated in Section 2(a)(1)-(4) immediately above, such greater limits will apply to this Contract.

3. Self-Insured Retention

The certificate of insurance must disclose the actual amount of any deductible or self-insured retention, or lack thereof, for all coverages required herein. Any self-insured retention or deductible in excess of \$50,000 (\$100,000 if Contractor is a publicly-traded company) must be declared to and approved by VTA. If Contractor is a governmental authority such as a state, municipality or special district, self-insurance is permitted. To apply for approval for a level of retention or deductible in excess of \$50,000, Contractor must provide a current financial report including balance sheets and income statements for the past three years, so that VTA can assess Contractor's ability to pay claims falling within the self-insured retention or deductible. Upon review of the financial report, if deemed necessary by VTA in its sole discretion, VTA may elect one of the following options: to accept the existing self-insured retention or deductible; require the insurer to reduce or eliminate the self-insured retention or deductible as respects VTA, its directors, officers, officials, employees and volunteers; or to require Contractor to procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses. Applicable costs resulting

therefrom will be borne solely by Contractor. Contractor may request execution of a nondisclosure agreement prior to submission of financial reports.

B. Builder's Risk Insurance

To the extent allowed by law, Contractor is responsible for all loss or damage, howsoever caused, to the work and materials until final acceptance by VTA.

Contractor must procure and maintain at its own expense Builder's Risk insurance (including but not limited to Builder's Risk, Course of Construction, Installation Floater or similar first-party property insurance covering the interest of Contractor and VTA) as follows:

1. Coverage must be provided on an "all-risk" basis. Coverage does not need to include the perils of Earthquake and/or Flood.
2. Coverage must apply to all Work and materials under this Contract, whether in process or manufacture or finished, including off-site storage, "in transit" coverage to the final agreed upon destination of delivery, and including loading and unloading operations, and such coverage must be in force until the Work and materials are accepted by VTA.
3. Coverage must be in an amount no less than the full replacement value of the finished Work and materials with no periodic reporting requirements.
4. The deductible may not exceed \$50,000 (\$100,000 if Contractor is a publicly-traded company) per occurrence and must be borne by Contractor.
5. Loss, if any, must be adjustable with and payable to VTA as trustee for all entities having an insurable interest.

C. Claims Made Provisions

Claims-made coverage is never acceptable for General Liability or Auto Liability. Claims-made may be considered for Professional, Environmental/Pollution, or Cyber. For coverage written on a claims-made basis, it must be clearly stated on the Certificate of Insurance. In addition to all other coverage requirements, such policy must provide that:

1. The policy retroactive date must be no later than the date of this Contract.
2. If any policy is not renewed or the retroactive date of such policy is to be changed, Contractor must obtain or cause to be obtained the broadest extended reporting period coverage available in the commercial insurance market. This extended reporting provision must cover at least two (2) years.
3. No prior acts exclusion may be added to the policy during the contract period.
4. The policy allows for reporting of circumstances or incidents that might give rise to future claims.

D. Other Provisions

The policies must contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability

- a. VTA, its directors, officers, officials, employees and volunteers are to be named as additional insureds as respects: liability arising out of activities performed by or on behalf of the Contractor, including VTA's general supervision of the Contractor; products and completed operations of the Contractor and its subcontractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage must contain no special limitations on the scope of protection afforded to VTA, its directors, officers, officials, employees, or volunteers. Additional Insured endorsements must provide coverage at least as broad as afforded by the combination of ISO CG 20 10 10 01 and CG 20 37 10 01.
- b. Any failure to comply with reporting provisions of the policies may not affect coverage provided to VTA, its directors, officers, officials, employees, or volunteers.
- c. Contractor's insurance must apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
- d. The General Liability General Aggregate limit must apply per project, not per policy.
- e. The General Liability policy must be endorsed to remove the exclusion for railroad liabilities, with coverage at least as broad as afforded by ISO CG 24 17.

2. All Coverages

- a. The insurer must agree to waive all rights of subrogation against VTA, its directors, officers, officials, employees, and volunteers for losses arising from work performed by Contractor and its subcontractors for VTA.
- b. Contractor's insurance coverage must be primary insurance as respects VTA, its directors, officers, officials, employees, and volunteers. Self-insurance or insurance that may be maintained by VTA, its directors, officers, officials, employees, or volunteers may apply only as excess to Contractor's insurance. Contractor's insurance must not seek contribution from VTA's insurance program.

3. Other Insurance Provisions

- a. The Certificate must disclose the actual amount of the Deductible or Self-Insured Retention.
- b. If any coverage forms or endorsements required by this Contract are updated by their publishers, whether they be the insurance carrier(s), the Insurance Services Office, or the American Association of Insurance Services, during the duration of this Contract, VTA reserves the rights to require the Contractor to procure said coverage forms or endorsements using the updated versions upon the next renewal cycle.

E. Acceptability of Insurers

Insurance and bonds must be placed with insurers with an A.M. Best's rating of no less than A VII (financial strength rating of no less than A and financial size category of no less than VII), unless specific prior written approval has been granted by VTA.

Hamilton Station Stabilization
C20046F

(This page is intentionally left blank)



ALL QUESTIONS MUST BE ANSWERED AND APPLICATION MUST BE SIGNED.

VTA contract #

1. Name of Contractor

2. Address of Contractor

3. Name of project owner for whom work is being done:

4. Address

5. Physical Description of work being performed

5a. For VTA projects: is this capital or operations? Capital Operations

6. Total Cost of Contract

7. Total cost incurred within 50 feet

8. Location and Description of Contractor's work within 50 feet of railroad

8a. How many trains pass through the jobsite each day? 300

9. Anticipated start date

9a. # of total work days:

10. Anticipated completion date

11. If any movement of track, please describe

12. Confirm VTA is additional insured on Contractors policies: Yes No

13. Confirm VTA is held harmless in contract? Yes No

14. Confirm the contractual exclusion for work within 50 feet of a RR has been removed from the contractor's general liability, automobile and umbrella insurance policies.

15. Please attach project scope of services, and General Contractor's certificate of insurance, with the following endorsements attached: GL and Auto Additional Insured; GL Railroad CG 24 17; Waiver of Subrogation for all lines; Primary & Noncontributory for all lines; Separation of Insureds for all lines; Umbrella or Excess policy Schedule of Underlying Insurance; Umbrella or Excess Drop Down endorsement

Signed: to the best of my knowledge, the information provided above is true and correct.

See other side for premium coding (VTA projects only)

For VTA Use Only

VTA coding (for VTA projects only)

G/L Account
CO Area
Cost Center
Order
WBS Element
Fund
Functional Area
Funds Center

Funding Source
Grant
Commitment Item

APPENDIX B CONTRACT DATA REQUIREMENTS

Table B-2 Technical Submittals List is below. The Technical Submittal List is intended to summarize the requirements for submittals as specified in the Contract Documents

Other submittals shall be required in accordance with the Technical Specifications. If conflicts exist between the lists and the referenced paragraph, the referenced paragraph will take precedence. Refer to Contract Section 6.6 for additional information and requirements for contract data submittals and technical submittals.

Table B-2 Technical Submittals List

	Item	Reference *	Due Date/ Frequency	Comments
51001	Schedule of Values	7.59	Within 10 days following Notice of Award	6 copies
51002	Preliminary 120 day Progress Schedule	6.21	Within 14 working days following Notice of Award	6 copies
51004	Baseline CPM Schedule	6.21	Within 60 days following First Charged Day	6 copies
51005	Schedule Update	6.21	Within 7 days after end of each month	6 copies
51006	Quality Assurance Plan	6.26	Within 20 days following Notice of Award	6 copies
51007	Site Specific Safety Plan	6.14	"	6 copies
51008	Product Data Sheets	7.43	"	6 copies
51009	Material Safety Data Sheets (MSDS)	6.14	"	6 copies

Hamilton Station Stabilization
C20046F

	Item	Reference *	Due Date/ Frequency	Comments
51010	ESCAPE (Erosion & Sedimentation Control Action Plan Element)	Appendix G	Within 6 days following Notice of Award	1 copy
51011	Illness & Injury Prevention Plan	6.14	Within 6 working days following Notice of Award	1copy
51012	Operations and Maintenance (O&M) Manuals	—	Before Final Acceptance	Copies As Specified
51013	Warranties	7.73	Before Final Acceptance	As Specified
DIVISION 1 GENERAL REQUIREMENTS				
	Submittal schedule and List of products	01 33 00	Within 10 days after the effective date of Notice to Proceed	As specified
	Shop Drawings, product data and samples (manufacturers' standard schematic drawings, Contractor's or manufacturers' calculations, manufacturers' standard data, manufacturers' printed installation, assembly, erection, application, and placement instructions, sample item as specified, inspection reports, test reports, and certificates of compliance, submitted to VTA for information or record purposes, permits and licenses and other such documents are obtained in the VTA's name)	01 33 23	As required	As specified

Hamilton Station Stabilization
C20046F

	Item	Reference *	Due Date/ Frequency	Comments
	Contractor Structural Quality Control (Structural Quality Control Plan, qualification), Independent Testing Agency (Qualification)	01 45 30		3 copies
	Traffic Control (Staging plan, Traffic control drawings, Haul routes for station access and egress, Platform accessibility)	01 55 26	25 days prior staged activity or detour	6 copies
	Licensed land surveyor's information	01 71 23 1.02A	Min. 10 days prior to commencing the survey work	6 copies
	Survey field notes, calculation and other documents	01 71 23 1.02B	Upon request or 5 days in advance of payment	6 copies
	All notes, calculations, and drawings to accomplish the field engineering work.	01 71 23 1.02C	Within 30 days of completion of the work	2 copies
	Calculations used in establishing survey points, temporary benchmarks, stakes or control stakes for line and grade of the work.	01 71 23 1.02D	Within 5 working days of installation of stakes in the field	7 copies
	Project Record Documents	01 78 39 1.06	Before requesting for final inspection	6 copies
	Removal, Storage, Protection and Construction Plan	02 10 10		

Hamilton Station Stabilization
C20046F

	Item	Reference *	Due Date/ Frequency	Comments
	Portland Cement Concrete (Concrete Mix Design, product data, samples, affidavits/ certificates, batch tickets, quality control program, concrete mix designer information, and concrete technologist information)	03 05 15	10 working days before placing concrete	6 copies
	Concrete Forming (shop drawings, product data, samples)	03 11 00		
	Concrete Accessories (shop drawings, product data, samples)	03 15 00		
	Concrete Reinforcement (Shop drawings, product data, samples, certificates and laboratory test reports)	03 20 00	25 working days before staged activity	6 copies
	Cast-in-place Concrete (Shop drawings, product data, and records/reports)	03 30 00	25 working days before staged activity	6 copies
	Polyester Concrete (manufacturer's instructions, safety data sheets, testing data, and certificates of compliances)	03 30 53		
	High-Molecular-Weight Methacrylate (HMWM.) (manufacturer's instructions, safety data sheets, testing data, and certificates of compliances)	03 30 53		
	Concrete Finishing (shop drawings, product data, samples)	03 35 00		
	Precast Structural Concrete (shop drawings, product data, samples)	03 41 00		
	Backfill Grouting (grouting plan)	03 61 30		

Hamilton Station Stabilization
C20046F

	Item	Reference *	Due Date/ Frequency	Comments
	Metal Welding (welder qualifications, welding procedure specifications (WPS), welding records and data, and mill certificates)	05 05 22		
	Metal Fabrication (shop drawings and product data)	05 50 00		
	Tactile Warning Band (shop drawings, product data, samples, maintenance instructions, and quality assurance submittals)	09 65 00		
	Paints and Coatings (product data, samples, certificates of compliance, and manufacturers' review)	09 90 00		
	Earthwork (Test reports, samples, delivery tickets, quality plan, calculations and shop drawings)	31 00 00	25 working days before staged activity	6 copies
	Structural Backfill (site locations for earthwork materials)	31 23 23		
	Tieback Assembly (shop drawings, product data, grout mix design, mill certificates/ certificates of compliance for materials, tension measurements and procedures)	31 32 36		
	Utility Garde Adjustment (shop drawings, and product data)	33 05 10		

Hamilton Station Stabilization
C20046F

	Item	Reference *	Due Date/ Frequency	Comments
	Track work (Certificates of Compliance, shop drawings, procedures, test records, equipment, methods, surveys and data)	34 11 10	25 working days before staged activity	6 copies
	Ballast (Quarry qualifications test report, plan for handling and placing ballast)	34 11 14	25 working days before staged activity	6 copies
	Track Rehabilitation (Site specific work plans, procedures, methods, and equipment, work safety plan, work plan and testing procedures for protecting and replacing system related items, work plan for protecting existing items)	34 11 20	25 working days before staged activity Work Plan: 60 days before commencing track work	6 copies
	Timber Ties (Shop drawings, certificates, methods, marking scheme, test records, certified test reports)	34 11 31	30 working days before fabrication work	6 copies

APPENDIX C
BUSINESS DIVERSITY POLICY AND REQUIREMENTS
(Ref DBE Goal)

Table of Contents

1.1	Policy.....	3
1.2	DBE Participation Goal.....	3
1.3	Counting DBE Participation toward the Goal.....	3
1.4	Certification.....	3
1.4.1	Firms Certified.....	3
1.4.2	Expired Certification.....	4
1.5	Bid Submittals.....	4
1.5.1	Bid Form 4.....	4
1.5.2	Bid Form 5.....	4
1.5.3	Good Faith Effort.....	4
1.6	Award of the Contract.....	4
1.7	Compliance.....	4
1.8	Good Faith Efforts.....	4
1.8.1	General.....	4
1.8.2	Good Faith Criteria.....	5
1.8.3	Presumption.....	7
1.8.4	Verification of Information.....	7
1.9	Commitment.....	8
1.10	Non-Discrimination.....	8
1.11	Substitution of DBE Subcontractors by non-DBE Contractor.....	8
1.11.1	Prior Written Consent.....	8
1.11.2	Substitution Process.....	8
1.11.3	Penalty.....	9
1.12	Reports.....	9
1.12.1	Monthly DBE Utilization Report.....	9
1.12.2	Final DBE Utilization Report.....	9
1.12.3	Failure to Submit Reports.....	9
1.13	Change Orders, Extra Work and Allowances.....	9
1.14	Prompt Payment.....	10
1.15	Enforcement Actions.....	10
1.16	Contractor Assurances (as required by 49 C.F.R. 26.13).....	10

[This Page Intentionally Left Blank]

1.1 Policy

It is the policy of Santa Clara Valley Transportation Authority (VTA) to ensure that Disadvantaged Business Enterprises (DBE) as defined in federal regulations at 49 CFR Part 26 have the opportunity to participate in the performance of contracts and subcontracts financed with Federal funds.

VTA's Office of Business Diversity Program encourages Contractors to call (408) 321-5962 for assistance in identifying eligible DBE firms. Listings of eligible firms are also available on the following website:

<https://dot.ca.gov/programs/civil-rights/dbe-search>

1.2 DBE Participation Goal

A DBE participation goal has been established as stated in the Invitation for Bid and the Bid Forms for this Contract.

1.3 Counting DBE Participation toward the Goal

DBE firms may perform as prime contractors, subcontractors to a prime (1st tier), or subcontractor to subcontractor (2nd tier). Only the value of the work actually performed by the DBE, including materials and supplies, will be counted toward the DBE participation goal.

A DBE must perform a commercially useful function; i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work. If a DBE does not perform or exercise responsibility of at least 30% of the total cost of its contract with its own work force, or if the DBE subcontracts a greater portion of work of a contract than would be expected on the basis of normal industry practice, then it will be presumed that the DBE is not performing a commercially useful function.

Credit for a DBE vendor of materials or supplies is limited to 60% of the amount to be paid to the vendor for the materials or supplies unless the vendor manufactures or substantially alters the goods. Credit for DBE brokers is limited to only the fees and commissions portion of the amount paid. All other firms receive 100% credit, less work subcontracted by the DBE to non-DBE firms, toward the DBE goal.

Credit for DBE trucking firms is limited to the amount performed by the DBE's own trucks and drivers and by certified DBE trucking subhaulers. A DBE trucking firm must itself own and operate at least one fully licensed, insured and operational truck used on the contract.

In a joint venture, only the portion of the total dollar value of the Contract equal to the distinct, clearly-defined portion of the Work of the Contract that the DBE performs with its own forces will be counted toward the DBE goal.

Bidders are encouraged to utilize services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals in VTA's community and marketplace.

1.4 Certification

1.4.1 Firms Certified

All DBE firms listed on the Bid Forms must be certified by the California Unified Certification Program (CUCP) at the time of Bid to be counted toward the DBE participation goal.

1.4.2 Expired Certification

During the life of a contract, work performed by DBE firms whose certification has expired will not continue to be counted toward the DBE participation goal. Only work performed by a certified DBE firm will be counted toward the DBE participation goal when the DBE firm has been paid.

1.5 Bid Submittals

1.5.1 Bid Form 4

Bid Form 4 lists DBE Bidder plus the subcontractor(s) or supplier(s) Bidder intends to use and count toward the DBE participation goal, with a complete description of services or supplies to be provided by each, work which the DBE further subcontracts to non-DBE firms, and the dollar value of each such subcontracting or supplies transaction. Instructions for completing the form are provided on the form.

1.5.2 Bid Form 5

Bid Form 5 is Supplemental Contractor and Subcontractor information. Instructions for completing the form are provided on the form.

1.5.3 Good Faith Effort

A Bidder not achieving the DBE participation goal must submit a report documenting that it made sufficient efforts to meet the DBE participation goal. Documentation of Good Faith Effort must be provided in accordance with Appendix C Section 1.8 Good Faith Efforts.

1.6 Award of the Contract

VTA will award this Contract to the lowest responsible and responsive bidder as required by federal and California laws and VTA DBE policy.

Following the bid opening and submittal of all documentation, VTA will evaluate all bids and required information submitted by bidders to formulate a recommendation for award of the Contract. The bidder with the lowest bid price who also meets the specified DBE participation goal or demonstrates that sufficient good faith efforts, for those contracts with a specific goal vs. non-specific goal (NSG), were made to meet the specified DBE participation goal will be deemed the lowest responsible and responsive bidder.

1.7 Compliance

VTA will advise Bidder of its compliance with the contract DBE participation goal or with the good faith efforts documentation requirements.

1.8 Good Faith Efforts

1.8.1 General

To determine whether a Bidder that has failed to meet the DBE participation goal may be awarded the Contract, VTA will decide whether the Bidder made adequate “good faith efforts”, where applicable, to meet the goal.

“Good faith efforts” means all necessary and reasonable steps to achieve the DBE participation goal which by their scope, intensity and appropriateness, could reasonably be expected to fulfill the goal. Only those

efforts made prior to Bid Opening will be considered in evaluating good faith efforts. Mere *pro forma* efforts are not sufficient good faith efforts to meet the DBE contract requirements.

Bidders are expected to be directly responsible for performing the good faith efforts requirements of this Contract. Bidder's use of third parties to support its good faith efforts is at Bidder's own risk and does not relieve the Bidder from being responsible for meeting the good faith efforts requirements.

VTA may request ancillary or omitted documentation required to complete Bidder's good faith efforts submittal.

1.8.2 Good Faith Criteria

The criteria listed below are reflective of good faith efforts undertaken by a Bidder actively and aggressively seeking to meet the goal:

- (a) **Pre-Bid Meeting.** Bidder attended any pre-solicitation or pre-Bid meetings that were scheduled by VTA to inform Bidders of the Small Business Enterprise Program requirements for this Contract. VTA may waive this requirement if it determines from the documentation submitted that Bidder is informed as to those program requirements.
- (b) **Identification of DBE Participation Opportunities.** Bidder identified and selected specific items of the Work to be performed by DBE firms to provide genuine opportunities for participation by DBE firms. Bidder shall provide documentation showing the items that were identified and selected and shall describe how such items were utilized by Bidder to solicit DBE participation. Where appropriate, Bidder should be able to show that Bidder broke out Contract work to facilitate DBE participation, even when Bidder preferred to perform this portions of the Work with its own forces.
- (c) **Advertisements.** At least ten calendar days¹ before the Bid Opening, Bidder solicited sub-bids from DBE firms for specified categories of work or materials or supplies for the contract through advertisements (not simply the listing of planholders) placed in two or more of the following media, one of which shall be from each of the following two categories:

Category I

Daily Pacific Builder
300 American Metro Blvd., Suite 185
Hamilton, NJ 08619
(888) 814-0513

OR

Daily Construction Service
P. O. Box 1748
Glen Ellen, CA 95442
Email: vicki.darmiento@cmdgroup.com
(800) 242- 9747

Category II

Small Business Exchange

¹ The time of requirements for advertising [Section 7.1c)] and written notice [Section 7.1d)] shall apply only those contracts for which VTA has issued public notice of the contract at least 15 calendar days prior to bid opening.

795 Folsom Street, First Floor
San Francisco, CA 94107
(415) 778-6250

- (d) **Written Notice.** At least ten calendar days before the Bid Opening, Bidder provided written notice to a sufficient number of DBE certified firms in each subcontracting work category, and to such firms in each category of materials or supplies for the project. Written notice to a minimum of ten (10) firms shall constitute a sufficient number of firms to be notified if the approved databases contain at least 10 firms for that category.

Written notice shall be sent first to “local firms”, then, where none are available or remain, to out-of-area firms. “Local” shall mean Santa Clara County and its contiguous counties, as well as Sacramento and San Joaquin Counties.

- (e) **Follow-up of Initial Solicitations.** Bidder followed up initial solicitations of interest by contacting the DBE firms to determine with certainty whether the firms were interested in bidding on the project. Such follow-up activity shall be documented with telephone and or fax logs or other written documentation that shall be submitted to VTA and that shall set forth, at a minimum, the following information:

- The type of contact; i.e., telephone, meeting, letter, fax, or e-mail;
- The name of the DBE firm contacted;
- The date and time the DBE firm was contacted;
- The full name, title, telephone or fax number, and e-mail address of the person at the DBE firm contacted by Bidder;
- The responses of each of the DBE firms contacted with regard to its interest in submitting a sub-bid; and
- For each DBE firm contacted that declined to bid, the reason(s) provided by the DBE firm for declining to bid.

- (f) **Information Regarding Plans, Specifications, and Requirements.** Bidder provided interested DBE firms with information about the plans, specifications and requirements for selected subcontracting or materials or supplies work. Bidder shall describe the information provided to interested firms, report the name of the firms involved, and set forth the date and method of providing such information.

- (g) **Request for Assistance in the Recruitment of DBE Firms.** Bidder requested assistance from federal, state, and local agencies for lists of DBE firms, as accepted or approved by VTA, on a case-by-case basis. Bidder is responsible for receiving approval from VTA prior to listing DBE firms of other agencies not certified or approved by VTA. Bidder shall state the agencies contacted, names of persons contacted, date and method of contact and results of contacts.

- (h) **Good-Faith Evaluation of and Negotiation with Interested DBE Firms.** Bidder evaluated the proposals of and negotiated in good faith with interested DBE firms, and did not unjustifiably reject DBE firm(s) as unsatisfactory or unqualified without sound reasons based on a thorough assessment of the capabilities of the firm(s) in question. Bidder shall list all DBE responses to the solicitation, and all DBE sub-bids which were received but not used. **NOTE: If no DBE bids are received, this fact must be stated.** Bidder shall provide, at a minimum, the following information:

- Contacting bonding and/or insurance companies on behalf of a DBE firm;

- Arranging with sureties phased or incremental bonding for the DBE firm;
- Waiving bonds or insurance requirements;
- Referring DBE firms to resource agencies which may assist DBE firms to obtain bonding, insurance or lines of credit, such as the Small Business Administration (SBA); or
- Making efforts to assist interested DBE firms in obtaining necessary equipment, supplies, materials, or related assistance or services.

The ability of or desire of a prime Contractor to perform the Work with its own firm does not relieve the Bidder of the responsibility to make sufficient good faith efforts. Prime Contractors are not required to accept higher quotes from DBE firms if the price difference is excessive or unreasonable when compared to industry standards.

(i) **Advice and Assistance to Interested DBE Firms.** Bidder advised and made efforts to assist those DBE firms requesting help in obtaining bonds, lines of credit or insurance required by VTA or Bidder. Assistance may include, but is not limited to:

- Contacting bonding and/or insurance companies on behalf of a DBE firm;
- Arranging with sureties phased or incremental bonding for the DBE firm;
- Waiving bonds or insurance requirements;
- Referring DBE firms to resource agencies which may assist DBE firms to obtain bonding, insurance or lines of credit, such as the Small Business Administration (SBA); or
- Making efforts to assist interested DBE firms in obtaining necessary equipment, supplies, materials, or related assistance or services.

Bidder shall state whether any such advice or assistance was given and to whom, the dates of any such advice or assistance, and a description of the advice or assistance provided.

(j) **Efforts to Obtain DBE Firms Could Reasonably Be Expected to Meet Goals.** Bidder's efforts to obtain DBE firm participation could reasonably be expected by VTA to produce a level of participation sufficient to meet the goals and requirements of VTA. Bidder shall provide any additional data to support a demonstration of good faith efforts to produce the level of DBE participation sufficient to meet the goal for this Contract.

(k) **Performance of Other Bidders to be Taken into Account.** The performance of other Bidders in meeting the DBE participation goal may be taken into account by VTA. If, for example, the apparent low Bidder fails to meet the DBE participation goal but other Bidders meet the goal, this may be taken into consideration in considering whether the apparent low Bidder made good faith efforts to meet the goal.

1.8.3 Presumption

Satisfaction of the criteria above will create a rebuttable presumption that Bidder has made an adequate good faith effort to comply with the goal and requirements of VTA for DBE participation for this Contract.

1.8.4 Verification of Information

VTA may verify the accuracy or completeness of any or all of the documentation submitted by Bidder by directly contacting the listed DBE firms or through other means.

1.9 Commitment

The DBE Goal Achieved in the approved Bid Form 4 equates to a commitment from the Contractor. The Contractor must meet this commitment ("DBE Commitment") regardless of the participation goal stated during Contract advertisement.

1.10 Non-Discrimination

Contractor shall make VTA's contracting requirements known to subcontractors, vendors and suppliers who are certified or accepted as certifiable as a DBE firm, as well as to non-DBE firms, and shall provide a practical opportunity for all firms to participate in this Contract.

1.11 Substitution of DBE Subcontractors by non-DBE Contractor

1.11.1 Prior Written Consent

A DBE subcontractor or supplier shall not be replaced without the prior written consent of VTA.

1.11.2 Substitution Process

Contractor shall make good faith efforts to find another DBE subcontractor or supplier to substitute for the original DBE that is unwilling or unable to perform the Work. The efforts employed by the Contractor shall be those that one could reasonably expect a Contractor to take if the Contractor were actively and aggressively trying to engage a certified DBE firm to substitute for a DBE firm that has to be replaced and shall include the following:

- (a) Contractor shall immediately notify VTA in writing of its intent to replace a DBE firm, and of the reasons therefore, prior to any solicitation or advertisement for replacement firms. A copy of the notice shall be provided to the VTA Office of Business Diversity Program (OBDP).
- (b) VTA will provide written notice to the DBE firm of Contractor's request for substitution and of the reasons therefore and they will be requested to provide any written objections within five working days.
- (c) Contractor shall utilize the following sources for identifying certified DBE firms for solicitation: California DBE Uniform Certification Program database.
- (d) Contractor shall provide written notice to at least five firms in each work or material/supply category to be substituted. If Contractor provides written notice to less than five firms Contractor shall explain to OBDP in writing why the number of firms solicited was sufficient. Written notice shall be sent first to firms located in the County of Santa Clara and its contiguous counties as well as Sacramento and San Joaquin counties ("local firms") and then, where appropriate, to out-of-area DBE firms.
- (e) Contractor shall contact the DBE firms solicited to determine with certainty whether the firms are interested in bidding on the project. This follow-up shall be documented with telephone logs, fax logs or other written documentation and submitted to OBDP.
- (f) Contractor shall provide OBDP with the following information:
 - A list and copies of all DBE and non-DBE responses to the solicitation, including all bids received;
 - If a bid is rejected by Contractor, the reasons for the rejection;

- If Contractor rejected a DBE firm as unqualified, a description of the qualification assessment conducted by Contractor and the factors considered.

1.11.3 Penalty

A Contractor who fails to use good faith efforts to replace a DBE firm with another DBE firm may be subject to the imposition of a penalty of up to 15% of the value of the work of the subcontractor or supplier replaced.

1.12 Reports

1.12.1 Monthly DBE Utilization Report

Contractor must submit monthly DBE Utilization Reports electronically to the DBE Administrator, VTA Office of Business Diversity Program. These monthly report shall be submitted electronically and the Contractor will document the dollar value of payments to DBE firms, and the percentage of the Contract completed. VTA will monitor the Contract for compliance with DBE requirements.

This system is web-based, accessible from any computer via the internet at: <https://vta.sdbde.com>.

Contractor and each subcontractor will receive an email providing them with Log On identification, and a temporary password and instructions on how to use the system. Classroom training will also be provided. Other assistance will be provided upon request.

Contractor will include this requirement in all of its subcontracts and purchase orders when required to provide or verify DBE utilization documentation.

If the DBE Utilization Reports indicate potential problems, such as a failure to meet the DBE Commitment, the Contractor shall meet with the appropriate VTA representative(s) to address any deficiencies and discuss appropriate corrective actions. When the Contract completion reaches 50% and the DBE utilization percentage participation goal completed is less than 50% of the DBE Commitment, a detailed report of the reasons why must be submitted to VTA stating a plan to reach the DBE Commitment by Contract completion.

1.12.2 Final DBE Utilization Report

Prior to final payment, Contractor will be required to submit a final DBE Utilization Report. In addition to payments to the DBE firms, the final report must include payments to and other information about all other businesses, including non-DBE subcontractors, suppliers of materials, trucking firms, consultants and others.

1.12.3 Failure to Submit Reports

Failure by Contractor to submit required reports as described above may be considered grounds for a determination by VTA of non-responsibility in consideration of Contractor's eligibility to bid on or be awarded future work.

1.13 Change Orders, Extra Work and Allowances

Including all change or extra work and allowances, Contractor shall maintain the contractual DBE goal throughout the life of the Contract or make good faith efforts to meet the DBE participation goal.

1.14 Prompt Payment

Contractor must adhere to all Federal and California prompt payment laws and regulations. See also 7.61, Prompt Payment. If Contractor does not adhere to prompt payment requirements, penalties may apply.

1.15 Enforcement Actions

VTA will bring to the attention of U.S DOT any false, fraudulent, or dishonest conduct in connection with its DBE Program, so that U.S. DOT can take the steps (i.e., referral to the Department of Justice for criminal prosecution, referral to the U.S. DOT Inspector General, action under suspension and debarment or Program Fraud and Civil Remedies rules) provided in 49 CFR 26.107. VTA will consider similar action under its own legal authority, including responsibility determinations in any future contracts.

1.16 Contractor Assurances (as required by 49 C.F.R. 26.13)

The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contractor. The Contractor shall carry out applicable requirements of 49 CFR part 26 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 recipient² deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the Contractor from future bidding as non-responsible.

Contractor must include this assurance in each of its subcontracts related to this Contract.

² "Recipient" is VTA.

APPENDIX D FEDERAL REQUIREMENTS

TABLE OF CONTENTS

1. Federal Laws and Regulations
2. Changes to Federal Requirements
3. No Federal Government Obligations to Third Parties
4. False or Fraudulent Statements and Claims
5. Access to Records and Reports
6. Civil Rights
7. Geographic Restrictions
8. Buy America
9. Lobbying Restrictions
10. Clean Air
11. Clean Water
12. Cargo Preference
13. Fly America
14. Construction Employee Protections
15. Seismic Safety
16. Energy Conservation
17. Subcontracts
18. Incorporation of Federal Transit Administration (FTA) Terms

1. **Federal Laws and Regulations.** In performance of its obligations pursuant to this Contract, Contractor agrees to comply with all applicable provisions of Federal, state, and local law, regulations, and Federal Transit Administration (FTA) directives.
2. **Changes to Federal Requirements.** The terms of the most recent amendment to any Federal, state or local law, regulations, FTA directives, and amendments to the grant or cooperative agreement providing funding for this Contract that may be subsequently adopted, are applicable to this Contract to the fullest extent feasible, unless FTA provides otherwise in writing.
3. **No Federal Government Obligations to Third Parties.** Contractor agrees that, absent the Federal Government's express written consent, the Federal Government shall not be subject to any obligations or liabilities to any subrecipient, any third party contractor, or any other person not a party to this Contract, the Grant Agreement or Cooperative Agreement in connection with the performance of the Project. Notwithstanding any concurrence provided by the Federal Government in or approval of any solicitation, subagreement, or third party contract, the Federal Government continues to have no obligation or liabilities to any party, including Contractor and any third party contractor.
4. **False or Fraudulent Statements and Claims.** Contractor acknowledges and agrees as follows:

- a. Contractor recognizes that the requirements of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§ 3801 et seq. and U.S. Department of Transportation (DOT) regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions pertaining to the Project. Accordingly, by signing this Contract, Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, or it may make pertaining to the matters covered by this contract. In addition to other penalties that may be applicable, Contractor also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986, as amended, on Contractor to the extent the Federal Government deems appropriate.
- b. Contractor also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. chapter 53, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5323(l) on Contractor, to the extent the Federal Government deems appropriate.
- c. Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

5. Access to Records and Reports. Contractor agrees as follows:

- a. Record Retention. Contractor will retain, and will require its subcontractors of all tiers to retain, complete and readily accessible records related in whole or in part to the Contract, including, but not limited to, data, documents, reports, statistics, sub-agreements, leases, subcontracts, arrangements, other third party agreements of any type, and supporting materials related to those records.
- b. Retention Period. Contractor agrees to comply with the record retention requirements in accordance with 2 C.F.R. § 200.333. Contractor shall maintain all books, records, accounts and reports required under this Contract for a period of at not less than three (3) years after the date of termination or expiration of this Contract, except in the event of litigation or settlement of claims arising from the performance of this Contract, in which case records shall be maintained until the disposition of all such litigation, appeals, claims or exceptions related thereto.
- c. Access to Records. Contractor agrees to provide sufficient access to FTA and its contractors to inspect and audit records and information related to performance of this contract as reasonably may be required.
- d. Access to the Sites of Performance. Contractor agrees to permit FTA and its contractors access to the sites of performance under this contract as reasonably may be required.

6. Civil Rights. Under this Contract, Contractor shall at all times comply with the following requirements and shall include these requirements in each subcontract entered into as part thereof.

- a. **Nondiscrimination.** In accordance with Federal transit law at 49 U.S.C. § 5332, Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, disability, or age. In addition, Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.
 - b. **Race, Color, Religion, National Origin, Sex.** In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e et seq., and Federal transit laws at 49 U.S.C. § 5332, Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. chapter 60, and Executive Order No. 11246, "Equal Employment Opportunity in Federal Employment," September 24, 1965, 42 U.S.C. § 2000e note, as amended by any later Executive Order that amends or supersedes it, referenced in 42 U.S.C. § 2000e note. Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, national origin, or sex (including sexual orientation and gender identity). Such action shall include, but not be limited to, the following: employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.
 - c. **Age.** In accordance with the Age Discrimination in Employment Act, 29 U.S.C. §§ 621-634, U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, "Age Discrimination in Employment Act," 29 C.F.R. part 1625, the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 et seq., U.S. Health and Human Services regulations, "Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance," 45 C.F.R. part 90, and Federal transit law at 49 U.S.C. § 5332, Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.
 - d. **Disabilities.** In accordance with section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, the Americans with Disabilities Act of 1990, as amended, 42 U.S.C. § 12101 et seq., the Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 et seq., and Federal transit law at 49 U.S.C. § 5332, Contractor agrees that it will not discriminate against individuals on the basis of disability. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.
7. **Geographic Restrictions.** Contractor agrees to refrain from using state or local geographic preferences, except those expressly mandated or encouraged by Federal statute, and as permitted by FTA.
 8. **Buy America.** Contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. part 661, which provide that Federal funds may not be obligated unless all steel, iron, and manufactured products used in FTA funded projects are produced in the United States, unless a waiver has been granted by

FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. § 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. § 661.11.

9. Lobbying Restrictions. Contractor acknowledges and agrees as follows:

- a. No Federal appropriated funds have been paid or will be paid, by or on behalf of Contractor, to any person for influencing or attempting to influence an officer or employee of VTA, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of VTA, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, Contractor shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- c. Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.
- d. Contractor shall submit certification (Bid Form 21) as a material representation of fact upon which reliance was placed when this Contract was made or entered into. Submission of this certification is a prerequisite for making or entering into this Contract imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

10. Clean Air. Contractor agrees as follows:

- a. Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. Contractor agrees to report each violation to VTA and understands and agrees that VTA will, in turn, report each violation as required to assure notification to FTA and the appropriate Environmental Protection Agency (EPA) Regional Office.
- b. Contractor agrees to report and require each third party subcontractor at any tier to report any violation of these requirements resulting from any Project implementation activity of a third party subcontractor or itself to FTA and the appropriate U.S. EPA Regional Office.

11. Clean Water. Contractor agrees as follows:

- a. Contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251 et seq. Contractor agrees to report each violation to VTA and understands and agrees that VTA will, in turn, report each violation as required to assure notification to FTA and the appropriate Environmental Protection Agency (EPA) Regional Office.
- b. Contractor agrees to report and require each third party subcontractor at any tier to report any violation of these requirements resulting from any Project implementation activity of a third party subcontractor (at any tier) or itself to FTA and the appropriate U.S. EPA Regional Office.

12. Cargo Preference. Contractor agrees as follows:

- a. For third-party contacts that may involve equipment, materials, or commodities which may be transported by ocean vessels, Contractor and subcontractors must comply with 46 U.S.C. Section 55303 and 46 CFR Part 381, "Cargo Preferences-U.S. Flag Vessels."
- b. To utilize privately owned United States flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, materials, or commodities pursuant to this Contract to the extent such vessels are available at fair and reasonable rates for United States - flag commercial vessels.
- c. To furnish within 20 days following the date of loading for shipments originating within the United States, or within 30 working days following the date of loading for shipment originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (1) above to the recipient (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, 400 Seventh Street, SW, Washington, D.C. 20590, and to VTA, marked with appropriate identification of the project.
- d. To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this Contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

13. Fly America. Contractor agrees as follows:

- a. When Federal funds are used to fund travel, Section 5 of the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) (Fly America Act) requires contractors, recipients, and others use U.S.-flag air carriers for U.S. Government-financed international air transportation of personnel (and their personal effects) or property, to the extent that service by those carriers is available. It requires the Comptroller General of the United States, in the absence of satisfactory proof of the necessity for foreign-flag air transportation, to disallow expenditures from funds, appropriated or otherwise established for the account of the United States, for international air transportation secured aboard a

foreign-flag air carrier if a U.S.-flag air carrier is available to provide such services. If available, Contractor, in performing work under this contract, shall use U.S.-flag carriers for international air transportation of personnel (and their personal effects) or property.

- b. Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements.
- c. Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

14. Construction Employee Protections. For construction activities exceeding \$2,000 performed in connection with the Contract, Contractor agrees to comply with the following construction employee requirements:

- a. Prevailing Wage and Anti-Kickback. For all prime construction, alteration or repair contracts in excess of \$2,000 awarded by FTA, Contractor shall comply with the Davis-Bacon Act and the Copeland "Anti-Kickback" Act. Under 49 U.S.C. § 5333(a), prevailing wage protections apply to laborers and mechanics employed on FTA assisted construction, alteration, or repair projects. Contractor will comply with the Davis-Bacon Act, 40 U.S.C. §§ 3141-3144, and 3146-3148 as supplemented by DOL regulations at 29 C.F.R. part 5, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction." In accordance with the statute, Contractor shall pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, Contractor agrees to pay wages not less than once a week. Contractor shall also comply with the Copeland "Anti-Kickback" Act (40 U.S.C. § 3145), as supplemented by DOL regulations at 29 C.F.R. part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States." Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled.
- b. Contract Work Hours and Safety Standards Act. For all contracts in excess of \$100,000 that involve the employment of mechanics or laborers, Contractor shall comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701-3708), as supplemented by the DOL regulations at 29 C.F.R. part 5. Under 40 U.S.C. § 3702 of the Act, Contractor shall compute the wages of every mechanic and laborer, including watchmen and guards, on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchase of supplies or materials or articles ordinarily available on the open market, or to contracts for transportation or transmission of intelligence.

- c. In the event of any violation of the clause set forth herein, Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of this clause in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by this clause.
 - d. The FTA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the prime contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in this section.
15. **Seismic Safety.** Contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation (DOT) Seismic Safety Regulations 49 C.F.R. part 41 and will certify to compliance to the extent required by the regulation. Contractor also agrees to ensure that all work performed under this Contract, including work performed by a subcontractor, is in compliance with the standards required by the Seismic Safety regulations and the certification of compliance issued on the project.
16. **Energy Conservation.** Contractor agrees to comply with the mandatory energy efficiency standards and policies within the applicable state energy conservation plans issued in compliance with the Energy Policy and Conservation Act, as amended, 42 U.S.C. §§ 6201 et seq.
17. **Subcontracts.** If required by law, Contractor shall include the provisions of this Appendix entitled **Federal Requirements**, modified only to show the particular contractual relationship, in all its contracts connected with this Contract.
18. **Incorporation of Federal Transit Administration (FTA) Terms.** The preceding provisions include, in part, certain Standard Terms and Conditions required by Department Of Transportation, whether or not expressly set forth in the preceding agreement provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F, dated March 18, 2013 (Rev. 4), are hereby incorporated by reference. Anything relating to this Agreement herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. Contractor shall not perform any act, fail to perform any act, or refuse to comply with any of VTA's requests which would cause VTA to be in violation of the FTA terms and conditions.

[This Page Intentionally Left Blank]

APPENDIX E

POLICY ON THE USE OF PERSONAL ELECTRONIC DEVICES

Refer to Contract Special Conditions Section 6.15.2 Use of Electronic Devices regarding compliance with the California Public Utilities Commission (CPUC) requirements, including the notice that the use of personal electronic devices is prohibited at all times when within 6 feet of the Track Zone (an area within 6 feet of the closest rail on both sides of the track).

Refer to the attached VTA policy “Use of Personal Electronic Devices by Bus and Light Rail Employees and Contractor Staff”.

[This Page Intentionally Left Blank]

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017

1.0 Purpose:

To establish the standards and restrictions for use of Personal Electronic Devices (PEDs).

2.0 Scope:

This policy applies to all VTA employees, contractors or their staff (hereafter collectively referred to as “Personnel”), who:

- Operate a VTA bus or Light Rail Vehicle (LRV);
- Operate hi-rail or any other on-track equipment;
- Act as Rail Controllers, flaggers, or the Employee In Charge (EIC) or otherwise control the movement of rail vehicles;
- Perform any task while Fouling the Tracks; and/or
- Perform work within the Safety Envelope.

Note: Electronic devices prescribed by a licensed medical practitioner to permit an employee to meet minimum levels as required by VTA or by a contractor performing work on VTA property, are exempt. Roadway Worker Protection Devices provided by VTA are also exempt.

3.0 Responsibilities:

All Personnel are responsible for the safe delivery of transportation services. All Personnel who operate vehicles in revenue service or operate hi-rail vehicles or other on-track equipment; or who control the movement of rail vehicles or perform work on the right of way will receive a copy of this Policy, and be responsible for strict adherence to this Policy and State and Federal regulations.

4.0 Policy:

It is VTA policy that all VTA-owned revenue service vehicles, or any hi-rail vehicles and on-track equipment operated on the VTA rail system, will be operated in a safe and responsible manner. Personnel who operate a VTA bus or LRV or control the movement of rail vehicles, or perform work on the right of way or Foul the Tracks in the performance of their duties are responsible for the safety of the passengers and the public at large. Personnel are prohibited from using cellular telephones or any other PEDs (as defined in section 5) while operating VTA buses, LRVs, hi-rail or other on track equipment.



Original Date:	Supersede Date:	Revision Date:	Page 1 of 6
06/12/2009	03/05/2012	04/10/2017	

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017

4.1 Restrictions and Storage:

- 4.1.1 For Personnel operating a VTA bus or LRV, the restrictions include, but are not limited to: making or receiving telephone calls, text messaging, checking e-mail messages, checking the time, using the clock feature of a cell phone, wearing a Fitbit or other fitness monitoring device, wearing a smart watch (e.g., Apple Watch, Samsung Gear, etc.) or similar watch, reading, playing games or listening to music or other audio. Personnel are prohibited from giving the PED to another person, including another employee, on the bus or LRV.

In an emergency, Personnel must proceed to a safe area and stop the bus, LRV, hi-rail vehicle, or on-track equipment, and vacate the operating area. Afterwards, Personnel may use a PED for the purposes of addressing the emergency.

All PEDs shall be Turned Off and Stowed Away while operating a bus or LRV, or while sitting in the Operator's Area, as defined in Section 5. The bag that the PED is stowed away in must conceal the device so that it is not visible without opening the bag. Employees acting in a management or supervisory role and who are not operating a bus or LRV, or otherwise functioning in an Operator capacity, may keep their cell phone on their persons while in the Operator's Area as long as it is on vibrate or silent. The supervisor must leave the Operator's Area before using the cell phone, with the exception of the Operator's Area on a bus where a bona fide emergency exists or the supervisor is on the bus for the purposes of training or testing. Supervisors who must operate a bus or LRV, or otherwise function in an Operator capacity, may stow their PED in the Operator pouch.

PEDs may be used by bus and light rail Operators while on break or at a layover when the vehicle is safely stopped and the Operator is out of the Operator's Area. The PED must remain Turned Off and Stowed Away until the Operator has cleared the Operator's Area and must be Turned Off and Stowed Away prior to returning to the Operator Area.

- 4.1.2 For Personnel operating hi-rail or on-track equipment, the restrictions include, but are not limited to, making or receiving telephone calls, text messaging, checking e-mail messages, checking the time, using any feature of a cell phone, wearing a Fitbit or other fitness monitoring device, wearing a smart watch or similar watch, reading, playing games or listening to music or other audio.

PEDs shall be Turned Off and Stowed Away while operating a hi-rail vehicle or on-track equipment. Personnel operating a hi-rail vehicle or on-track equipment, who wish to use their PEDs while on break, must move their hi-rail or on track equipment off of the right of way to a location that is not Fouling the Tracks. Prior to retrieving and turning on their PED for use, Personnel must stop, shut off the



Original Date:	Supersede Date:	Revision Date:	Page 2 of 6
06/12/2009	03/05/2012	04/10/2017	

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017

engine, and clear the Operator’s Area. The PED must be Turned Off and Stowed Away prior to returning to the Operator’s Area or restarting the engine.

Use of cell phone communication is allowed to safely direct the movement of pushing a dead-car train only when no other means of communication is available and prior approval has been obtained from the Operations Control Center.

- 4.1.3 Personnel who are directing, flagging, or otherwise controlling the movement of rail transit vehicles, or performing any task while Fouling the Tracks may keep the PED in their possession and powered on but must proceed to a safe area outside the Safety Envelope (minimum 6 feet from the nearest light rail) to use their PED. Rail Controllers in the Operations Control Center must unplug and step away from their console before using their PED.

4.2 Discipline:

Failure to adhere to this Policy may constitute a serious safety violation. Violations of this policy will be considered a disciplinary action under Article 20 of the AFSCME Collective Bargaining Agreement (CBA). VTA employees who violate this policy will be subject to disciplinary action as listed below subject to the underlying circumstances and the individual employee. Talking on a PED, texting, playing video games or other violations that distract the Operator and pose the greatest risk will result in the highest levels of discipline.

Repeat violations of any portion of this Policy is considered a serious matter. The applicable sequence of the offenses (first, second, and third) is based on violations of any portion of this Policy. For example, if an employee violates Section 4.2.5 and six months later violates Section 4.2.2, the second violation will be considered a “Second Offense” and will be issued the corresponding discipline of termination. All “days” referenced in the box below are continuous calendar days of unpaid suspension.

(The discipline table is located on the next page).

**Discipline is mitigated if the employee is acting in a management or supervisory role and the violation occurred during an emergency.*



Original Date:	Supersede Date:	Revision Date:	Page 3 of 6
06/12/2009	03/05/2012	04/10/2017	

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017

	VIOLATION	1st Offense	2nd Offense	3rd Offense
4.2.1	Any violation of this policy where the employee is involved in an accident (preventable or non-preventable). <i>*Discipline issued for preventable accidents only.</i>	Termination <i>*10-15 days</i>	<i>*20 - 30 days</i>	<i>*Termination</i>
4.2.1(a)	<i>*If the accident results in a fatality and the employee was using a PED, then discipline will be issued whether the accident is preventable or non-preventable.</i>	<i>*20 days – Termination</i>	<i>*Termination</i>	
4.2.2	Use of PED while operating a bus, LRV, hi-rail vehicle or on-track equipment.	20 – 30 days <i>*5-10 days</i>	Termination <i>*10 - 15 days</i>	<i>*Termination</i>
4.2.3	Use of PED in the Operator’s Area, but not while operating a bus or LRV.	10 – 20 days	20 – 30 days	Termination
4.2.4	Use of PED while directing, flagging, acting as the EIC, or otherwise controlling the movement of rail transit vehicles, or performing any task while Fouling the Tracks.	10 – 20 days	20 – 30 days	Termination
4.2.5	Failure to Turn Off and properly Stow Away PED while operating a bus or LRV, or while in the Operator’s Area.	Up to 10 days <i>*Written Warning</i>	10 – 30 days <i>*Up to 5 days</i>	Termination <i>*10-30 days</i>

4.2.6 Any contractor staff violating this Policy will be removed from the job and will not be allowed to return to the project. The contractor may be made responsible for any fines levied on VTA for the violation. Repeat



Original Date:	Supersede Date:	Revision Date:	Page 4 of 6
06/12/2009	03/05/2012	04/10/2017	

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017

violations from the same contractor’s staff may result in the contract being cancelled.

5.0 Definitions:

- 5.1 Fouling the Track: The placement of an individual in such proximity to a track that the individual could be struck by a moving train or other on-track equipment, or is within six feet of the nearest rail.
- 5.2 Operator: bus and Light Rail Vehicle Operators, hi-rail and on-track equipment operators, service workers, mechanics, and any other authorized VTA employee or contractor and their staff.
- 5.3 Operator's Area: On VTA buses, this area is defined as all area forward of the yellow line and expressly includes the Operator's seat. On Light Rail Vehicles, this is the area inside the Operator's cab and expressly includes the Operator's seat. On hi-rail or on-track equipment, this is the area where the Operator is positioned during operation of the vehicle or equipment.
- 5.4 Personal Electronic Device or PED: means any wireless or portable electronic device. This includes, but is not limited to, wireless phones, personal digital assistants, smart phones, two way pagers, portable internet devices, laptop computers, DVD players, iPods, MP3 players, smart watches, Fitbits or other personal fitness monitors, games, Bluetooth devices, or any headphones or ear buds of any type. The following devices are excluded from this definition:
 - 5.4.1 VTA-owned licensed radio communications equipment such as cab-mounted or portable two-way radios with channels dedicated solely for VTA operations.
 - 5.4.2 Electronic or electrical devices prescribed by a licensed medical practitioner to permit an employee to meet minimum levels as required by the VTA or contractor.
 - 5.4.3 Roadway worker protection devices.
- 5.5 Rail Controllers: Individuals tasked with flagging or otherwise controlling the movement of rail transit vehicles. Tasks include “dispatching” as described in California Public Utilities Commission (CPUC) General Order 172 (Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Rail Fixed Guideway Systems).
- 5.6 Safety Envelope: The area within six feet of the closest rail on light rail tracks or within ten feet of the overhead catenary.



Original Date:	Supersede Date:	Revision Date:	Page 5 of 6
06/12/2009	03/05/2012	04/10/2017	

POLICY USE OF PERSONAL ELECTRONIC DEVICES BY BUS AND LIGHT RAIL EMPLOYEES AND CONTRACTOR STAFF (AFSCME)	Document Number:	OPS-PL-0001(c)
	Version Number:	03
	Date:	04/10/2017




5.7 Stowed Away: Not on one's person; must be completely concealed, so that it is not visible, in a backpack or bag and out of reach.

5.8 Turned Off: The power is off.

6.0 Summary of Changes:

Policy title changed. Policy updated to accurately reflect Safety Envelope. Greater clarity on discipline levels for different infractions were provided. Contractor language was added to provide policy on violations by contractors and their staff. Policy now allows for the use of cell phones when dead pulling a train when no other means of communications is available, with prior Operations Control Center approval.

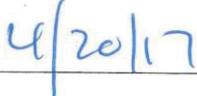
7.0 Approval Information:

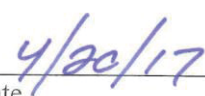
<i>Prepared by</i>	<i>Reviewed by</i>	<i>Approved by</i>
 George Sandoval Operations Manager	 Inez Evans Chief Operating Officer	 Nuria I. Fernández General Manager/CEO

Concurrence by American Federation of State County and Municipal Employees, Local 101:


 Tina Acree
 Business Agent, AFSCME


 Steve Jovel
 President, AFSCME


 Date


 Date

Date Approved: 04/20/2017



Original Date:	Supersede Date:	Revision Date:	Page 6 of 6
06/12/2009	03/05/2012	04/10/2017	

APPENDIX F VTA RESTRICTED ACCESS

Refer to Contract Special Conditions, Section 6.15.3 Restricted Access Permit regarding requirements and the use of the Restricted Access Permit form

The Restricted Access Permit Form is provided in the following pages.

[This Page Intentionally Left Blank]



RESTRICTED ACCESS PERMIT

VTA Restricted Access Permit Office
 101 West Younger Avenue
 San Jose California 95110

Restricted Access Permit Office: (408) 546-7608
 Restricted Access Permit Office Fax (408) 993-2174

VTA Operations Control Center (OCC) (408) 546-7688
 VTA Construction Permits Fax (408) 321-7569

General Contractor Name:			Main Office Phone Number	VTA PERMIT NUMBER
Address:			After hours Phone Number	SION
City:	State	Zip	On Site Wireless Number	VTA Project / Contract Number

Sub Contractor's:		Requester's Name:		Safety Critical Item Check List Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Number of Work Sites	Number Of Employees	Security Background:	Site Specific Work Plan:	RWP Training:	

Scope of Work to be Performed:

Equipment to be Used:

EXACT LOCATION OF WORK			
Direction: (Check Appropriate Boxes) <input type="checkbox"/> North <input type="checkbox"/> South <input type="checkbox"/> East <input type="checkbox"/> West			
At:	Between:	And:	
Start Date:	(General) Start Time:	End Date:	(General) End Time:

THE FOLLOWING PROTECTION OR CONDITIONS ARE REQUIRED WHEN APPLICABLE					
Power Down / Lock & Tag	Train Operation	Reduced Speed Zone	Supervised Access		
# Tags required	Platform Work	Maint.Bay/TrainWashPowerDown	Non Supervised Access		
# of Locks required	Track Closure	Watchman Required	Hardhats Required		

Special Requirements: (See Back of Permit for NORMAL Rules)

CONTRACTOR AGREEMENT

I have read and Understand the rules and requirements detailed above and on the reverse side of this form, and will abide by them. This permit may be suspended and or revoked at any time for any violation of the listed rules and requirements or as deemed necessary for the safety of personnel and equipment. It is further understood I will comply with all material contained in the "Roadway Worker Protection" training book and the "Roadway Worker On-Track Safety Manual" received during roadway worker training.

Signature of Contractor's Representative:	Title:	Date:
---	--------	-------

VTA AUTHORIZATION (Note: Not all signatures are required, only required signature is Track Allocation Representative)			
WP&S Power Department:	WP&S Track Department:	WP&S Signal Department:	Light Rail Station Maint. Supervisor:
Superintendent Vehicle Maintenance:	VTA System Safety Department:	VTA Construction & Engineering:	WP&S Signal Department:
VTA Technology Department	VTA Construction Inspector	VTA Security Department	VTA Project Manager

RESTRICTED ACCESS OFFICE			
Approved <input type="checkbox"/>		Denied <input type="checkbox"/>	
VTA Track Allocation Representative:	Date:	Superintendent Way Power & Signal:	Date:

A DOUBLE SIDED COPY OF THIS PERMIT MUST BE AVAILABLE AT THE WORK SITE AT ALL TIMES

RESTRICTED ACCESS WORK RULES

1. **PERMIT REQUIREMENTS-** Any access to enter or cross the track as well as all work performed on any VTA property designed for the operation of the Light Rail System shall require a permit. Permits are available through the Light Rail Restricted Access Permit Office. Unless the Track Allocation Chairperson makes an exception, all permit and training fees must be paid prior to issuance of a permit or attendance in a safety training class. In other cases such as urgent work or emergencies, by signing this document, the contractor agrees to pay all associated permit and training fees.
2. **CLEARANCE FROM TRAINS-** Based on California Public Utilities Commission (CPUC) General Order 175-A, all work performed within six (6) feet of the nearest rail shall require a Lookout/Watchperson to watch for approaching trains. This Lookout/Watchperson shall instruct workers to take equipment and move to the predetermined place of safety at least six (6) feet from the track fifteen (15) seconds prior to the approach of a train. When workers are clear, ONLY the EIC or SEIC shall give the train a "PROCEED" hand signal. If workers or equipment fail to clear, the train must be given a "STOP" hand signal. When clear the train will be given a "PROCEED" Signal.
3. **CLEARANCE FROM ENERGIZED OVERHEAD POWER LINES-** The overhead contact system is energized with 600 to 900 volts of direct current at all times, in accordance with CAL-OSHA Title 8, all work (including metal ladders, metal handle extensions, or equipment) shall remain ten (10) feet from any overhead wire unless a ground strap has been installed and is visible to the workers and VTA's Lock Out / Tag Out Procedures have been approved and completed.
4. **PERMIT AVAILABILITY-** A double sided copy of this permit must be available at the work site. Permits must be shown to any VTA, CPUC or FRA representative as well as any other authorized person when requested.
5. **SAFETY TRAINING-** Prior to commencement of work all workers must attend and complete VTA's "Basic Roadway Worker Protection" training class. This class trains persons working on VTA's right-of-way to work safely in a railroad environment. Every work crew must have an "Employee In Charge" referred to as the E.I.C. The E.I.C must successfully complete the VTA "Advanced Roadway Worker Protection" training class and must be at the work site at all times. The E.I.C. Must have the ability to read, write and speak english in order to communicate with VTA's Operation Control Center (OCC) to document and relay instructions. Once training fees have been paid, you may schedule training classes by calling The Light Rail Technical Training Department at (408) 952-6800. Training fees are \$85.00 per person. An estimate for training costs will be provided, a control number will be issued and must be provided when making training reservations.
6. **SAFETY EQUIPMENT-** Proper safety equipment must be worn at all times as specified in the VTA Roadway Worker Protection training manual.
7. **CONES AND FLAGS-** Work zone cones and flags shall be posted when working within six (6) feet of the nearest rail. The work zones shall be established as described in the "Roadway Worker Protection" training manual. VTA requires workers to establish a safe work area for workers and to provide advance warning to train operators allowing them to slow to a safe speed or stop prior to reaching workers. VTA may require a work zone when outside the safety envelope when tools or equipment is used that may have the potential to foul the trackway. Cones and flags left longer than thirty (30) minutes without the obvious presence of workers (unless approved by OCC) shall be removed and become the property of VTA. Cost and procurement of cones and flags shall be the responsibility of the contractor. Cones and flags may be purchased at local safety suppliers. Twenty-two (22) inch reflective cones illuminated from within shall be used during times of limited visibility. Cones and flags must be no closer than eighteen (18) inches from the rail and placed to allow a clear unobstructed view by train operators.
8. **NOTIFICATION TO OCC-**The Employee In Charge (E.I.C.) shall call the Operations Control Center (OCC) at (408) 546-7688 prior to establishing work zones and again at the end of the work shift when the work zone is to be removed.
9. **OVERHEAD POWER REMOVAL-** Power removal, when necessary shall be done in accordance with VTA's Lock Out / Tag Out procedures under the direction of VTA's Way Power and Signals Department and VTA's Operation Control Center. All request must be coordinated through the Track Allocation Meeting.
10. **SAFETY ADHERENCE / PERMIT EXPIRATION / DURATION-** Contractors shall be strictly confined to the time and location restrictions of their permit. When performing work on or about the right-of-way, contractors must adhere to all rules and procedures contained in the "Light Rail Restricted Access Procedures Manual". Work sites will be monitored; any deviation from or violation of these rules may be cause for immediate eviction of the contractor from the work site at the expense of the contractor.
11. **COST / CLAIMS-** Any cost to VTA resulting from this permit, the level of protection required (such as power removal, Lookout/Watchmen, EIC, Bus Bridge, etc.) or any unscheduled disruption to train or bus service caused by the contractors actions or inaction will be the responsibility of the contractor. In consideration of issuance of this permit, the contractor shall indemnify and hold harmless the Valley transportation Authority (VTA), its employees and agents from any demands, claims or judgments arising as a result of any act or omission of the contractor, or the contractor's employees or agents.
12. **SIGNALS-** Hand signals used by EIC/SEIC shall be as described in VTA's "Roadway Worker Protection" training manual and as instructed in the Roadway Worker Protection safety training class. On the Vasona Freight track Roadway Worker Protection rules shall apply. Caution must be used as Union Pacific freight trains may not observe VTA hand signals.
13. **GENERAL CONDITIONS- LEGAL RESPONSIBILITIES AND RELATIONSHIPS**

Character of Workmen: If any sub-contractor or person employed by the contractor shall appear to VTA to be incompetent or to act in a disorderly, improper or unsafe manner, such person shall be discharged immediately on at the request of VTA, and such person shall not be allowed to be employed on any current or future VTA project.

WORKING ENVIRONMENT- The contractor shall ensure and maintain a working environment free of harassment and intimidation between the contractors staff, VTA employees and members of the public at all VTA project sites and in all VTA facilities where the contractors staff are assigned to work. Conduct that creates an intimidating, hostile or offensive working environment is prohibited. Failure to comply with the above will be considered a material breach of this contract.



RESTRICTED ACCESS PERMIT APPLICATION

CONSTRUCTION ACCESS PERMIT (CAP)
 RESTRICTED ACCESS PERMIT

Permit Applicant:		Address		VTA Contract / Project Number:
City:		State	Zip:	SION Number:
Contact Person:		Title:		Phone Number:
Fax Number:	E-Mail Address: @		24 Hour Emergency Phone Number:	
Emergency Contact Person:				

WORK BEING PERFORMED FOR:

Company Name:		Address:		
City:		State	Zip:	
Contact Person:	Phone Number:	E-Mail Address: @		

SUB CONTRACTOR'S PERFORMING WORK:

Company Name:		Address:		
City:		State	Zip:	
Contact Person:	Phone Number:	E-Mail Address: @		

PROJECT LOCATION

Location:				
Start Date:	Completion Date:	Estimated Regular Work Days:	Overtime, Weekend & Holiday Days	
Number of Persons to be Safety Trained:		X (\$85.00 Per Person)		

PERMIT EVALUATION PROCESS USUALLY AVERAGES 7 - 14 DAYS FROM DATE RECEIVED

Submit Completed Application Package To: Santa Clara Valley Transportation Authority
 Restricted Access Permit Office
 101 West Younger Ave. Build. A-3
 San Jose, CA. 95110

Phone: (408) 546-7608
 Fax: (408) 993-2174

By signing this application form, the permit applicant agrees to all of the terms and conditions contained herein and to any provisions set forth in the Restricted Access Permit.

Authorized Signature:	Print Name:	Date:	Phone Number:
-----------------------	-------------	-------	---------------

I. THE FOLLOWING ITEMS OR CONDITIONS ARE REQUIRED FOR ALL PERMIT APPLICATIONS:

- a. Completed and sign Restricted Access Permit Form.
All applicants must adhere to the VTA Background Security Screening process prior to applying for a Restricted Access Permit.
- b. Minimum Application Fee of \$3,050.00 and Roadway Worker Protection (RWP) Safety Training Fee of \$85.00 per person. The final permit fee will be determined after review of the plans. Payment may be made by cash or check, (ONLY) payable to Valley Transportation Authority (VTA). For further information regarding permit fees call (408) 546-7608. Permit Applicant agrees to reimburse VTA for all actual and direct costs expended by VTA, including costs to process this application and inspect the permit work.
- c. No work to be conducted when events at Levi Stadium exceed 20,000 in attendance.
- d. Liability Insurance Certificate from primary Contractor. The certificate must be received **prior to issuance of the Permit** and must

Type	Projects Over \$1,000,000	Projects Over \$1,000,000
General Liability	\$1,000,000	\$5,000,000
Automobile Liability	\$1,000,000	\$5,000,000
Worker's Compensation	\$1,000,000	\$1,000,000
Employer Liability	\$1,000,000	\$1,000,000
Railroad Liability Insurance (see item II, e Below)	\$1,000,000	\$5,000,000

Best's Rating of No Less Than B=, VIII

* All public agencies that are self-insured must provide to VTA evidence of self-insurance prior to issuance of the permit.

II. THE FOLLOWING ITEMS OR CONDITIONS ARE REQUIRED WHEN APPLICABLE:

- a. VTA's Background Security screening Contractor is IPROVEIT.com.
- b. When workers or their equipment are working within or have the potential of working within the dynamic envelope of the Light Rail Tracks/System, or over/under any catenary system, the Contractor is required to obtain a Restricted Access Permit. For further information call (408) 546-7608. All workers are required to complete RWP Safety Training, call VTA's Light Rail Technical Training at (408) 952-6800 for further information. Safety Training fee is \$85.00 per person.
- c. When workers or their equipment are working within or have the potential of working within 15' of Cal train's (JPB) tracks or 25' of Union Pacific Railroad's (UPRR) tracks, within VTA property, all workers are required to complete the appropriate RWP Safety Training.
- d. Work within the Silicon Valley Rapid Transit (SVRT/BART) Corridor requires a permit or written authorization from UPRR. For UPRR permit information, contact Patrick Kerr, Manager of Public Projects, Union Pacific Railroad, 10031 Foothills Blvd., Roseville, California 95747, or call (916) 789-6334. A copy of UPRR's permit or written authorization will be required prior to VTA issuing a Permit. The UPRR's website address is www.uprr.com. All workers are required to complete RWP Safety Training. Call the SVRT Rail Access Coordinator for further information: James Mendez (408) 715-8279.
- e. Traffic Control Plan. Site Specific Work Plan (SSWP). (If applicable)
- f. Work within 50 feet of the Light Rail Tracks/System or over/under any Catenary System or within 50 feet of Heavy Rail Tracks requires Railroad Protective Liability Insurance.
- g. A copy of the Prime/General Contractors State of California Contractors License.
- h. Applicants needing to install a utility or a facility on property owned in fee by VTA must submit a copy of a document such as a License Agreement or Recorded Easement, that allows applicant to enter, construct, install, maintain or operate within VTA property. If no such document exists, applicant must enter into an applicable Agreement with VTA prior to receiving a Construction Access Permit. Due to the fact that license fees are based on property values and other factors, fee information will be provided after the application has been reviewed and approved by VTA.
- i. As stated in Government Code 4216.9. (a), "No permit to excavate ...shall be valid unless the applicant has been provided with an initial inquiry identification number..." Permit Applicant or its Contractor shall notify VTA's Permit & Utility Services Unit of the USA Ticket Number prior to start of work.

NOTE: VTA requires a safe work area for workers and equipment and to provide advance warning to train operators allowing them to slow to a safe speed or stop prior to reaching workers. VTA may require a work zone when outside the safety envelope when tools or equipment is used that may have the potential to foul the trackway.

III. POWER SHUTDOWN:

VTA will make an assessment to determine if a power shutdown of the Overhead Catenary System is required. In your opinion, will this job require the Light Rail Overhead Catenary System (OCS) power to be shut down in order to safely perform this work?

Yes No Required for all work above or within 10' of OCS

If VTA determines that a Light Rail power shutdown is required, any costs incurred will be borne by Permit Applicant or its Contractor.

IV. BUS STOP AND/OR SERVICE INTERRUPTION:

Will this project require blockage of a VTA Bus Stop or cause a Service Interruption?

Yes No

Revised: 12-07-2017

Authorized Signature:	Print Name:	Date:	Phone Number:
-----------------------	-------------	-------	---------------



VTA RESTRICTED ACCESS PERMIT APPLICATION

Permit Applicant: _____ Address: _____
 City: _____ State: _____ Zip: _____
 Contact Person: _____ Title: _____
 Phone #: _____ Fax #: _____
 E-Mail Address: _____
 Emergency Contact Person: _____ 24/HR Emergency Phone #: _____

Work Being Performed for:

Company/Agency Name: _____ Address: _____
 City: _____ State: _____ Zip: _____
 Contact Person: _____ Phone #: _____
 E-Mail Address: _____ Contractor's CA License #: _____

Work being performed by: (List all General Contractor's and Subcontractor's – See attached page):

Company Name: _____ Address: _____
 City: _____ State: _____ Zip: _____
 Contact Person: _____ Phone: _____
 E-Mail Address: _____ Contractor's CA License #: _____
 Project Location: _____ Start Date: _____ Completion Date: _____
 Estimated # of Regular Work Days: _____ Estimated # of Overtime/Weekend or Holiday Days: _____

The permit evaluation process usually takes 7- 14 working days from the date that all Permit requirements are completed and received by VTA.

SUBMIT APPLICATION PACKAGE TO:
Santa Clara Valley Transportation Authority (VTA) Restricted Access Permit Office
101 West Younger Ave.
Bldg. A-3
San Jose, California 95110
(408) 546-7608

By signing this application form, the Permit Applicant agrees to all of the terms and conditions contained herein
 And to any provisions set forth in the Restricted Access Permit.

Authorized Signature: _____ DATE: _____
 Name: _____ Phone#: _____



TERMS AND CONDITIONS OF VTA RESTRICTED ACCESS PERMIT

I. THE FOLLOWING ITEMS OR CONDITIONS ARE REQUIRED FOR ALL PERMIT APPLICATIONS:

- a. All interested applicants, except for governmental agencies or workers working under a VTA contract, must adhere to the attached background security screening process, prior to applying for a Construction Access Permit. All workers except for government agencies workers on this VTA permits must have a Background Security Check clearance/badge prior to a VTA permit being issued.
- b. Completed and signed Application Form with the Permit Application fee to initiate the permit process. The final permit fee will be determined after review and approval of the application and/or plans. Payment may be made by cash or check payable to Valley Transportation Authority, (VTA). For further information regarding permit fees call (408) 321-5856. Applicant agrees to reimburse VTA for all actual and direct costs expended by VTA, including costs to process this application and inspect the permit work "
- c. Applicant to provide below a detailed description of the work to be performed on VTA's property. Applicant's description of the work, at a minimum, must include the items below. If applicant wishes to include additional information, please enclose additional sheet.

- | | | |
|------------------------|--------------------|--|
| 1. Type of Project | 2. Traffic Plan | 3. Distance from the Nearest Tracks |
| 4. Contractor Schedule | 5. Cost of Project | 6. Impact on VTA Operations (If Known) |
| 7. Work Plan | | |

d. One (1) electronic copy of the Plans and Specifications for construction projects. All plans submitted to VTA must include the APN number, VTA property lines, tracks, stations, facilities and all known underground utilities.

e. Do you have a cooperative or other agreement with VTA concerning this project? YES
If so please provide a copy of the agreement with your application.

f. Prior to final approval of the permit, Applicant must provide VTA with evidence of the following

Insurance Coverage: All limits are subject to review by VTA and will be adjusted based on risk of project.

Coverage:	Under \$250,000	\$250,000 - \$1,000,000	Over \$1,000,000
• General Liability	\$1,000,000	\$2,000,000	\$5,000,000
• Automobile Liability	\$1,000,000	\$2,000,000	\$5,000,000
• Employer Liability	Statutory Limits	Statutory Limits	Statutory Limits
• Contractor Pollution Liability	\$1,000,000	\$1,000,000	\$1,000,000
• Railroad Protective Liability Ins.	\$1,000,000	\$2,000,000	\$3,000,000
(See Item II Below)	\$3,000,000 /	\$3,000,000 /	\$5,000,000 /
• Contractor Pollution Liability	\$6,000,000	\$6,000,000	\$10,000,000

- VTA Shown as Additional Insured on all coverage's except RRPLI where VTA must be listed as Insured.
- Best's Rating of No Less Than B+, VIII

All public agencies that are self-insured must provide to VTA evidence of self-insurance prior to issuance of the permit

Authorized Signature: _____ DATE: _____
Name: _____ Phone#: _____



TERMS AND CONDITIONS OF VTA RESTRICTED ACCESS PERMIT

II. THE FOLLOWING ITEMS OR CONDITIONS ARE REQUIRED WHEN APPLICABLE:

- a) A restricted access permit must be obtained prior to commencing any underground, overhead, or surface work on any VTA property designed for the operation of the Light Rail System.
- b) When workers or their equipment are working within or have the potential of working within the dynamic envelope of the Light Rail Tracks/System, or over/under any catenary system, the Contractor is required to obtain a Light Rail Restricted Access Permit, in addition to a VTA Construction permit. Call (408) 546-7608 for further information.
- c) All workers, on VTA's light rail property, are required to complete VTA's Railroad Worker Protection and Safety (RWP) training class prior to beginning any work on the project. Call VTA's Light Rail Technical Training Center at (408) 952-6800 for further information.
- d) When workers or their equipment working within or have the potential of working within 15' of Cal train's tracks or 25' of Union Pacific Railroad's (UPRR) tracks, within VTA property, all workers are required to complete a Heavy Rail Safety Training Class.
- e) Submission of an approval Traffic Control Plan.
- f) Construction work within 50 feet of the Light Rail Tracks/System or over/under any Catenary System or within 25 feet of any freight railroad track on VTA property requires the applicant to provide Railroad Protective Liability Insurance. VTA must be listed as Insured on all RRPLI policies.
- g) The Contractor/Applicant is responsible for arranging and paying for all costs for railroad
- h) For construction work, a copy of the Prime Contractor's State of California Contractors License must be Submitted.
- i) Applicants wishing to install a utility or a facility on property owned by VTA must submit a copy of a document such as a License or Recorded Easement that allows Applicant to enter, construct, install, maintain or operate upon VTA property. If no such document exists, Applicant must enter into such an Agreement with VTA prior to receiving a Permit. Applicant shall submit a site plan together with either a 8 1/2 "x 11" or 11" x 17" size exhibit that illustrates the location of the proposed encroachment, dimensions, depth and width of utility installation and/or the location of any existing utilities, plus nearest public cross street. Because License fees are based on property values and other factors, fee information will be provided after the
- j) As stated in Government Code 4216.9. (a): "No permit to excavate ...shall be valid unless the applicant has been provided with an initial inquiry identification number ..." Applicant or its Contractor shall notify VTA's Permit & Utility Services Unit of the USA Ticket Number prior to start of work.

III. POWER SHUT DOWN:

- a) In your opinion, will this job require the Light Rail Overhead Catenary System (OCS) power to be shut down in order to safely perform this work? (Required for all work above or within 10' of OCS) **YES**
NO

If VTA determines that a Light Rail power shutdown is required, any actual costs incurred by VTA will be bore by Applicant or its Contractor. VTA will make an assessment to determine if a power shutdown of

IV. BUS STOP AND/OR SERVICE INTERRUPTION:

- a) In your opinion, if you feel that this project will require a Bus Stop and/or Service Interruption, please contact the VTA General Bus Stop Hotline at (408) 321-5800. **YES** **NO**
If so, provide the estimated Number of Work Days:
VTA will make an assessment to determine if a Bus Stop and/or Service Interruption are required.

Authorized Signature: _____ DATE: _____
Name: _____ Phone#: _____



To VTA Restricted Access Permit Applicant:

Santa Clara Valley Transportation Authority (VTA) is committed to providing a safe and secure workplace for all Employees, Permittees and Permittee's employees and subcontractors. This commitment is extended to all that may or may not work under the authorization of a VTA Access Permit. In an effort to better protect VTA interests and ensure that all Permittees and their employees and subcontractors accessing or working at VTA properties/facilities/systems are in a safe and secure environment, VTA has adopted a Background Security Check Program that will require the following:

- Criminal and Identity background screening
- VTA authorized access badge with photo that must be displayed on the work site

Effective August 1, 2010, Access Permit Applicants that apply for VTA Access Permits to perform work or other activities authorized by VTA Construction Access Permits or Restricted Access Permits are required to comply with the Background Security Check (BSC) Program Standards. Applicants and their employees and subcontractors can be denied access to or near VTA properties/facilities/systems if they have:

1. A felony conviction within the last 7 years or a misdemeanor conviction within 1 year.
2. An active warrant.
3. A falsification or failure to disclose any and all related information.
4. On parole, probation or other court required supervision.
5. Registered sex, narcotics or arson offender.

This Program will be administered by iproveit.com, referred to hereafter as the Investigator. To initiate the BSC Program, please contact Iproveit at (678) 775-6720. Their website is as follows: www.iproveit.com. A onetime enrollment fee will be required.

These standards have been set for those Permittees and their employees and subcontractors who will be allowed to access or encroach upon VTA's properties/facilities/systems and/or near the VTA's properties/facilities/systems to perform permit work. VTA reserves the right, at its sole discretion, to bar any person from accessing, encroaching upon or working on or near VTA properties/facilities/systems.

All charges incurred in the use of the Investigator services are solely the responsibility of the respective Permittee. Background investigations that a Permittee may have secured outside of this Program from companies other than the Investigator are not applicable to this Program. Your dealings with regard to the services of the Investigator will be directly with the Investigator and not with VTA.

Permittees and any of their employees and subcontractors that are not in compliance with the Background Security Check Program will be denied access to work on a VTA Construction Access Permit or Restricted Access Permit or on any VTA properties/facilities/systems.

If you have any questions concerning the above, contact the VTA Restricted Access Permits Office, Cheryl D. Gonzales, Assistant Superintendent, at (408) 546-7608 or Kathy Bardley at (408) 321-5815. Your cooperation is greatly appreciated. Sincerely,

Kathy Bradley
Real Estate & Project Admin Manager
(408)321-5815

[This Page Intentionally Left Blank]



Work being performed by:

General Contractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

1. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

2. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

3. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

4. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____
Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

5. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

6. Subcontractor:

Company Name: _____ Address: _____
City: _____ State: _____ Zip: _____
Contact Person: _____ Phone#: _____
E-Mail Address: _____ Contractors CA License#: _____

[This Page Intentionally Left Blank]



Solutions that move you

**RESTRICTED ACCESS / RAIL ACTIVATION
PERMIT AND TRAINING FEE ASSESSMENT FORM**

RESTRICTED ACCESS PERMIT NUMBER	SCION	VTA Project / Contract Number
---------------------------------	-------	-------------------------------

Permit Applicant Name / Company: _____

Insurance Certificate Received: Yes No Contractor's License Received: Yes No

Permit Application Fee (\$3,050.00)	<input style="width:100%;" type="text"/>
Training Fees	
Regular VTA Classes <input style="width:50px;" type="text"/> X \$85.00	<input style="width:100%;" type="text"/> OP0505
Special Training SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/> Special Training Charged At actual Cost
ADDITIONAL FEES AND DESCRIPTION	
Power Department Fees	
Power Department Fee SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/>
Signal Department Fee SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/>
Track Department Fee SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/>
Operations Fee SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/> Bus Bridge, Field Response etc.
Inspection Fee SION: <input style="width:100px;" type="text"/>	<input style="width:100%;" type="text"/>
Total Fees:	<input style="width:100%; border: 2px solid black;" type="text"/>

Authorized Signature:	Print Name:	Date:	Phone Number:
-----------------------	-------------	-------	---------------

Track Allocation Chairperson	Date
Way Power and Signal	Date
Light Rail Technical Training	Date
Central Permit Office	Date

Valley Transportation Authority Central Permit Office 3331 North First Street, Bldg. B, 2nd Floor San Jose, California 95123 (408) 321-5856	Valley Transportation Authority Restricted Access Permit Office 101 West Younger Avenue, Bldg A, 2nd Floor San Jose, California 95110 (408) 546-7608
---	--

APPENDIX G ENVIRONMENTAL COORDINATION AND COOPERATION

The following requirements of this Appendix G apply to this Project if the box next to the requirement is checked:

- 1.1 Tree Removal
- 1.2 Archeological Sensitive Area
- 1.3 Archeological/Historical Discoveries
- 1.4 Environmentally Sensitive Areas
- 1.5 Mitigation Measures
- 1.6 Migratory Nesting Birds and Roosting Wildlife
- 1.7 Sudden Oak Death
- 1.8 Storm Water Pollution Prevention Plan (SWPPP)
- 1.9 Erosion and Sedimentation Control Action Plan Element (ESCAPE)
- 1.10 Water Pollution Control Program (WPCP)
- 1.11 Construction Water Conservation

Attachments to this Appendix are included if the box next to the listed attachment is checked:

- Attachment G1 Sample regulatory agency permits *OR* Regulatory agency permits
- Attachment G2 ESCAPE Template

1.1 Erosion and Sedimentation Control Action Plan Element (ESCAPE)

1.1.1 VTA, being the owner of the site where the subject construction activity is to occur, is responsible for preventing and/or mitigating potential chemical releases, erosion and sedimentation impacts associated with stormwater runoff. VTA has established an Erosion and Sedimentation Control Action Plan Element (ESCAPE) for storm water discharge associated with construction activity.

1.1.2 Using the template provided and included in this Appendix G, Contractor shall prepare and submit an ESCAPE for the subject site to VTA for review and approval **within five (5) working days following Notice of Award of Contract**.

- (a) Contractor shall clearly identify its construction activities and those of its subcontractors and the manner in which Contractor will ensure their compliance with VTA approved ESCAPE.
- (b) The ESCAPE shall be prepared consistent with the provisions of the National Pollution Discharge Elimination System (NPDES), General Permit No. CAS000002 for Storm Water Discharges Associated with Construction And Land Disturbance Activities adopted by the State Water Resources Control Board on September 2, 2009 as Order No. 2009-0009-DWQ. In that the area on which the Work shall be conducted plus the construction laydown/staging area(s) are **less than one acre in size**, a Notice of Intent is not required for submission by VTA to the Regional Water Quality Control Board.
- (c) VTA will provide review comments to Contractor **within five (5) working days** after receipt of the ESCAPE for any necessary revision and preparation of the final document.
- (d) Contractor shall return a final ESCAPE document to VTA **within two (2) working days** of receipt of VTA comments.

1.1.3 At a minimum, the ESCAPE must address the following Best Management Practices (BMPs) in the **California Storm Water Best Management Practice Handbook for Construction Activity** prepared by the California Storm Water Quality Association ("CASQA") for the California State Water Resources Control Board. This is available online at CASQA's website. Contractor must be a member or subscriber of CASQA to access this handbook.

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-8, Concrete Waste Management
- NS-8 & 9, Vehicle and Equipment Fueling, Cleaning and Maintenance
- SS-2, Preservation of Existing Vegetation
- WE-1, Wind Erosion Control
- SE-1, Silt Fence
- SE-5, Fiber Rolls
- SE-9, Straw Bale Barriers
- SE-10, Storm Drain Inlet Protection

1.1.4 Contractor shall provide copies of the approved ESCAPE to its subcontractors and shall keep a copy available at the subject site. Contractor shall provide amendments to the ESCAPE whenever there is a change in construction, operations, or where storm water run-off conditions which may affect the discharge of significant quantities of pollutants to surface waters, groundwater, or separate municipal storm sewer systems. The amended ESCAPE shall be submitted to VTA for review and approval as soon as practical and Contractor shall retain the amended ESCAPE onsite.

1.1.5 Contractor is advised that preparation and implementation of a VTA approved ESCAPE does not relieve Contractor or its subcontractor(s) of their responsibilities to comply with other state, county, and local governmental requirements, including those for storm water management or non-point source runoff controls.

1.1.6 Full compensation for conforming to the requirements of this section shall be paid for as described in the Schedule of Quantities and Prices (SQP).

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

Erosion and Sediment Control Action Plan Element (ESCAPE)

for

Hamilton Station Stabilization
C20046F

Prepared for

The Santa Clara Valley Transportation Authority (VTA)

Submitted by

Project Address

Preparation Data

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

A. INTRODUCTION

The proposed project is located in all VTA Facilities. The preparation of the ESCAPE is based on the principal of Best Management Practices, not numeric effluent limitations, to control and abate the discharge of pollutants in storm water discharges. This ESCAPE is dynamic, viable, and will be modified and amended when there is a change in the construction or operations which may affect the discharge of storm waters from the construction site to the receiving waters.

TYPE OF PROJECT	[LANDSCAPING]
CONSTRUCTION LIMITS:	[FROM_]
DURATION:	[MONTH, YEAR]
START DATE:	[MONTH, DAY, YEAR]
END DATE:	[MONTH, DAY, YEAR]
CONTRACTOR:	[NAME]

These documents are available for review by any interested party during the normal working hours at:

[LOCATION]

[ADDRESS]

B. PURPOSE

The purpose of this Erosion and Sedimentation Control Plan Element:

1. Identify pollutant sources that may affect the quality of discharges of storm water associated with the construction activities of the project.
2. Identify, construct, and implement storm water pollution prevention measures to reduce pollutants in storm water discharges from the construction site during construction and post construction.
3. Document erosion control, sediment control, wind erosion, tracking control, and non-storm water management, and waste management and pollution control. Best Management Practices (BMPs) that must be implemented year round as appropriate based on construction activities. The ESCAPE may require modification as the project progresses and as conditions warrant. All modifications to the approved ESCAPE must be submitted to VTA for review and approval.

C. OBJECTIVE

The objective of this ESCAPE is to minimize the degradation of off-site water receiving waters to the extent possible by identifying, constructing, and implementing storm water pollution prevention measures, with the current Best Management Practices, before, during, and post construction.

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

D. SOURCE POLLUTANT IDENTIFICATION

1. Include a Site map with:
 - a. Areas of soil disturbance
 - b. Drainage pattern and slopes anticipated after grading activities are completed
 - c. Locations of controls such as: sandbags, inlet protections, concrete washout, check dams, etc.
 - d. Areas and plan for storage and waste, including toxic/chemical materials
 - e. Staging, trailer, and construction equipment locations.
 - f. Locations of post construction control practices
2. List of hazardous materials and other chemicals.

TABLE I. LIST OF SITE POLLUTANTS		
CATEGORY	PRODUCT	POLLUTANTS

E. BEST MANAGEMENT PRACTICES (BMP)

1. Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles. This construction project will implement the following practices to provide effective temporary and final erosion control during construction. This includes Wind Erosion controls.

2. Sediment Controls

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This includes track out controls such as stabilized entrance and roadways.

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

3. Non-Storm water Controls

All construction equipment utilized on-site shall be regularly inspected for leaks and repaired immediately. Petroleum distillate fueled and lubricated equipment shall be properly maintained to prevent leakage of such materials. Servicing of such equipment shall be performed in such a manner that all petroleum distillate materials do not come into contact with the ground and shall be disposed of properly offsite.

4. Materials Management and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing and using construction materials to prevent the release of those materials into storm water discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

F. NON-STORM WATER MANAGEMENT

Non-storm water management at this site involves prevention of contamination from the following sources:

- Vehicle fluids, including oil, grease, petroleum, and coolants;
- Vehicle equipment and wash water;
- Asphaltic emulsions associated with asphalt-concrete paving operations;
- Chemical curing compounds and cure water from concrete curing;
- Concrete washout water;
- Water and solid waste from concrete finishing;
- Paints, solvents, thinners, acids;
- Accumulated sediment from dewatering operations;
- Portable toilet waste;
- General litter.

G. ACCIDENTAL DISCHARGES

Accidental discharges can be the greatest cause of pollution of the storm water discharges. All emergency spill controls and measures shall be performed as follows:

1. Notify the Resident Inspector immediately
2. Contain the spread of spills
3. If the spills occur on paved or impermeable surfaces, clean them up using “dry” methods (absorbent materials, cat litter, and/or rags). Contain the spills by encircling with absorbent materials and do not let them spread widely.

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

H. POST CONSTRUCTION STORM WATER MANAGEMENT

Post construction storm water management will be the same as the existing pre-construction storm water management practices.

I. WASTE MANAGEMENT AND DISPOSAL

All wastes including waste oil and other equipment wastes shall be disposed of off-site in compliance with federal, state and local regulations. Proper disposal of construction related wastes and equipment wastes is the responsibility of the contractor. Contractor is required to submit detailed information regarding waste management and disposal.

J. MAINTENANCE, INSPECTION, REPORTS, AND REPAIR

Contractor is responsible for implementation of the ESCAPE. VTA will ensure compliance with permit requirements and contract specifications.

While many of the storm pollution control measures are actually structural controls which, to function properly, require ongoing inspection, maintenance and repair. Once a week site inspections, daily monitoring, Inspections before and after a storm event are required. The results of the inspection and assessment must be written and include the date of inspection, the person who performed the inspection, and the observations. A tracking or follow-up procedure must follow any inspection, which discovers deficiencies in the BMP's. Copies of inspection reports will be forwarded to VTA.

Based on the annual inspection, a Certificate of Compliance is required to be filed. Contractor will annually certify, to VTA, that the construction operations (both Contractor's activity and construction activity) are in compliance with the requirements of this ESCAPE.

K. RECORD KEEPING AND REPORTS

Contractor is responsible for implementation of the ESCAPE. VTA will ensure compliance with permit requirements and contract specifications. All amendments will be submitted to VTA for approval prior to incorporation.

During the course of construction, unanticipated changes may occur, such as schedule changes, phasing changes, and staging area modifications. These changes must be made known and the ESCAPE revised accordingly. Revisions to the ESCAPE are also required when the properly installed BMP system is ineffective. All revisions will be submitted to VTA for approval prior to incorporation.

Non-compliance must be reported to the Regional Water Quality Control Board. This notification is to identify the types of non-compliance, the actions required to come into compliance, and a time schedule to achieve compliance.

All monitoring of this ESCAPE will be submitted to and recorded by VTA. All records will be maintained for three (3) years after completion of the construction activity

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

ATTACHMENT A

SITE SPECIFIC MAP/PLANS & DETAILS

1. Site Plan:

List the plan sheet(s) that show the project site and scope of construction activity. Site plan sheets need to conform to VTA's requirements (e.g., size, scale) for site plan submitted for Grading and Construction Permits. The site plan and project description in the Project Description section of the ESCAPE need to match.

2. BMP Locations:

List the plan sheet(s) that show the locations of proposed construction activity BMPs. Some BMPs may be included as notes on the site plan. In addition to BMPs, show required local creek setbacks and preserved existing vegetation on the site plan.

3. BMP Implementation Schedule:

Identify schedule for BMP implementation with the commencement of the construction activities and that BMPs will be implemented year round, as appropriate, until the project is complete. Include final site stabilization in the schedule..

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

ATTACHMENT B

**PROJECT COMPLIANCE PERMITS AND
SPECIFICATIONS**

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

ATTACHMENT C

APPLICABLE CASQA BEST MANAGEMENT PRACTICES (BMPs)

ENCLOSED CASQA BMPS

1. Erosion Control
 - a. EC-
 - b. EC-

2. Sediment Control
 - a. SE-
 - b. SE-

3. Non-Storm water Control
 - a. NS-
 - b. NS-

4. Tracking Control
 - a. TC-
 - b. TC-

5. Wind Erosion Control
 - a. WE-
 - b. WE-

6. Waste/Material Management
 - a. WM-
 - b. WM-

ATTACHMENT G2 ESCAPE TEMPLATE ONLY

(This page is intentionally left blank)

APPENDIX H
FEDERAL WAGE DETERMINATION

Refer to Contract Invitation to Bid regarding Federal Wage Determination requirements.

A copy of the Federal Wage Determination is provided in the following pages.

[This Page Intentionally Left Blank]

"General Decision Number: CA20200018 09/18/2020

Superseded General Decision Number: CA20190018

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

Counties: Alameda, Calaveras, Contra Costa, Fresno, Kings, Madera, Mariposa, Merced, Monterey, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Stanislaus and Tuolumne Counties in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	01/10/2020
2	01/24/2020
3	01/31/2020
4	02/07/2020
5	03/06/2020
6	03/13/2020
7	04/17/2020
8	06/05/2020
9	06/19/2020
10	06/26/2020
11	07/03/2020
12	07/10/2020
13	07/17/2020
14	07/24/2020
15	08/07/2020
16	08/14/2020

17	08/21/2020
18	09/04/2020
19	09/11/2020
20	09/18/2020

ASBE0016-004 01/01/2019

AREA 1: CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, MONTEREY, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, STANISLAUS & TOULMNE COUNTIES

AREA 2: ALAMEDA, CONTRA COSTA, SAN FRANSICO, SAN MATEO & SANTA CLARA COUNTIES

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)		
Area 1.....	\$ 28.20	9.27
Area 2.....	\$ 36.53	9.27

ASBE0016-008 01/01/2020

AREA 1: ALAMEDA, CONTRA COSTA, MONTEREY, SAN BENITO, SAN FRANSICO, SAN MATEO, SANTA CLARA, & SANTA CRUZ

AREA 2: CALAVERAS, COLUSA, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAU, & TUOLUMNE

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, Protective Coverings, Coatings, and Finishes to all types of mechanical systems)		
Area 1.....	\$ 71.16	23.39
Area 2.....	\$ 54.26	23.39

BOIL0549-001 10/01/2016

AREA 1: ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN MATEO & SANTA CLARA COUNTIES

AREA 2: REMAINING COUNTIES

	Rates	Fringes
BOILERMAKER		
Area 1.....	\$ 43.28	37.91
Area 2.....	\$ 39.68	35.71

BRCA0003-001 08/01/2019

	Rates	Fringes
MARBLE FINISHER.....	\$ 35.41	16.45

BRCA0003-003 08/01/2019

	Rates	Fringes
MARBLE MASON.....	\$ 49.42	27.86

BRCA0003-005 05/01/2019

	Rates	Fringes
BRICKLAYER		
(1) Fresno, Kings, Madera, Mariposa, Merced....	\$ 41.88	22.19
(7) San Francisco, San Mateo.....	\$ 42.34	25.83
(8) Alameda, Contra Costa, San Benito, Santa Clara.....	\$ 44.16	21.71
(9) Calaveras, San Joaquin, Stanislaus, Toulumne.....	\$ 39.66	20.76
(16) Monterey, Santa Cruz...	\$ 39.51	23.49

BRCA0003-008 07/01/2019

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 37.58	17.33
TERRAZZO WORKER/SETTER.....	\$ 48.53	26.84

BRCA0003-011 04/01/2019

AREA 1: Alameda, Contra Costa, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz

AREA 2: Calaveras, San Joaquin, Stanislaus, Tuolumne

AREA 3: Fresno, Kings, Madera, Mariposa, Merced

	Rates	Fringes
TILE FINISHER		
Area 1.....	\$ 29.94	16.38
Area 2.....	\$ 25.60	14.30
Area 3.....	\$ 26.58	15.65
Tile Layer		
Area 1.....	\$ 49.90	19.16
Area 2.....	\$ 42.67	16.81
Area 3.....	\$ 40.27	18.58

CARP0022-001 07/01/2020

San Francisco County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82

Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 52.80	30.82
Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

CARP0034-001 07/01/2020

Rates Fringes

Diver

Assistant Tender, ROV Tender/Technician.....	\$ 51.90	34.02
Diver standby.....	\$ 58.09	34.02
Diver Tender.....	\$ 57.09	34.02
Diver wet.....	\$ 101.42	34.02
Manifold Operator (mixed gas).....	\$ 62.09	34.02
Manifold Operator (Standby).	\$ 57.09	34.02

DEPTH PAY (Surface Diving):

050 to 100 ft	\$2.00 per foot
101 to 150 ft	\$3.00 per foot
151 to 220 ft	\$4.00 per foot
221 ft.-deeper	\$5.00 per foot

SATURATION DIVING:

The standby rate shall apply until saturation starts. The saturation diving rate applies when divers are under pressure continuously until work task and decompression are complete. The diver rate shall be paid for all saturation hours.

DIVING IN ENCLOSURES:

Where it is necessary for Divers to enter pipes or tunnels, or other enclosures where there is no vertical ascent, the following premium shall be paid: Distance traveled from entrance 26 feet to 300 feet: \$1.00 per foot. When it is necessary for a diver to enter any pipe, tunnel or other enclosure less than 48" in height, the premium will be \$1.00 per foot.

WORK IN COMBINATION OF CLASSIFICATIONS:

Employees working in any combination of classifications within the diving crew (except dive supervisor) in a shift are paid in the classification with the highest rate for that shift.

CARP0034-003 07/01/2020

Rates Fringes

Piledriver.....	\$ 52.90	34.02
-----------------	----------	-------

CARP0035-007 07/01/2019

AREA 1: Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara counties

AREA 2: Monterey, San Benito, Santa Cruz Counties

AREA 3: Calaveras, Fresno, Kings, Madera, Mariposa, Merced, San

Joaquin, Stanislaus, Tuolumne Counties

	Rates	Fringes
Modular Furniture Installer		
Area 1		
Installer I.....	\$ 27.46	22.14
Installer II.....	\$ 22.18	20.42
Lead Installer.....	\$ 30.91	22.64
Master Installer.....	\$ 35.13	22.64
Area 2		
Installer I.....	\$ 24.81	22.14
Installer II.....	\$ 20.01	20.42
Lead Installer.....	\$ 27.78	22.64
Master Installer.....	\$ 31.41	22.64
Area 3		
Installer I.....	\$ 23.86	22.14
Installer II.....	\$ 19.24	20.42
Lead Installer.....	\$ 26.66	22.64
Master Installer.....	\$ 30.08	22.64

 CARP0035-008 08/01/2019

AREA 1: Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara counties

AREA 2: Monterey, San Benito, Santa Cruz Counties

AREA 3: San Joaquin

AREA 4: Calaveras, Fresno, Kings, Madera, Mariposa, Merced, Stanislaus, Tuolumne Counties

	Rates	Fringes
Drywall Installers/Lathers:		
Area 1.....	\$ 50.50	30.64
Area 2.....	\$ 44.62	30.64
Area 3.....	\$ 41.02	29.15
Area 4.....	\$ 43.77	30.64
Drywall Stocker/Scrapper		
Area 1.....	\$ 25.25	17.86
Area 2.....	\$ 22.31	17.86
Area 3.....	\$ 20.51	16.88
Area 4.....	\$ 21.89	17.86

 * CARP0152-001 07/01/2020

Contra Costa County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 52.80	30.82
Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

* CARP0152-002 07/01/2020

San Joaquin County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 46.92	30.82
Journeyman Carpenter.....	\$ 46.77	30.82
Millwright.....	\$ 49.27	32.41

* CARP0152-004 07/01/2020

Calaveras, Mariposa, Merced, Stanislaus and Tuolumne Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 45.57	30.82
Journeyman Carpenter.....	\$ 45.42	30.82
Millwright.....	\$ 47.92	32.41

* CARP0217-001 07/01/2020

San Mateo County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 52.80	30.82
Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

* CARP0405-001 07/01/2020

Santa Clara County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 52.80	30.82

Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

* CARP0405-002 07/01/2020

San Benito County

	Rates	Fringes
--	-------	---------

Carpenters

Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 46.83	30.82
Journeyman Carpenter.....	\$ 46.77	30.82
Millwright.....	\$ 49.27	32.41

* CARP0505-001 07/01/2020

Santa Cruz County

	Rates	Fringes
--	-------	---------

Carpenters

Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 46.92	30.82
Journeyman Carpenter.....	\$ 46.77	30.82
Millwright.....	\$ 49.27	32.41

* CARP0605-001 07/01/2020

Monterey County

	Rates	Fringes
--	-------	---------

Carpenters

Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 46.92	30.82
Journeyman Carpenter.....	\$ 46.77	30.82
Millwright.....	\$ 49.27	32.41

* CARP0701-001 07/01/2020

Fresno and Madera Counties

	Rates	Fringes
--	-------	---------

Carpenters

Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw		

Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer.....	\$ 45.57	30.82
Journeyman Carpenter.....	\$ 45.42	30.82
Millwright.....	\$ 47.92	32.41

* CARP0713-001 07/01/2020

Alameda County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway		
Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw		
Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer.....	\$ 52.80	30.82
Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

CARP1109-001 07/01/2020

Kings County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway		
Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw		
Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer.....	\$ 45.57	30.82
Journeyman Carpenter.....	\$ 45.42	30.82
Millwright.....	\$ 47.92	32.41

ELEC0006-004 12/01/2018

SAN FRANCISCO COUNTY

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 40.52	3%+19.05
Technician.....	\$ 46.60	3%+19.05

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC0006-007 06/01/2020

SAN FRANCISCO COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 78.00	3%+35.96

ELEC0100-002 09/01/2020

FRESNO, KINGS, AND MADERA COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 40.00	24.85

ELEC0100-005 12/01/2019

FRESNO, KINGS, MADERA

	Rates	Fringes
Communications System		
Installer.....	\$ 35.25	20.86
Technician.....	\$ 40.54	21.02

SCOPE OF WORK

Includes the installation testing, service and maintenance, of the following systems which utilize the transmission and/or transference of voice, sound, vision and digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call system, radio page, school intercom and sound, burglar alarms, and low voltage master clock systems.

A. SOUND AND VOICE TRANSMISSION/TRANSFERENCE SYSTEMS

Background foreground music, Intercom and telephone interconnect systems, Telephone systems Nurse call systems, Radio page systems, School intercom and sound systems, Burglar alarm systems, Low voltage, master clock systems, Multi-media/multiplex systems, Sound and musical entertainment systems, RF systems, Antennas and Wave Guide,

B. FIRE ALARM SYSTEMS Installation, wire pulling and testing

C. TELEVISION AND VIDEO SYSTEMS Television monitoring and surveillance systems Video security systems, Video entertainment systems, Video educational systems, Microwave transmission systems, CATV and CCTV

D. SECURITY SYSTEMS Perimeter security systems Vibration sensor systems Card access systems Access control systems, Sonar/infrared monitoring equipment

E. COMMUNICATIONS SYSTEMS THAT TRANSMIT OR RECEIVE INFORMATION AND/OR CONTROL SYSTEMS THAT ARE INTRINSIC TO THE ABOVE LISTED SYSTEMS SCADA (Supervisory Control and Data Acquisition) PCM (Pulse Code Modulation) Inventory Control Systems, Digital Data Systems Broadband and Baseband and Carriers Point of Sale Systems, VSAT Data Systems Data Communication Systems RF and Remote Control Systems, Fiber Optic Data Systems

WORK EXCLUDED Raceway systems are not covered (excluding Ladder-Rack for the purpose of the above listed systems). Chases and/or nipples (not to exceed 10 feet) may be installed on open wiring systems. Energy management systems. SCADA (Supervisory Control and Data Acquisition) when not intrinsic to the above listed systems (in the scope). Fire alarm systems when installed in raceways (including wire and cable pulling) shall be performed at the electrician wage rate, when either of the following two (2) conditions apply:

1. The project involves new or major remodel building trades construction.
2. The conductors for the fire alarm system are installed in conduit.

ELEC0234-001 12/23/2019

MONTEREY, SAN BENITO AND SANTA CRUZ COUNTIES

	Rates	Fringes
ELECTRICIAN		
Zone A.....	\$ 51.47	26.64
Zone B.....	\$ 56.62	26.80

Zone A: All of Santa Cruz, Monterey, and San Benito Counties within 25 air miles of Highway 1 and Dolan Road in Moss Landing, and an area extending 5 miles east and west of Highway 101 South to the San Luis Obispo County Line

Zone B: Any area outside of Zone A

ELEC0234-003 12/01/2018

MONTEREY, SAN BENITO, AND SANTA CRUZ COUNTIES

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 40.02	19.75
Technician.....	\$ 46.02	19.75

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75'

above the lowest floor level having building access);
excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC0302-001 02/25/2019

CONTRA COSTA COUNTY

	Rates	Fringes
CABLE SPLICER.....	\$ 60.48	26.06
ELECTRICIAN.....	\$ 53.76	25.86

ELEC0302-003 12/01/2019

CONTRA COSTA COUNTY

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 40.31	21.01
Technician.....	\$ 46.36	21.19

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC0332-001 06/01/2020

SANTA CLARA COUNTY

	Rates	Fringes
CABLE SPLICER.....	\$ 82.25	40.66
ELECTRICIAN.....	\$ 71.52	40.34

FOOTNOTES: Work under compressed air or where gas masks are required, or work on ladders, scaffolds, stacks, ""Bosun's chairs,"" or other structures and where the workers are not

protected by permanent guard rails at a distance of 40 to 60 ft. from the ground or supporting structures: to be paid one and one-half times the straight-time rate of pay. Work on structures of 60 ft. or over (as described above): to be paid twice the straight-time rate of pay.

ELEC0332-003 12/01/2019

SANTA CLARA COUNTY

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 42.93	21.08
Technician.....	\$ 49.37	21.28

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC0595-001 06/01/2020

ALAMEDA COUNTY

	Rates	Fringes
CABLE SPLICER.....	\$ 69.00	3%+38.52
ELECTRICIAN.....	\$ 60.00	3%+38.52

ELEC0595-002 06/01/2020

CALAVERAS AND SAN JOAQUIN COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 48.00	7.75%+25.33
ELECTRICIAN		
(1) Tunnel work.....	\$ 42.00	7.75%+25.33
(2) All other work.....	\$ 40.00	7.75%+25.33

ELEC0595-006 12/01/2019

ALAMEDA COUNTY

	Rates	Fringes
--	-------	---------

Sound & Communications

Installer.....	\$ 42.93	3%+20.22
Technician.....	\$ 53.66	3%+20.22

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

 ELEC0595-008 12/01/2019

CALAVERAS AND SAN JOAQUIN COUNTIES

	Rates	Fringes
Communications System		
Installer.....	\$ 35.25	3%+20.22
Technician.....	\$ 44.06	3%+20.22

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

 ELEC0617-001 06/01/2020

SAN MATEO COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 66.00	39.77

ELEC0617-003 12/01/2019		

SAN MATEO COUNTY

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 42.93	21.09
Technician.....	\$ 49.37	21.28

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC0684-001 06/01/2020

MARIPOSA, MERCED, STANISLAUS AND TUOLUMNE COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 41.00	3%+24.58
CABLE SPLICER = 110% of Journeyman Electrician		

ELEC0684-004 12/01/2019

MARIPOSA, MERCED, STANISLAUS AND TUOLUMNE COUNTIES

	Rates	Fringes
Communications System		
Installer.....	\$ 35.25	20.86
Technician.....	\$ 40.54	21.02

SCOPE OF WORK: Including any data system whose only function is to transmit or receive information; excluding all other data systems or multiple systems which include control function or power supply; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or

jobs for which the conductors for the fire alarm system are installed in conduit; excluding installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excluding energy management systems.

FOOTNOTE: Fire alarm work when installed in raceways (including wire and cable pulling), on projects which involve new or major remodel building construction, for which the conductors for the fire alarm system are installed in the conduit, shall be performed by the inside electrician.

ELEC1245-001 06/01/2020

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 59.14	20.78
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 47.24	19.59
(3) Groundman.....	\$ 36.12	19.19
(4) Powderman.....	\$ 51.87	18.79

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

ELEV0008-001 01/01/2020

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 69.78	34.765+a+b

FOOTNOTE:

- a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
- b. PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0003-001 06/24/2019

""AREA 1"" WAGE RATES ARE LISTED BELOW

""AREA 2"" RECEIVES AN ADDITIONAL \$2.00 PER HOUR ABOVE AREA 1 RATES.

SEE AREA DEFINITIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment		

(AREA 1:)

GROUP 1.....	\$ 49.02	30.74
GROUP 2.....	\$ 47.49	30.74
GROUP 3.....	\$ 46.01	30.74
GROUP 4.....	\$ 44.63	30.74
GROUP 5.....	\$ 43.36	30.74
GROUP 6.....	\$ 42.04	30.74
GROUP 7.....	\$ 40.90	30.74
GROUP 8.....	\$ 39.76	30.74
GROUP 8-A.....	\$ 37.55	30.74

OPERATOR: Power Equipment
(Cranes and Attachments -
AREA 1:)

GROUP 1		
Cranes.....	\$ 50.65	30.74
Oiler.....	\$ 36.63	30.39
Truck crane oiler.....	\$ 43.55	30.74
GROUP 2		
Cranes.....	\$ 48.14	30.74
Oiler.....	\$ 36.36	30.39
Truck crane oiler.....	\$ 43.33	30.74
GROUP 3		
Cranes.....	\$ 46.40	30.74
Hydraulic.....	\$ 38.32	30.39
Oiler.....	\$ 36.14	30.39
Truck Crane Oiler.....	\$ 43.06	30.74
GROUP 4		
Cranes.....	\$ 43.36	30.74

OPERATOR: Power Equipment
(Piledriving - AREA 1:)

GROUP 1		
Lifting devices.....	\$ 45.89	30.39
Oiler.....	\$ 36.63	30.39
Truck crane oiler.....	\$ 39.20	30.39
GROUP 2		
Lifting devices.....	\$ 44.07	30.39
Oiler.....	\$ 36.36	30.39
Truck Crane Oiler.....	\$ 38.98	30.39
GROUP 3		
Lifting devices.....	\$ 42.39	30.39
Oiler.....	\$ 36.14	30.39
Truck Crane Oiler.....	\$ 38.71	30.39
GROUP 4		
Lifting devices.....	\$ 40.62	30.39
GROUP 5		
Lifting devices.....	\$ 39.32	30.39
GROUP 6		
Lifting devices.....	\$ 37.98	30.39

OPERATOR: Power Equipment
(Steel Erection - AREA 1:)

GROUP 1		
Cranes.....	\$ 46.30	30.39
Oiler.....	\$ 36.63	30.39
Truck Crane Oiler.....	\$ 39.20	30.39
GROUP 2		
Cranes.....	\$ 43.79	30.39
Oiler.....	\$ 36.36	30.39
Truck Crane Oiler.....	\$ 38.98	30.39
GROUP 3		
Cranes.....	\$ 42.05	30.39
Hydraulic.....	\$ 38.32	30.39
Oiler.....	\$ 36.14	30.39
Truck Crane Oiler.....	\$ 38.71	30.39
GROUP 4		
Cranes.....	\$ 39.01	30.39

GROUP 5		
Cranes.....	\$ 35.13	30.39
OPERATOR: Power Equipment (Tunnel and Underground Work - AREA 1:)		
SHAFTS, STOPES, RAISES:		
GROUP 1.....	\$ 40.77	30.39
GROUP 1-A.....	\$ 43.24	30.39
GROUP 2.....	\$ 39.51	30.39
GROUP 3.....	\$ 38.18	30.39
GROUP 4.....	\$ 37.04	30.39
GROUP 5.....	\$ 35.90	30.39
UNDERGROUND:		
GROUP 1.....	\$ 40.67	30.39
GROUP 1-A.....	\$ 43.14	30.39
GROUP 2.....	\$ 39.41	30.39
GROUP 3.....	\$ 38.08	30.39
GROUP 4.....	\$ 36.94	30.39
GROUP 5.....	\$ 35.80	30.39

FOOTNOTE: Work suspended by ropes or cables, or work on a Yo-Yo Cat: \$.60 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Operator of helicopter (when used in erection work); Hydraulic excavator, 7 cu. yds. and over; Power shovels, over 7 cu. yds.

GROUP 2: Highline cableway; Hydraulic excavator, 3-1/2 cu. yds. up to 7 cu. yds.; Licensed construction work boat operator, on site; Power blade operator (finish); Power shovels, over 1 cu. yd. up to and including 7 cu. yds. m.r.c.

GROUP 3: Asphalt milling machine; Cable backhoe; Combination backhoe and loader over 3/4 cu. yds.; Continuous flight tie back machine assistant to engineer or mechanic; Crane mounted continuous flight tie back machine, tonnage to apply; Crane mounted drill attachment, tonnage to apply; Dozer, slope brd; Gradall; Hydraulic excavator, up to 3 1/2 cu. yds.; Loader 4 cu. yds. and over; Long reach excavator; Multiple engine scraper (when used as push pull); Power shovels, up to and including 1 cu. yd.; Pre-stress wire wrapping machine; Side boom cat, 572 or larger; Track loader 4 cu. yds. and over; Wheel excavator (up to and including 750 cu. yds. per hour)

GROUP 4: Asphalt plant engineer/box person; Chicago boom; Combination backhoe and loader up to and including 3/4 cu. yd.; Concrete batch plant (wet or dry); Dozer and/or push cat; Pull- type elevating loader; Gradesetter, grade checker (GPS, mechanical or otherwise); Grooving and grinding machine; Heading shield operator; Heavy-duty drilling equipment, Hughes, LDH, Watson 3000 or similar; Heavy-duty repairperson and/or welder; Lime spreader; Loader under 4 cu. yds.; Lubrication and service engineer (mobile and grease rack); Mechanical finishers or spreader machine (asphalt, Barber-Greene and similar); Miller Formless M-9000 slope paver or similar; Portable crushing and screening plants; Power blade support; Roller operator, asphalt; Rubber-tired scraper, self-loading (paddle-wheels, etc.); Rubber-tired earthmoving equipment (scrapers); Slip form paver (concrete); Small tractor with drag; Soil

stabilizer (P & H or equal); Spider plow and spider puller; Tubex pile rig; Unlicensed constuction work boat operator, on site; Timber skidder; Track loader up to 4 yds.; Tractor-drawn scraper; Tractor, compressor drill combination; Welder; Woods-Mixer (and other similar Pugmill equipment)

GROUP 5: Cast-in-place pipe laying machine; Combination slusher and motor operator; Concrete conveyor or concrete pump, truck or equipment mounted; Concrete conveyor, building site; Concrete pump or pumpcrete gun; Drilling equipment, Watson 2000, Texoma 700 or similar; Drilling and boring machinery, horizontal (not to apply to waterliners, wagon drills or jackhammers); Concrete mixer/all; Person and/or material hoist; Mechanical finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical burm, curb and/or curb and gutter machine, concrete or asphalt); Mine or shaft hoist; Portable crusher; Power jumbo operator (setting slip-forms, etc., in tunnels); Screed (automatic or manual); Self-propelled compactor with dozer; Tractor with boom D6 or smaller; Trenching machine, maximum digging capacity over 5 ft. depth; Vermeer T-600B rock cutter or similar

GROUP 6: Armor-Coater (or similar); Ballast jack tamper; Boom- type backfilling machine; Assistant plant engineer; Bridge and/or gantry crane; Chemical grouting machine, truck-mounted; Chip spreading machine operator; Concrete saw (self-propelled unit on streets, highways, airports and canals); Deck engineer; Drilling equipment Texoma 600, Hughes 200 Series or similar up to and including 30 ft. m.r.c.; Drill doctor; Helicopter radio operator; Hydro-hammer or similar; Line master; Skidsteer loader, Bobcat larger than 743 series or similar (with attachments); Locomotive; Lull hi-lift or similar; Oiler, truck mounted equipment; Pavement breaker, truck-mounted, with compressor combination; Paving fabric installation and/or laying machine; Pipe bending machine (pipelines only); Pipe wrapping machine (tractor propelled and supported); Screed (except asphaltic concrete paving); Self-propelled pipeline wrapping machine; Tractor; Self-loading chipper; Concrete barrier moving machine

GROUP 7: Ballast regulator; Boom truck or dual-purpose A-frame truck, non-rotating - under 15 tons; Cary lift or similar; Combination slurry mixer and/or cleaner; Drilling equipment, 20 ft. and under m.r.c.; Firetender (hot plant); Grouting machine operator; Highline cableway signalperson; Stationary belt loader (Kolman or similar); Lift slab machine (Vagtborg and similar types); Maginnes internal full slab vibrator; Material hoist (1 drum); Mechanical trench shield; Pavement breaker with or without compressor combination); Pipe cleaning machine (tractor propelled and supported); Post driver; Roller (except asphalt); Chip Seal; Self-propelled automatically applied concrete curing mahcine (on streets, highways, airports and canals); Self-propelled compactor (without dozer); Signalperson; Slip-form pumps (lifting device for concrete forms); Tie spacer; Tower mobile; Trenching machine, maximum digging capacity up to and including 5 ft. depth; Truck- type loader

GROUP 8: Bit sharpener; Boiler tender; Box operator; Brakeperson; Combination mixer and compressor (shotcrete/gunite); Compressor operator; Deckhand; Fire tender; Forklift (under 20 ft.); Generator;

Gunite/shotcrete equipment operator; Hydraulic monitor; Ken seal machine (or similar); Mixermobile; Oiler; Pump operator; Refrigeration plant; Reservoir-debris tug (self-propelled floating); Ross Carrier (construction site); Rotomist operator; Self-propelled tape machine; Shuttlecar; Self-propelled power sweeper operator (includes vacuum sweeper); Slusher operator; Surface heater; Switchperson; Tar pot firetender; Tugger hoist, single drum; Vacuum cooling plant; Welding machine (powered other than by electricity)

GROUP 8-A: Elevator operator; Skidsteer loader-Bobcat 743 series or smaller, and similar (without attachments); Mini excavator under 25 H.P. (backhoe-trencher); Tub grinder wood chipper

ALL CRANES AND ATTACHMENTS

GROUP 1: Clamshell and dragline over 7 cu. yds.; Crane, over 100 tons; Derrick, over 100 tons; Derrick barge pedestal-mounted, over 100 tons; Self-propelled boom-type lifting device, over 100 tons

GROUP 2: Clamshell and dragline over 1 cu. yd. up to and including 7 cu. yds.; Crane, over 45 tons up to and including 100 tons; Derrick barge, 100 tons and under; Self-propelled boom-type lifting device, over 45 tons; Tower crane

GROUP 3: Clamshell and dragline up to and including 1 cu. yd.; Cranes 45 tons and under; Self-propelled boom-type lifting device 45 tons and under;

GROUP 4: Boom Truck or dual purpose A-frame truck, non-rotating over 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) over 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) - under 15 tons;

PILEDRIVERS

GROUP 1: Derrick barge pedestal mounted over 100 tons; Clamshell over 7 cu. yds.; Self-propelled boom-type lifting device over 100 tons; Truck crane or crawler, land or barge mounted over 100 tons

GROUP 2: Derrick barge pedestal mounted 45 tons to and including 100 tons; Clamshell up to and including 7 cu. yds.; Self-propelled boom-type lifting device over 45 tons; Truck crane or crawler, land or barge mounted, over 45 tons up to and including 100 tons; Fundex F-12 hydraulic pile rig

GROUP 3: Derrick barge pedestal mounted under 45 tons; Self-propelled boom-type lifting device 45 tons and under; Skid/scow piledriver, any tonnage; Truck crane or crawler, land or barge mounted 45 tons and under

GROUP 4: Assistant operator in lieu of assistant to engineer; Forklift, 10 tons and over; Heavy-duty repairperson/welder

GROUP 5: Deck engineer

GROUP 6: Deckhand; Fire tender

STEEL ERECTORS

GROUP 1: Crane over 100 tons; Derrick over 100 tons; Self-propelled boom-type lifting device over 100 tons

GROUP 2: Crane over 45 tons to 100 tons; Derrick under 100 tons; Self-propelled boom-type lifting device over 45 tons to 100 tons; Tower crane

GROUP 3: Crane, 45 tons and under; Self-propelled boom-type lifting device, 45 tons and under

GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy-duty repair person/welder

GROUP 5: Boom cat

--

TUNNEL AND UNDERGROUND WORK

GROUP 1-A: Tunnel bore machine operator, 20' diameter or more

GROUP 1: Heading shield operator; Heavy-duty repairperson; Mucking machine (rubber tired, rail or track type); Raised bore operator (tunnels); Tunnel mole bore operator

GROUP 2: Combination slusher and motor operator; Concrete pump or pumpcrete gun; Power jumbo operator

GROUP 3: Drill doctor; Mine or shaft hoist

GROUP 4: Combination slurry mixer cleaner; Grouting Machine operator; Motorman

GROUP 5: Bit Sharpener; Brakeman; Combination mixer and compressor (gunite); Compressor operator; Oiler; Pump operator; Slusher operator

AREA DESCRIPTIONS:

POWER EQUIPMENT OPERATORS, CRANES AND ATTACHMENTS, TUNNEL AND UNDERGROUND [These areas do not apply to Piledrivers and Steel Erectors]

AREA 1: ALAMEDA, CALAVERAS, CONTRA COSTA, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, MONTEREY, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, STANISLAUS, TUOLUMNE

AREA 2 -NOTED BELOW

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

CALAVERAS COUNTY:

Area 1: Remainder

Area 2: Eastern Part

FRESNO COUNTY:

Area 1: Remainder

Area 2: Eastern Part

MADERA COUNTY:

Area 1: Remainder

Area 2: Eastern Part

MARIPOSA COUNTY:

Area 1: Remainder

Area 2: Eastern Part

MONTEREY COUNTY:

Area 1: Remainder

Area 2: Southwestern part

TUOLUMNE COUNTY:

Area 1: Remainder

Area 2: Eastern Part

 ENGI0003-008 07/01/2019

	Rates	Fringes
Dredging: (DREDGING: CLAMSHELL & DIPPER DREDGING; HYDRAULIC SUCTION DREDGING:)		
AREA 1:		
(1) Leverman.....	\$ 47.88	33.10
(2) Dredge Dozer; Heavy duty repairman.....	\$ 42.92	33.10
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator.....	\$ 41.80	33.10
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler..	\$ 38.50	33.10
AREA 2:		
(1) Leverman.....	\$ 49.88	33.10
(2) Dredge Dozer; Heavy duty repairman.....	\$ 44.92	33.10
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator.....	\$ 43.80	33.10
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler..	\$ 40.50	33.10

AREA DESCRIPTIONS

AREA 1: ALAMEDA,BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED,
 NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN,
 SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS,
 SUTTER, YOLO, AND YUBA COUNTIES

AREA 2: MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2
 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part

Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Remainder

Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part

Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part

Area 2: Remainder

FRESNO COUNTY:

Area 1: Remainder

Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part

Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border
with Shasta County

Area 2: Remainder

MADERA COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

MONTERREY COUNTY

Area 1: Except Southwestern part

Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County

Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion

Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion

Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner

Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part

Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part

Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner
 Area 2: Remainder

TEHAMA COUNTY:

Area 1: All but the Western border with Mendocino & Trinity Counties
 Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeastern border with Shasta County
 Area 2: Remainder

TUOLUMNE COUNTY:

Area 1: Except Eastern part
 Area 2: Eastern part

 ENGI0003-019 06/29/2020

SEE AREA DESCRIPTIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (LANDSCAPE WORK ONLY)		
GROUP 1		
AREA 1.....	\$ 39.95	30.28
AREA 2.....	\$ 41.95	30.28
GROUP 2		
AREA 1.....	\$ 36.35	30.28
AREA 2.....	\$ 38.35	30.28
GROUP 3		
AREA 1.....	\$ 31.74	30.28
AREA 2.....	\$ 33.74	30.28

GROUP DESCRIPTIONS:

GROUP 1: Landscape Finish Grade Operator: All finish grade work regardless of equipment used, and all equipment with a rating more than 65 HP.

GROUP 2: Landscape Operator up to 65 HP: All equipment with a manufacturer's rating of 65 HP or less except equipment covered by Group 1 or Group 3. The following equipment shall be included except when used for finish work as long as manufacturer's rating is 65 HP or less: A-Frame and Winch Truck, Backhoe, Forklift, Hydragraphic Seeder Machine, Roller, Rubber-Tired and Track Earthmoving Equipment, Skiploader, Straw Blowers, and Trencher 31 HP up to 65 HP.

GROUP 3: Landscae Utility Operator: Small Rubber-Tired Tractor, Trencher Under 31 HP.

AREA DESCRIPTIONS:

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Except Eastern part
Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part
Area 2: Remainder

DEL NORTE COUNTY:

Area 1: Extreme Southwestern corner
Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY

Area 1: Except Eastern part
Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part
Area 2: Remainder

HUMBOLDT COUNTY:

Area 1: Except Eastern and Southwestern parts
Area 2: Remainder

LAKE COUNTY:

Area 1: Southern part
Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border
with Shasta County
Area 2: Remainder

MADERA COUNTY

Area 1: Remainder
Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Remainder
Area 2: Eastern part

MENDOCINO COUNTY:

Area 1: Central and Southeastern parts
Area 2: Remainder

MONTEREY COUNTY

Area 1: Remainder
Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County
Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion
Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion
Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner
Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part
Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner
Area 2: Reaminder

TEHAMA COUNTY:

Area 1: All but the Western border with mendocino & Trinity
Counties
Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeaster border with
Shasta County
Area 2: Remainder

TULARE COUNTY;

Area 1: Remainder
Area 2: Eastern part

TUOLUMNE COUNTY:

Area 1: Remainder
Area 2: Eastern Part

IRON0377-001 07/01/2020

ALAMEDA, CONTRA COSTA, SAN MATEO, SANTA CLARA & SAN FRANCISCO
COUNTIES

Rates Fringes

Ironworkers:

Fence Erector.....	\$ 34.58	24.81
Ornamental, Reinforcing and Structural.....	\$ 42.50	33.45

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval
Reserve-Niland,
Edwards AFB, Fort Irwin Military Station, Fort Irwin Training
Center-Goldstone, San Clemente Island, San Nicholas Island,

Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

IRON0433-005 07/01/2020

REMAINING COUNTIES

	Rates	Fringes
IRONWORKER		
Fence Erector.....	\$ 34.58	24.81
Ornamental, Reinforcing and Structural.....	\$ 41.00	33.45

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LAB00067-002 06/29/2020

AREA ""A"" - ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA ""B"" - CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, MONTEREY, SAN BENITO, SAN JOAQUIN, STANISLAUS, AND TUOLUMNE COUNTIES

	Rates	Fringes
Asbestos Removal Laborer		
All Counties.....	\$ 25.05	12.00
LABORER (Lead Removal)		
Area A.....	\$ 33.07	25.30

Area B.....\$ 32.07 25.30

ASBESTOS REMOVAL-SCOPE OF WORK: Site mobilization; initial site clean-up; site preparation; removal of asbestos-containing materials from walls and ceilings; or from pipes, boilers and mechanical systems only if they are being scrapped; encapsulation, enclosure and disposal of asbestos-containing materials by hand or with equipment or machinery; scaffolding; fabrication of temporary wooden barriers; and assembly of decontamination stations.

LAB00073-002 06/25/2018

CALAVERAS AND SAN JOAQUIN COUNTIES

Rates Fringes

LABORER (TRAFFIC CONTROL/LANE CLOSURE)

Escort Driver, Flag Person..\$ 29.54	23.65
Traffic Control Person I...\$ 29.84	23.65
Traffic Control Person II...\$ 27.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LAB00073-003 07/01/2020

SAN JOAQUIN COUNTY

Rates Fringes

LABORER

Mason Tender-Brick.....\$ 32.84	23.71
---------------------------------	-------

LAB00073-005 06/25/2018

Rates Fringes

Tunnel and Shaft Laborers:

GROUP 1.....\$ 37.82	24.11
GROUP 2.....\$ 37.59	24.11
GROUP 3.....\$ 37.34	24.11
GROUP 4.....\$ 36.89	24.11
GROUP 5.....\$ 36.35	24.11
Shotcrete Specialist.....\$ 38.34	24.11

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Guniting and shotcrete nozzle men

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickers - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Guniting & shotcrete gunman & potman; Headermen; High

pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0073-007 06/25/2018

CALAVERAS AND SAN JOAQUIN COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT LABORERS)		
Construction Specialist		
Group.....	\$ 30.49	23.20
GROUP 1.....	\$ 29.79	23.20
GROUP 1-a.....	\$ 30.01	23.20
GROUP 1-c.....	\$ 29.84	23.20
GROUP 1-e.....	\$ 30.34	23.20
GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 29.64	23.20
GROUP 3.....	\$ 29.54	23.20
GROUP 4.....	\$ 23.23	23.20
See groups 1-b and 1-d under laborer classifications.		
LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS)		
(1) New Construction.....	\$ 29.54	23.20
(2) Establishment Warranty Period.....	\$ 23.23	23.20
LABORER (GUNITE)		
GROUP 1.....	\$ 29.75	22.31
GROUP 2.....	\$ 29.25	22.31
GROUP 3.....	\$ 28.66	22.31
GROUP 4.....	\$ 28.54	22.31
LABORER (WRECKING)		
GROUP 1.....	\$ 29.79	23.20
GROUP 2.....	\$ 29.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small

trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalars (including drilling of same); Tree toppler; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall

apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunitite laborer

 WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

 LAB00073-009 07/01/2018

CALAVERAS AND SAN JOAQUIN COUNTIES

	Rates	Fringes
LABORER (Plaster Tender).....	\$ 32.02	23.00

Work on a swing stage scaffold: \$1.00 per hour additional.

 LAB00261-003 06/25/2018

SAN FRANCISCO AND SAN MATEO COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person..	\$ 20.54	23.65
Traffic Control Person I....	\$ 30.84	23.65
Traffic Control Person II...\$	28.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

 LAB00261-005 06/25/2018

SAN FRANCISCO AND SAN MATEO COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 37.82	24.11
GROUP 2.....	\$ 37.59	24.11
GROUP 3.....	\$ 37.34	24.11
GROUP 4.....	\$ 36.89	24.11
GROUP 5.....	\$ 36.35	24.11
Shotcrete Specialist.....	\$ 38.34	24.11

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Guniting and shotcrete nozzle men

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry picker men - where car is lifted; Concrete finisher

in tunnel; Concrete screedman; Grout pumpman and potman; Gunitite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LAB00261-009 06/25/2018

SAN FRANCISCO, AND SAN MATEO COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT		
LABORERS - AREA A:)		
Construction Specialist		
Group.....	\$ 31.49	23.20
GROUP 1.....	\$ 30.79	23.20
GROUP 1-a.....	\$ 31.01	23.20
GROUP 1-c.....	\$ 30.84	23.20
GROUP 1-e.....	\$ 31.34	23.20
GROUP 1-f.....	\$ 31.37	23.20
GROUP 2.....	\$ 30.64	23.20
GROUP 3.....	\$ 30.54	23.20
GROUP 4.....	\$ 24.23	23.20
See groups 1-b and 1-d under laborer classifications.		
LABORER (GARDENERS,		
HORTICULTURAL & LANDSCAPE		
LABORERS - AREA A:)		
(1) New Construction.....	\$ 30.54	23.20
(2) Establishment Warranty		
Period.....	\$ 24.23	23.20
LABORER (WRECKING - AREA A:)		
GROUP 1.....	\$ 30.79	23.20
GROUP 2.....	\$ 30.64	23.20
Laborers: (GUNITITE - AREA A:)		
GROUP 1.....	\$ 30.75	22.31
GROUP 2.....	\$ 30.25	22.31
GROUP 3.....	\$ 29.66	22.31
GROUP 4.....	\$ 29.54	22.31

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work;

Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalars (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically

covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LAB00261-011 05/01/2018

SAN FRANCISCO AND SAN MATEO COUNTIES:

	Rates	Fringes
MASON TENDER, BRICK.....	\$ 35.37	20.70

FOOTNOTES: Underground work such as sewers, manholes, catch basins, sewer pipes, telephone conduits, tunnels and cut trenches: \$5.00 per day additional. Work in live sewage: \$2.50 per day additional.

LAB00261-014 07/01/2017

SAN FRANCISCO AND SAN MATEO COUNTIES:

	Rates	Fringes
PLASTER TENDER.....	\$ 34.70	23.11

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00270-003 06/25/2018

AREA A: SANTA CLARA

AREA B: MONTEREY, SAN BENITO AND SANTA CRUZ COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person		
Area A.....	\$ 30.54	23.65
Area B.....	\$ 29.54	23.65
Traffic Control Person I		
Area A.....	\$ 30.84	23.65
Area B.....	\$ 29.84	23.65
Traffic Control Person II		
Area A.....	\$ 28.34	23.65
Area B.....	\$ 27.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LABO0270-004 06/25/2018

MONTEREY, SAN BENITO, SANTA CLARA, AND SANTA CRUZ COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 37.82	24.11
GROUP 2.....	\$ 37.59	24.11
GROUP 3.....	\$ 37.34	24.11
GROUP 4.....	\$ 36.89	24.11
GROUP 5.....	\$ 36.35	24.11
Shotcrete Specialist.....	\$ 38.34	24.11

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Guniting and shotcrete nozzle men

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickers - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Guniting & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0270-005 07/01/2020

MONTEREY AND SAN BENITO COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 32.84	23.71

LABO0270-007 06/25/2018

MONTEREY, SAN BENITO, AND SANTA CRUZ, COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT LABORERS - AREA B)		
Construction Specialist		
Group.....	\$ 30.40	23.20
GROUP 1.....	\$ 29.79	23.20
GROUP 1-a.....	\$ 30.01	23.20
GROUP 1-c.....	\$ 29.84	23.20
GROUP 1-e.....	\$ 30.34	23.20

GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 29.64	23.20
GROUP 3.....	\$ 29.54	23.20
GROUP 4.....	\$ 23.23	23.20

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS,
HORTICULTURAL & LANDSCAPE
LABORERS - AREA B)

(1) New Construction.....	\$ 29.54	23.20
(2) Establishment Warranty Period.....	\$ 23.23	23.20

LABORER (GUNITE - AREA B)

GROUP 1.....	\$ 29.75	22.31
GROUP 2.....	\$ 29.25	22.31
GROUP 3.....	\$ 28.66	22.31
GROUP 4.....	\$ 28.54	22.31

LABORER (WRECKING - AREA B)

GROUP 1.....	\$ 29.79	23.20
GROUP 2.....	\$ 29.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucket; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of

sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

- GROUP 1: Structural Nozzleman
- GROUP 2: Nozzleman, Gunman, Potman, Groundman
- GROUP 3: Reboundman
- GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

- GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)
- GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LABO0270-010 06/25/2018

SANTA CLARA COUNTY

Rates Fringes

LABORER (CONSTRUCTION CRAFT
LABORERS - AREA A:)

Construction Specialist		
Group.....	\$ 31.49	23.20
GROUP 1.....	\$ 30.79	23.20
GROUP 1-a.....	\$ 31.01	23.20
GROUP 1-c.....	\$ 30.84	23.20
GROUP 1-e.....	\$ 31.34	23.20
GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 30.64	23.20
GROUP 3.....	\$ 30.54	23.20
GROUP 4.....	\$ 24.23	23.20

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS,
HORTICULTURAL & LANDSCAPE

LABORERS - AREA A:)

(1) New Construction.....\$ 30.54	23.20
(2) Establishment Warranty Period.....\$ 24.23	23.20

LABORER (GUNITE - AREA A:)

GROUP 1.....\$ 30.75	22.31
GROUP 2.....\$ 30.25	22.31
GROUP 3.....\$ 29.66	22.31
GROUP 4.....\$ 29.54	22.31

LABORER (WRECKING - AREA A:)

GROUP 1.....\$ 30.79	23.20
GROUP 2.....\$ 30.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and

rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. ""Sewer cleaner"" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and

piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material cleaner"" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

GUNITE LABORER CLASSIFICATIONS

- GROUP 1: Structural Nozzleman
- GROUP 2: Nozzleman, Gunman, Potman, Groundman
- GROUP 3: Reboundman
- GROUP 4: Guniting laborer

WRECKING WORK LABORER CLASSIFICATIONS

- GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)
- GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LAB00270-011 07/01/2017

MONTEREY, SAN BENITO, SANTA CRUZ, SANTA CLARA COUNTIES

	Rates	Fringes
LABORER (Plaster Tender).....	\$ 34.70	21.22

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00294-001 07/01/2020

FRESNO, KINGS AND MADERA COUNTIES

	Rates	Fringes
LABORER (Brick)		
Mason Tender-Brick.....	\$ 32.84	23.71

LAB00294-002 06/25/2018

FRESNO, KINGS, AND MADERA COUNTIES

Rates Fringes

LABORER (TRAFFIC CONTROL/LANE CLOSURE)

Escort Driver, Flag Person..\$	29.54	23.65
Traffic Control Person I....\$	29.84	23.65
Traffic Control Person II...\$	27.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LABO0294-005 06/25/2018

FRESNO, KINGS, AND MADERA COUNTIES

Rates Fringes

Tunnel and Shaft Laborers:

GROUP 1.....\$	37.82	24.11
GROUP 2.....\$	37.59	24.11
GROUP 3.....\$	37.34	24.11
GROUP 4.....\$	36.89	24.11
GROUP 5.....\$	36.35	24.11
Shotcrete Specialist.....\$	38.34	24.11

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlelemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0294-008 06/25/2018

FRESNO, KINGS, AND MADERA COUNTIES

Rates Fringes

LABORER (CONSTRUCTION CRAFT

LABORERS - AREA B:)

Construction Specialist

Group.....	\$ 30.49	23.20
GROUP 1.....	\$ 29.79	23.20
GROUP 1-a.....	\$ 30.01	23.20
GROUP 1-c.....	\$ 29.84	23.20
GROUP 1-e.....	\$ 30.34	23.20
GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 29.64	23.20
GROUP 3.....	\$ 29.54	23.20
GROUP 4.....	\$ 23.23	23.20

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS,
HORTICULTURAL & LANDSCAPE

LABORERS - AREA B:)

(1) New Construction.....	\$ 29.54	23.20
(2) Establishment Warranty Period.....	\$ 23.23	23.20

LABORER (GUNITITE - AREA B:)

GROUP 1.....	\$ 29.75	22.31
GROUP 2.....	\$ 29.25	22.31
GROUP 3.....	\$ 28.66	22.31
GROUP 4.....	\$ 28.54	22.31

LABORER (WRECKING - AREA B:)

GROUP 1.....	\$ 29.79	23.20
GROUP 2.....	\$ 29.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of

voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling

of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

- GROUP 1: Structural Nozzleman
- GROUP 2: Nozzleman, Gunman, Potman, Groundman
- GROUP 3: Reboundman
- GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

- GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)
- GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LAB00294-010 07/01/2018

CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS & TUOLUMNE

	Rates	Fringes
Plasterer tender.....	\$ 32.02	23.00

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00294-011 07/01/2017

FRESNO, KINGS, AND MADERA COUNTIES

	Rates	Fringes
LABORER (Plaster Tender).....	\$ 31.02	22.52

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00304-002 06/25/2018

ALAMEDA COUNTY

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person..	\$ 30.54	23.65
Traffic Control Person I....	\$ 30.84	23.65
Traffic Control Person II...	\$ 28.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LAB00304-003 06/26/2017

ALAMEDA COUNTY

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 36.60	24.83
GROUP 2.....	\$ 36.37	24.83
GROUP 3.....	\$ 36.12	24.83
GROUP 4.....	\$ 35.67	24.83
GROUP 5.....	\$ 35.13	24.83
Shotcrete Specialist.....	\$ 37.12	24.83

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0304-004 06/25/2018

ALAMEDA COUNTY

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT		
LABORERS - AREA A:)		
Construction Specialist		
Group.....	\$ 31.49	23.20
GROUP 1.....	\$ 30.79	23.20
GROUP 1-a.....	\$ 31.01	23.20
GROUP 1-c.....	\$ 30.84	23.20
GROUP 1-e.....	\$ 31.34	23.20
GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 30.64	23.20
GROUP 3.....	\$ 30.54	23.20
GROUP 4.....	\$ 24.23	23.20
See groups 1-b and 1-d under laborer classifications.		
LABORER (GARDENERS,		
HORTICULTURAL & LANDSCAPE		
LABORERS - AREA A:)		
(1) New Construction.....	\$ 30.54	23.20
(2) Establishment Warranty		
Period.....	\$ 24.23	23.20
LABORER (GUNITE - AREA A:)		
GROUP 1.....	\$ 30.75	22.31
GROUP 2.....	\$ 30.25	22.31
GROUP 3.....	\$ 29.66	22.31
GROUP 4.....	\$ 29.54	22.31
LABORER (WRECKING - AREA A:)		
GROUP 1.....	\$ 30.79	23.20
GROUP 2.....	\$ 30.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2

yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree toppler; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep

footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building

materials)

LAB00304-005 05/01/2018

ALAMEDA COUNTY

	Rates	Fringes
Brick Tender.....	\$ 35.37	20.70

FOOTNOTES: Work on jobs where heat-protective clothing is required: \$2.00 per hour additional. Work at grinders: \$.25 per hour additional. Manhole work: \$2.00 per day additional.

LAB00304-008 07/01/2017

ALAMEDA AND CONTRA COSTA COUNTIES:

	Rates	Fringes
Plasterer tender.....	\$ 34.70	23.11

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00324-002 06/25/2018

CONTRA COSTA COUNTY

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person..	\$ 30.54	23.65
Traffic Control Person I....	\$ 30.84	23.65
Traffic Control Person II...	\$ 28.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LAB00324-006 06/25/2018

CONTRA COSTA COUNTY

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 37.82	24.11
GROUP 2.....	\$ 37.59	24.11
GROUP 3.....	\$ 37.34	24.11
GROUP 4.....	\$ 36.89	24.11
GROUP 5.....	\$ 36.35	24.11
Shotcrete Specialist.....	\$ 38.34	24.11

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Guniting and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0324-012 06/25/2018

CONTRA COSTA COUNTY

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT		
LABORERS - AREA A:)		
Construction Specialist		
Group.....	\$ 31.49	23.20
GROUP 1.....	\$ 30.79	23.20
GROUP 1-a.....	\$ 31.01	23.20
GROUP 1-c.....	\$ 30.84	23.20
GROUP 1-e.....	\$ 31.34	23.20
GROUP 1-f.....	\$ 30.37	23.20
GROUP 1-g.....	\$ 30.99	23.20
GROUP 2.....	\$ 30.64	23.20
GROUP 3.....	\$ 30.54	23.20
GROUP 4.....	\$ 24.23	23.20
See groups 1-b and 1-d under laborer classifications.		
LABORER (GARDENERS,		
HORTICULURAL & LANDSCAPE		
LABORERS - AREA A:)		
(1) New Construction.....	\$ 30.54	23.20
(2) Establishment Warranty		
Period.....	\$ 24.23	23.20
LABORER (GUNITE - AREA A:)		
GROUP 1.....	\$ 30.75	22.31
GROUP 2.....	\$ 30.25	22.31
GROUP 3.....	\$ 29.66	22.31
GROUP 4.....	\$ 29.54	22.31
LABORER (WRECKING - AREA A:)		
GROUP 1.....	\$ 30.79	23.20
GROUP 2.....	\$ 30.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in-place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Lead Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucket; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree toppler; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers'

work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 1-g, CONTRA COSTA COUNTY: Pipelayer (including grade checking in connection with pipelaying); Caulker; Bander; Pipewrapper; Conduit layer; Plastic pipe layer; Pressure pipe tester; No joint pipe and stripping of same, including repair of voids; Precast manhole setters, cast in place manhole form setters

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material cleaner"" is to be utilized under the following conditions:

- A: at demolition site for the salvage of the material.
- B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
- C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in

the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

GROUP 1-g, CONTRA COSTA COUNTY: Pipelayer (including grade checking in connection with pipelaying); Caulker; Bander; Pipewrapper; Conduit layer; Plastic pipe layer; Pressure pipe tester; No joint pipe and stripping of same, including repair of voids; Precast manhole setters, cast in place manhole form setters

LAB00324-014 05/01/2018

CONTRA COSTA COUNTY:

	Rates	Fringes
Brick Tender.....	\$ 35.37	20.70

FOOTNOTES: Work on jobs where heat-protective clothing is required: \$2.00 per hour additional. Work at grinders: \$.25 per hour additional. Manhole work: \$2.00 per day additional.

LAB00324-018 07/01/2018

ALAMEDA AND CONTRA COSTA COUNTIES:

	Rates	Fringes
Plasterer tender.....	\$ 37.14	22.32

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB01130-002 06/25/2018

MARIPOSA, MERCED, STANISLAUS, AND TUOLUMNE COUNTIES

	Rates	Fringes
--	-------	---------

LABORER (TRAFFIC CONTROL/LANE CLOSURE)

Escort Driver, Flag Person..\$ 29.54	23.65
Traffic Control Person I...\$ 29.84	23.65
Traffic Control Person II...\$ 27.34	23.65

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LAB01130-003 06/26/2017

MARIPOSA, MERCED, STANISLAUS, AND TUOLUMNE COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....\$ 36.60	36.60	24.83
GROUP 2.....\$ 36.37	36.37	24.83
GROUP 3.....\$ 36.12	36.12	24.83
GROUP 4.....\$ 35.67	35.67	24.83
GROUP 5.....\$ 35.13	35.13	24.83
Shotcrete Specialist.....\$ 37.12	37.12	24.83

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LAB01130-005 07/01/2018

MARIPOSA, MERCED, STANISLAUS AND TUOLUMNE COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick.....\$ 31.20	31.20	22.20

LAB01130-007 06/25/2018

MARIPOSA, MERCED, STANISLAUS, AND TUOLUMNE , COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT LABORERS - AREA B:)		
Construction Specialist		
Group.....	\$ 30.49	23.20
GROUP 1.....	\$ 29.79	23.20
GROUP 1-a.....	\$ 30.01	23.20
GROUP 1-c.....	\$ 29.84	23.20
GROUP 1-e.....	\$ 30.34	23.20
GROUP 1-f.....	\$ 29.37	23.20
GROUP 2.....	\$ 29.64	23.20
GROUP 3.....	\$ 29.54	23.20
GROUP 4.....	\$ 23.23	23.20

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA B:)		
(1) New Construction.....	\$ 29.54	23.20
(2) Establishment Warranty Period.....	\$ 23.23	23.20
LABORER (GUNITE - AREA B:)		
GROUP 1.....	\$ 29.75	22.31
GROUP 2.....	\$ 29.25	22.31
GROUP 3.....	\$ 28.66	22.31
GROUP 4.....	\$ 28.54	22.31
LABORER (WRECKING - AREA B:)		
GROUP 1.....	\$ 29.79	23.20
GROUP 2.....	\$ 29.64	23.20

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying,

dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. ""Sewer cleaner"" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and

grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material cleaner"" is to be utilized under the following conditions:
 A: at demolition site for the salvage of the material.
 B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
 C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

 GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunitite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LAB01130-008 07/01/2018

CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS & TUOLUMNE

Rates

Fringes

Plasterer tender.....\$ 32.02 23.00

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB01130-009 07/01/2018

MARIPOSA, MERCED, STANISLAUS, AND TUOLUMNE COUNTIES

Rates Fringes

LABORER (Plaster Tender).....\$ 32.02 23.00

Work on a swing stage scaffold: \$1.00 per hour additional.

PAIN0016-001 01/01/2019

ALAMEDA, CONTRA COSTA, MONTEREY, SAN BENITO, SAN MATEO, SANTA CLARA, AND SANTA CRUZ COUNTIES

Rates Fringes

Painters:.....\$ 42.67 24.03

PREMIUMS:

EXOTIC MATERIALS - \$0.75 additional per hour.

SPRAY WORK: - \$0.50 additional per hour.

INDUSTRIAL PAINTING - \$0.25 additional per hour

[Work on industrial buildings used for the manufacture and processing of goods for sale or service; steel construction (bridges), stacks, towers, tanks, and similar structures]

HIGH WORK:

over 50 feet - \$2.00 per hour additional

100 to 180 feet - \$4.00 per hour additional

Over 180 feet - \$6.00 per hour additional

PAIN0016-003 06/01/2020

AREA 1: ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN MATEO & SANTA CLARA COUNTIES

AREA 2: CALAVERAS, MARIPOA, MERCED, MONTEREY, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, STANISLAUS & TUOLUMNE COUNTIES

Rates Fringes

Drywall Finisher/Taper

AREA 1.....\$ 51.51 27.39

AREA 2.....\$ 47.38 25.99

PAIN0016-012 01/01/2019

ALAMEDA, CONTRA COSTA, MARIPOSA, MERCED, MONTEREY, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA AND SANTA CRUZ COUNTIES

Rates Fringes

SOFT FLOOR LAYER.....\$ 48.60 27.43

PAIN0016-015 01/01/2019

CALAVERAS, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS & TUOLUMNE COUNTIES

	Rates	Fringes
PAINTER		
Brush.....	\$ 33.68	20.24

FOOTNOTES:

SPRAY/SANDBLAST: \$0.50 additional per hour.
 EXOTIC MATERIALS: \$1.00 additional per hour.
 HIGH TIME: Over 50 ft above ground or water level \$2.00 additional per hour. 100 to 180 ft above ground or water level \$4.00 additional per hour. Over 180 ft above ground or water level \$6.00 additional per hour.

PAIN0016-022 01/01/2019

SAN FRANCISCO COUNTY

	Rates	Fringes
PAINTER.....	\$ 46.29	24.03

PAIN0169-001 06/01/2020

FRESNO, KINGS, MADERA, MARIPOSA AND MERCED COUNTIES:

	Rates	Fringes
GLAZIER.....	\$ 40.00	26.76

PAIN0169-005 07/01/2020

ALAMEDA CONTRA COSTA, MONTEREY, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA & SANTA CRUZ COUNTIES

	Rates	Fringes
GLAZIER.....	\$ 52.17	30.55

PAIN0294-004 06/01/2020

FRESNO, KINGS AND MADERA COUNTIES

	Rates	Fringes
PAINTER		
Brush, Roller.....	\$ 30.18	20.21
Drywall Finisher/Taper.....	\$ 40.10	25.00

FOOTNOTE:

Spray Painters & Paperhangers recive \$1.00 additional per hour. Painters doing Drywall Patching receive \$1.25 additional per hour. Lead Abaters & Sandblasters receive \$1.50 additional per hour. High Time - over 30 feet (does not include work from a lift) \$0.75 per hour additional.

PAIN0294-005 06/01/2020

FRESNO, KINGS & MADERA

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 33.30	21.42

PAIN0767-001 07/01/2020

CALAVERAS, SAN JOAQUIN, STANISLAUS AND TUOLUMNE COUNTIES:

	Rates	Fringes
GLAZIER.....	\$ 40.61	30.76

PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day.

Employee required to wear a body harness shall receive \$1.50 per hour above the basic hourly rate at any elevation.

PAIN1176-001 07/01/2020

HIGHWAY IMPROVEMENT

	Rates	Fringes
Parking Lot Striping/Highway Marking:		
GROUP 1.....	\$ 38.48	16.88
GROUP 2.....	\$ 32.71	16.88
GROUP 3.....	\$ 33.09	16.88

CLASSIFICATIONS

GROUP 1: Striper: Layout and application of painted traffic stripes and marking; hot thermo plastic; tape, traffic stripes and markings

GROUP 2: Gamecourt & Playground Installer

GROUP 3: Protective Coating, Pavement Sealing

PAIN1237-003 01/01/2020

CALAVERAS; SAN JOAQUIN COUNTIES; STANISLAUS AND TUOLUMNE COUNTIES:

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 39.61	22.59

PLAS0066-002 07/01/2019

ALAMEDA, CONTRA COSTA, SAN MATEO AND SAN FRANCISCO COUNTIES:

	Rates	Fringes
PLASTERER.....	\$ 42.41	30.73

PLAS0300-001 07/01/2018

	Rates	Fringes
PLASTERER		
AREA 188: Fresno.....	\$ 32.70	31.68
AREA 224: San Benito, Santa Clara, Santa Cruz.....	\$ 32.88	31.68
AREA 295: Calaveras & San Joaquin Counties.....	\$ 32.70	31.68
AREA 337: Monterey County..	\$ 32.88	31.68
AREA 429: Mariposa, Merced, Stanislaus, Tuolumne Counties.....	\$ 32.70	31.68

PLAS0300-005 07/01/2017

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 33.49	23.67

PLUM0038-001 07/01/2020

SAN FRANCISCO COUNTY

	Rates	Fringes
PLUMBER (Plumber, Steamfitter, Refrigeration Fitter).....	\$ 75.30	46.27

PLUM0038-005 07/01/2019

SAN FRANCISCO COUNTY

	Rates	Fringes
Landscape/Irrigation Fitter (Underground/Utility Fitter).....	\$ 63.04	31.48

PLUM0062-001 07/01/2020

MONTEREY AND SANTA CRUZ COUNTIES

	Rates	Fringes
PLUMBER & STEAMFITTER.....	\$ 45.00	35.99

PLUM0159-001 07/01/2019

CONTRA COSTA COUNTY

	Rates	Fringes
Plumber and steamfitter		
(1) Refrigeration.....	\$ 56.93	41.04
(2) All other work.....	\$ 57.82	41.04

PLUM0246-001 07/01/2020

FRESNO, KINGS & MADERA COUNTIES

	Rates	Fringes
PLUMBER & STEAMFITTER.....	\$ 42.65	34.64

PLUM0246-004 01/01/2017

FRESNO, MERCED & SAN JOAQUIN COUNTIES

	Rates	Fringes
PLUMBER (PIPE TRADESMAN).....	\$ 13.00	10.74

PIPE TRADESMAN SCOPE OF WORK:

Installation of corrugated metal piping for drainage, as well as installation of corrugated metal piping for culverts in connection with storm sewers and drains; Grouting, dry packing and diapering of joints, holes or chases including paving over joints, in piping; Temporary piping for dirt work for building site preparation; Operating jack hammers, pavement breakers, chipping guns, concrete saws and spades to cut holes, chases and channels for piping systems; Digging, grading, backfilling and ground preparation for all types of pipe to all points of the jobsite; Ground preparation including ground leveling, layout and planting of shrubbery, trees and ground cover, including watering, mowing, edging, pruning and fertilizing, the breaking of concrete, digging, backfilling and tamping for the preparation and completion of all work in connection with lawn sprinkler and landscaping; Loading, unloading and distributing materials at jobsite; Putting away materials in storage bins in jobsite secure storage area; Demolition of piping and fixtures for remodeling and additions; Setting up and tearing down work benches, ladders and job shacks; Clean-up and sweeping of jobsite; Pipe wrapping and waterproofing where tar or similar material is applied for protection of buried piping; Flagman

 PLUM0342-001 07/01/2018

ALAMEDA & CONTRA COSTA COUNTIES

	Rates	Fringes
PIPEFITTER		
CONTRA COSTA COUNTY.....	\$ 58.68	42.40
PLUMBER, PIPEFITTER, STEAMFITTER		
ALAMEDA COUNTY.....	\$ 58.68	42.40

 PLUM0355-004 07/01/2020

ALAMEDA, CALAVERAS, CONTRA COSTA, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, MONTEREY, SAN BENITO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, STANISLAUS, AND TUOLUMNE COUNTIES:

	Rates	Fringes
Underground Utility Worker /Landscape Fitter.....	\$ 29.90	16.30

 PLUM0393-001 07/01/2020

SAN BENITO AND SANTA CLARA COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 66.66	44.83

PLUM0442-001 07/01/2020

CALAVERAS, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS & TUOLUMNE COUNTIES

	Rates	Fringes
PLUMBER & STEAMFITTER.....	\$ 45.50	31.89

PLUM0467-001 07/01/2020

SAN MATEO COUNTY

	Rates	Fringes
Plumber/Pipefitter/Steamfitter...	\$ 70.00	37.86

ROOF0027-002 01/01/2020

FRESNO, KINGS, AND MADERA COUNTIES

	Rates	Fringes
ROOFER.....	\$ 31.11	14.41

FOOTNOTE: Work with pitch, pitch base of pitch impregnated products or any material containing coal tar pitch, on any building old or new, where both asphalt and pitchers are used in the application of a built-up roof or tear off: \$2.00 per hour additional.

ROOF0040-002 08/01/2020

SAN FRANCISCO & SAN MATEO COUNTIES:

	Rates	Fringes
ROOFER.....	\$ 44.38	19.69

ROOF0081-001 08/01/2019

ALAMEDA AND CONTRA COSTA COUNTIES:

	Rates	Fringes
Roofer.....	\$ 40.10	18.88

ROOF0081-004 08/01/2020

CALAVERAS, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS AND TUOLUMNE COUNTIES:

	Rates	Fringes
ROOFER.....	\$ 39.73	19.11

ROOF0095-002 08/01/2020

MONTEREY, SAN BENITO, SANTA CLARA, AND SANTA CRUZ COUNTIES:

Rates	Fringes
-------	---------

ROOFER

Journeyman.....	\$ 46.54	20.69
Kettle person (2 kettles); Bitumastic, Enameler, Coal Tar, Pitch and Mastic worker.....	\$ 48.54	20.69

SFCA0483-001 07/29/2019

ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN MATEO AND SANTA CLARA
COUNTIES:

	Rates	Fringes
SPRINKLER FITTER (FIRE).....	\$ 65.52	32.67

SFCA0669-011 04/01/2020

CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, MONTEREY,
SAN BENITO, SAN JOAQUIN, SANTA CRUZ, STANISLAUS AND TUOLUMNE
COUNTIES:

	Rates	Fringes
SPRINKLER FITTER.....	\$ 38.95	25.63

SHEE0104-001 07/01/2019

AREA 1: ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN MATEO, SANTA
CLARA

AREA 2: MONTEREY & SAN BENITO

AREA 3: SANTA CRUZ

	Rates	Fringes
SHEET METAL WORKER		
AREA 1:		
Mechanical Contracts		
under \$200,000.....	\$ 53.67	44.62
All Other Work.....	\$ 61.36	46.11
AREA 2.....	\$ 50.82	35.85
AREA 3.....	\$ 60.97	34.07

SHEE0104-003 07/01/2019

CALAVERAS AND SAN JOAQUIN COUNTIES:

	Rates	Fringes
SHEET METAL WORKER.....	\$ 41.20	36.84

SHEE0104-005 07/01/2020

MARIPOSA, MERCED, STANISLAUS AND TUOLUMNE COUNTIES:

	Rates	Fringes
SHEET METAL WORKER (Excluding metal deck and siding).....	\$ 40.38	43.47

 SHEE0104-007 07/01/2019

FRESNO, KINGS, AND MADERA COUNTIES:

	Rates	Fringes
SHEET METAL WORKER.....	\$ 40.03	39.06

 SHEE0104-015 07/01/2019

ALAMEDA, CONTRA COSTA, MONTEREY, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA AND SANTA CRUZ COUNTIES:

	Rates	Fringes
SHEET METAL WORKER (Metal Decking and Siding only).....	\$ 42.33	35.30

 SHEE0104-018 07/01/2019

CALAVERAS, FRESNO, KINGS, MADERA, MARIPOSA, MERCED, SAN JOAQUIN, STANISLAUS AND TUOLUMNE COUNTIES:

	Rates	Fringes
Sheet metal worker (Metal decking and siding only).....	\$ 42.33	35.30

 TEAM0094-001 07/01/2018

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 31.68	27.86
GROUP 2.....	\$ 31.98	27.86
GROUP 3.....	\$ 32.28	27.86
GROUP 4.....	\$ 32.63	27.86
GROUP 5.....	\$ 32.98	27.86

FOOTNOTES:

Articulated dump truck; Bulk cement spreader (with or without auger); Dumpcrete truck; Skid truck (debris box); Dry pre-batch concrete mix trucks; Dumpster or similar type; Slurry truck: Use dump truck yardage rate. Heater planer; Asphalt burner; Scarifier burner; Industrial lift truck (mechanical tailgate); Utility and clean-up truck: Use appropriate rate for the power unit or the equipment utilized.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Dump trucks, under 6 yds.; Single unit flat rack (2-axle unit); Nipper truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump machine; Fork lift and lift jitneys; Fuel and/or grease truck driver or fuel person; Snow buggy; Steam cleaning; Bus or personhaul driver; Escort or pilot car driver; Pickup truck; Teamster oiler/greaser and/or serviceperson; Hook tender (including loading and unloading); Team driver; Tool room attendant (refineries)

GROUP 2: Dump trucks, 6 yds. and under 8 yds.; Transit mixers, through 10 yds.; Water trucks, under 7,000 gals.; Jetting trucks, under 7,000 gals.; Single-unit flat rack (3-axle unit); Highbed heavy duty transport; Scissor truck; Rubber-tired muck car (not self-loaded); Rubber-tired truck jumbo; Winch truck and ""A"" frame drivers; Combination winch truck with hoist; Road oil truck or bootperson; Buggymobile; Ross, Hyster and similar straddle carriers; Small rubber-tired tractor

GROUP 3: Dump trucks, 8 yds. and including 24 yds.; Transit mixers, over 10 yds.; Water trucks, 7,000 gals. and over; Jetting trucks, 7,000 gals. and over; Vacuum trucks under 7500 gals. Trucks towing tilt bed or flat bed pull trailers; Lowbed heavy duty transport; Heavy duty transport tiller person; Self-propelled street sweeper with self-contained refuse bin; Boom truck - hydro-lift or Swedish type extension or retracting crane; P.B. or similar type self-loading truck; Tire repairperson; Combination bootperson and road oiler; Dry distribution truck (A bootperson when employed on such equipment, shall receive the rate specified for the classification of road oil trucks or bootperson); Ammonia nitrate distributor, driver and mixer; Snow Go and/or plow

GROUP 4: Dump trucks, over 25 yds. and under 65 yds.; Water pulls - DW 10's, 20's, 21's and other similar equipment when pulling Aqua/pak or water tank trailers; Helicopter pilots (when transporting men and materials); Lowbed Heavy Duty Transport up to including 7 axles; DW10's, 20's, 21's and other similar Cat type, Terra Cobra, LeTourneau Pulls, Tournorocker, Euclid and similar type equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers; Vacuum Trucks 7500 gals and over and truck repairman

GROUP 5: Dump trucks, 65 yds. and over; Holland hauler; Low bed Heavy Duty Transport over 7 axles

 WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====
 Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union

average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION"

Hamilton Station Stabilization
C20046F

(This page is intentionally left blank)

APPENDIX K VTA SUBSTITUTIONS FOR CALTRANS SPECS

Refer to Contract **Section 6.31 References to CALTRANS Standard Specifications** as an introduction to this Appendix K.

Contractor must perform the Work in accordance with the State of California Department of Transportation (Caltrans) Standard Specifications, Sections 10 through 98 inclusive, dated 2018, the Standard Plans dated 2018, insofar as they are specifically referenced in **Section 8.0 Technical Specifications** herein.

Attention is directed to **Table K-1 below**. Wherever in the Caltrans Standard Specifications, Sections 10 through 98 inclusive, the Caltrans sections in Table K-1 are referenced, the referenced section is hereby deleted and the corresponding VTA General / Special Condition or Contract Section is substituted. The absence of a reference to a General or Special Condition in Table K-1 does not imply that the Condition is deleted from the Contract.

Table K1 – VTA Substitutions for Caltrans Specs

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
Sections 1, 2 & 3 of Caltrans Standard Specifications are deleted in their entirety and replaced by the following Sections of these Contract Documents: Section 1.0 Invitation for Bid Section 3.0 Instructions to Bidders Section 4.0 Bid Forms Section 5.0 Contract Forms			
Section 3: Contract Award and Execution is replaced by the following:			
3-1.06	Contractor License	7.3	Contractors Licensing Requirements
Section 4: Scope of Work is replaced by the following:			
4-1.02	Intent	Contract Form	
4-1.04	Use of Materials Found on the Job Site	7.42	Source of Materials
4-1.05	Changes And Extra Work	7.65 7.66	Changes Requests and Change Notices Change Order
4-1.05B	Work-Character Change	7.65	Change Requests and Change Notices

Hamilton Station Stabilization
C20046F

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
4-1.06	Differing Site Conditions (23 CFR 635.109)	7.67	Differing Site Conditions
4-1.07B	Value Engineering Change Proposal	6.24	Value Engineering Change Proposal
4-1.13	Cleanup	7.53 7.55	Clean-up Final Inspection and Acceptance of All or a Portion of the Work
Section 5: Control of Work is replaced by the following			
5-1.02	Contract Components	Contract Form	
5-1.03	Engineer's Authority	7.24	Authorized Representatives
5-1.12	Assignment	7.17	Assignment and Delegation
5-1.13	Subcontracting	7.18	Subcontracts
5-1.16	Representative	7.4 7.24	Independent Contractor Authorized Representatives
5-1.17	Character of Workers	7.36	Character of Workers
5-1.20	Coordination with Other Entities	7.39	Cooperation/Coordination and Work by Others
5-1.20B	Permits, Licenses, Agreements, and Certifications	7.5	Permits, Licenses, Fees and Notices
5-1.20B(4)	Contractor – Property Owner Agreement	7.51	Disposal of Materials
5-1.23B	Action Submittals	7.43	Submittal of Shop Drawings, Product Data and Samples
5-1.26	Construction Surveys	7.44	Survey Requirements
5-1.30	Noncompliant and Unauthorized Work	7.50	Removal of Rejected or Unauthorized Work
5-1.33	Equipment		N/A
5-1.36	Property and Facility Preservation	7.45	Protection and Restoration of Property
5-1.36C(3)	Non-highway Facility Rearrangement	6.11	Work Sequence and Constraints

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
5-1.36D	Survey Monuments	7.44.2	Monument Preservation
5-1.37B	Load Limits		N/A
5-1.38	Maintenance and Protection Relief	7.55	Final Inspection and Acceptance of All or a Portion of the Work
5-1.39A	General	7.52	Protection of Completed Portions of Work
5-1.39B	Damage Caused by an Act of God	7.32	Excusable Delays and Extensions of Time
5-1.42	Requests for Information	7.25.3	Requests for Information (RFIs)
5-1.43	Potential Claims And Dispute Resolution	7.65 7.68	Change Requests and Change Notices Claims and Claim Resolution
5-1.46	Final Inspection and Contract Acceptance	7.55	Final Inspection and Acceptance of All or a Portion of the Work
5-1.47	Guarantee	7.73 7.74 7.75	Warranty Warranty Work Warranty on Repaired or Replaced Parts
Section 6: Control of Materials is replaced by the following:			
6-1.02	Department-Furnished Materials	6.9	VTA Furnished Materials
6-1.04	Buy America	7.1 7.2 Appendix D	Applicable Laws and Jurisdiction Compliance with Laws and Regulations Federal Requirements
6-2.02	Quality Control	6.26	Quality Assurance and Quality Control Requirements
Section 7: Legal Relations and Responsibility To The Public is replaced by the following:			
7-1.02A	General	7.1 7.2	Applicable Law and Jurisdiction Compliance with laws and Regulations
7-1.02B	US Fair Labor Standards Act	7.8 Contract Form	Labor Provisions
7-1.02I(2)	Nondiscrimination	7.6	Nondiscrimination
7-1.02K(1)	General	7.8	Labor Provisions
7-1.02K(2)	Wages	7.8.4	Prevailing Wage Rates

Hamilton Station Stabilization
C20046F

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
		7.60.2	Labor
7-1.02K(3)	Certified Payroll Records (Labor Code § 1776)	7.8.8 7.58	Retention of Labor Records Certified Payrolls
7-1.02K(4)	Apprentices	7.8.9	Employment of Apprentices
7-1.02K(5)	Working Hours	7.8 7.8.3	Labor Provisions Overtime Requirements
7-1.02K(6)	Occupational Safety and Health Standards	6.14 7.8.2	Safety Precautions, Programs and First Aid Requirements Safety
7-1.02K(6)(b)	Excavation Safety	6.14 7.8.2 7.43	Safety Precautions, Programs and First Aid Requirements Safety Submittal of Shop Drawings, Product Data, and Samples
7-1.02L(2)	Antitrust Claims	7.15 7.16 7.20	Ownership of Work and Material Title and Risk of Loss Antitrust Claims
7-1.02O	Vehicle Code		N/A
7-1.03	Public Convenience	7.38	Public Convenience and Safety
7-1.04	Public Safety	7.38	Public Convenience and Safety
7-1.05	Indemnification	6.1	Indemnity and Defense of Claims
7-1.06	Insurance	Appendix A	Insurance Requirements
7-1.06C	Workers' Compensation and Employer's Liability Insurance	Appendix A	Insurance Requirements
7-1.08	Personal Liability	6.1 Appendix A	Indemnity and Defense of Claims Insurance Requirements
Section 8: Prosecution and Progress is replaced by the following:			
8-1.02	Schedule	6.21 7.30	Progress Schedule Time of Completion
8-1.04B	Standard Start	6.4 7.29	Time for Performance Notice to Proceed
8-1.05	Time	7.30	Time of Completion

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
8-1.06	Suspensions	7.69	Suspension of the Work
8-1.07	Delays	7.32	Excusable Delays and Extensions of Time
8-1.10	Liquidated Damages	6.5	Liquidated Damages
8-1.13	Contractor's Control Termination	7.71	Termination for Default
8-1.14	Contract Termination	7.70	Termination for Convenience or in the Public Interest
		7.71	Termination for Default
Section 9: Payment is replaced by the following:			
9-1.02	Measurement	Section 8	Technical Specifications
9-1.02C	Final Pay Item Quantities	6.19	Final Pay Quantities
9-1.03	Payment Scope	7.59	Progress Payment
9-1.04	Force Account	7.60	Force Account Payment
9-1.04A	General	7.60.1	Work Performed by Contractor
9-1.04B	Labor	7.60.2	Labor
9-1.04C	Materials	7.60.3	Materials
9-1.04D	Equipment Rental	7.60.4	Equipment Rental
9-1.04D(2)	Equipment On the Job Site	7.60.5	Equipment at the Worksite
9-1.04D(3)	Equipment Not On the Job Site and Not Required for Original-Contract Work	7.60.6	Equipment Not at the Worksite
9-1.04D(5)	Non-Owner-Operated Dump Truck Rental	7.60.4	Equipment Rental
9-1.05	Extra Work Performed By Specialists	7.60.7	Work Performed by Special Forces or Other Special Services
9-1.06	Change Quantity Payment Adjustments	7.57	Increased or Decreased Quantities and Quantity Variation
9-1.06D	Eliminated Items	7.66	Change Order
9-1.16	Progress Payments	7.59	Progress Payment
9-1.16E(2)	Progress Withholds	7.59	Progress Payment

Caltrans Standard Specification		Corresponding Section of these Contract Documents or General or Special Condition	
9-1.16E(4)	Stop Notice Withholds	7.21	Stop Notices
9-1.17	Payment After Contract Acceptance	7.59	Progress Payment
9-1.17B	Payment Before Final Estimate		N/A
9-1.17D	Final Payment and Claims	7.59	Progress Payment
9-1.17D(2)(b)	Overhead Claims		N/A
9-1.21	Clerical Errors		N/A
9-1.22	Arbitration		N/A
Section 13: Water Pollution Control			
13	Water Pollution Control	Appendix G Section 8	Environmental Coordination and Cooperation Technical Specifications
Section 14: Environmental Stewardship			
14	Environmental Stewardship	Appendix G	Environmental Coordination and Cooperation
14-8.02	Noise Control	6.13	Sound Control Requirements
Section 20: Landscape			
20-1.02C	Pesticides	7.1 7.2	Applicable Law and Jurisdiction Compliance with Laws and Regulations

APPENDIX M

QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

Contractor must, at its own expense, submit for VTA's review and approval, and implement a quality assurance program consistent with the requirements of VTA's Quality Assurance Program (QAP) specified herein.

1.1 Contractor's Quality Assurance Program (CQAP)

Contractor must establish and maintain an effective Quality Assurance Program to manage, control, document and assure that the Work complies with the requirements of the Contract Documents. The CQAP must consist of programs, procedures and the organization necessary to assure a high standard of quality for materials, equipment, workmanship, fabrication and operations covering both onsite and offsite Work by Contractor, and its subcontractors, suppliers, and consultants of every tier.

1.2 Contractor Quality Control Plan (CQCP)

Contractor must provide written Quality Control (QC) guidelines for:

- Management Responsibility including but not limited to QC organization
- Submittal Management and Document Control
- Subcontractor and Supplier Control
- Process Control and Control of Special Processes (i.e. welding, coating, etc.)
- Inspection and Testing
- Identification, Control and Correction of Nonconformances (Corrective Actions)
- Quality Records
- Training and Qualifications

1.3 Submittal of CQCP

Contractor must, within **15 calendar days** after the date of the Notice of Award, furnish a CQCP, by which Contractor proposes to implement the requirements of this Section, for VTA's approval. If Contractor fails to submit an acceptable CQCP within the prescribed time, VTA may choose to not allow the Work to continue until Contractor submits an acceptable interim plan which addresses all the requirements of VTA's QAP that are specified herein. No schedule relief will be allowed for such delay.

1.4 Acceptance of CQCP

VTA's acceptance of the CQCP is conditional and will be predicated on satisfactory performance of Work during the life of the Contract. As the Work progresses, VTA may require Contractor to make changes to the CQCP as considered necessary to obtain the quality required in the Contract Documents. The approved CQCP will be subject to audit by VTA.

1.5 Changes to CQCP

Contractor must notify VTA in writing of any proposed changes to the approved CQCP. All proposed changes to the CQCP are subject to prior approval by VTA.

1.6 Management Responsibility including QC organization

Contractor, and its subcontractors, suppliers, manufacturers, consultants, and sub-consultants of every tier are responsible for the quality of Work under their control. However, Contractor is ultimately responsible for the overall quality of all Work which includes the performance and documentation of all required quality activities under this Contract.

Subject to VTA's approval, such approval not to be unreasonably withheld, Contractor shall assign an independent QC Inspector who must implement the CQCP ensuring compliance and documentation of all quality activities. The QC Inspector will inspect the quality of Work (except his/her own Work) and sign/date the inspection and testing reports and checklist. A brief resume of Contractor's QC Inspector must be submitted with the CQCP and must include description of assignments, duties, and responsibilities which establishes his/her experiences and qualifications.

The QC Inspector must maintain a diary or activity log to document quality activities and quality issues and each entry must be signed and dated. The QC Inspector must submit a QC Summary Report to VTA at the completion of the project to include the following as applicable:

- QC Inspector's Daily Reports (with before, during and after photographs)
- Submittal Log
- RFI Log
- Material Review Report (Mill Cert/Cert of Conformance)
- Inspection and Test Report and associated Checklists
- Material Test Result
- Concrete Tag
- Concrete Compression Test Monitor
- U.S.A. Log
- U.S.A. Report
- Audit/Surveillance Report and Checklist
- Existing Site Conditions
- Field Instruction (Summary) Report
- Others

1.7 **Submittal Management and Document Control**

The CQCP must contain provisions for scheduling and managing submittals. A "Submittal List" of submittals required from Contractor and its subcontractors, suppliers, manufacturers, consultants, and subconsultants must be developed using the Contract Document's Technical Submittal List, Technical Specifications, and other applicable sources.

The CQCP must also contain provisions for document control which define the responsibility and authority for controlling Project documents including, but not be limited to, correspondence, criteria, drawings, quality records, specifications, change orders, RFIs, procedures and instructions. Project documents must be available at the Worksite prior to the start of the Work effort and must be made available to VTA upon request. Changes to Project documents must be processed in writing and records of changes maintained as they are made. Documents approved by VTA must not be changed or altered without VTA's prior written approval.

1.8 Subcontractor and Supplier Control.

The CQCP must contain provisions to assure that materials, products, equipment, and services are procured from subcontractors, suppliers, manufacturers, consultants and subconsultants of every tier capable of meeting all requirements of the Contract Documents. All subcontractors, suppliers, manufacturers, consultants and subconsultants of every tier must comply with the approved CQCP or submit their own Quality Management Plan to VTA QA Manager for approval.

Contractor must ensure its subcontractor, supplier, manufacturer, consultant and subconsultant's agreements include the QA/QC requirements specified in this Appendix.

1.9 Process Control and Control of Special Processes.

To ensure accuracy and consistency in production and construction processes, Contractor and its subcontractors, suppliers, or manufacturers of every tier must submit written procedures, instructions, drawings, checklists, or other appropriate documents, as a supplement to the CQCP. These documents must identify equipment to be used and describe their means to control special and controlled processes including, but not be limited to, welding, nondestructive examination, and testing.

These Work processes must be consistent with the Contract requirements, applicable codes, standards, specifications, or other special contractual requirements using qualified/certified personnel and proper equipment.

1.10 Inspection and Testing.

The CQCP must contain provisions to ensure independent inspection and testing of materials, products, equipment, systems or Work is properly performed, documented, and status identified to assure that only items that have passed and met specified quality and contractual requirements are accepted, used or installed on the Project.

The CQCP must include an "Inspection and Testing Plan" and associated checklists, subject to VTA's review and acceptance. The completed Inspection and Testing Reports and Checklists must be provided to VTA, as part of quality records, confirming that all Work, materials, products, equipment, and systems conform to the requirements of Contract Documents. The Inspection and Testing Plan, at a minimum, must include a spreadsheet listing all required inspection and testing to be conducted, reference specification, drawing number, criteria and result, and signature/stamp of qualified/certified inspector or tester. As a condition to acceptance of the completed Work, VTA will verify Contractor's completed Inspection and Testing Reports and Checklists to determine compliance with inspection and testing requirements.

The Contractor must submit to VTA the name, address, and qualifications of the proposed inspection firm and testing laboratory, and qualifications/certifications of inspectors and testers as part of the CQCP for approval. Contractor and its inspection firm and testing laboratory must establish the guidelines and responsibilities for the calibration, storage, use, handling, and control of inspection, measuring and test equipment.

VTA or its consultants may perform verification inspections or tests as necessary to determine the Contractor's compliance with contract requirements. Such services by qualified inspection firm or testing laboratory will be selected and paid for by VTA.

1.11 Identification, Control and Correction of Nonconformances.

The CQCP must contain provisions for identifying, documenting, controlling, and correcting non-conforming items or conditions (Nonconformances) including provisions for reinspection and retesting of repaired or reworked items. Contractor must document Nonconformances with a Nonconformance Report, determine the root cause, identify, and implement corrective actions and prevent future recurrence.

Personnel performing evaluations to determine conformance must have demonstrated competence in the specific area of interest, have an adequate understanding of the requirements, and have access to pertinent background information. Certification of competency must be provided to VTA upon request.

1.12 Quality Records

The CQCP must contain provisions for identification of types of quality records to be maintained, their retrievability, and retention periods, and must include a sample or blank copy of quality records as applicable. Contractor must maintain quality records as evidence that all its quality activities and those of its subcontractors, suppliers, and manufacturers of every tier comply with the requirements of the approved CQCP. Copies of all quality records must be submitted to VTA as soon as they are available.

1.13 Training and Qualifications

Contractor must ensure that its Project team members are fully qualified to perform their portions of the Work and are informed of safety requirements associated with their Work. Personnel performing inspection, test, or approval of Work must be qualified through appropriate training and/or experience. Personnel license, certification, or special qualification and supporting training records, as applicable, must be submitted to VTA as part of the CQCP.

1.14 Agency Audits

The VTA QAM and/or his authorized representative may conduct audits and surveillances of Contractor, subcontractors, suppliers and manufacturers' activities and records systematically during the course of the contract to determine their level of compliance with the approved CQCP and Contract Documents. The audits and surveillances will include, but not be limited to Workmanship, as-built drawings, schedules, inspection and testing, document control, submittals, change orders, design changes/modifications, and close-out.

1.15 Payment Provisions.

Administration of Pay Item. The Contract's Quality Assurance Program pay item will be administered as follows:

- (a) Contractor may invoice 25% upon VTA's approval of the CQCP.
- (b) Contractor may not invoice the remaining 75% until after submittal of the QC Summary Report and final acceptance of the Work.
- (c) There will be no separate payment for any other submittal required by this appendix.

APPENDIX P VTA'S PROCEDURE ON REFLECTIVE SAFETY VESTS

Refer to Contract **Section 6.14.5 Written Safety Precautions** as an introduction to this Appendix P.

The following pages includes Procedure, Reflective Safety Vests, Document Number 600.009 to this Appendix P.

[This Page Intentionally Left Blank]

PROCEDURE REFLECTIVE SAFETY VESTS	Document Number:	600.009
	Version Number:	01
	Date:	01/10/2019

1. Purpose:

To outline when reflective safety vests are required to be worn by employees, contractors and visitors on VTA property and in the field. This procedure also summarizes the required safety vest standards, procurement process, record-keeping practices for their distribution, and relevant training.

This policy is being written to comply with the California Division of Industrial Safety (Cal/OSHA) Title 8 3380, 20 Code of Federal Regulations (CFR) 1910.132 and American National Standard Institute/International Safety Equipment Association (ANSI/ISEA) 107- as well as VTA's Injury and Illness Prevention Program, Personal Protective Equipment Procedure.

2. Scope:

This procedure applies to all VTA employees, contractors and visitors working at operational divisions or in the field that require additional reflective wear to reduce the risk of hazards and injury due to lack of visibility.

3. Responsibilities:

3.1. Safety and Compliance Department

- 3.1.1. Provide safety vest guidelines to all employees that are exposed to low visibility hazards outlined in section 4.1 of this procedure.
- 3.1.2. Procure Performance Class 3 vests for employees with potential exposure to low visibility hazards in the workplace as part of their job description.
- 3.1.3. Maintain loaner Performance Class 3 vests for staff and visitors for temporarily use in situations where a low visibility hazard is present.

3.2. Superintendents and Supervisors

- 3.2.1. Provide awareness of low visibility hazards associated with the tasks of their employees.
- 3.2.2. Ensure that the sizes needed for their staff are available and coordinate with the Safety and Compliance Department to procure adequate supply of vests for their respective department.
- 3.2.3. Ensure that staff are wearing proper vests under necessary circumstances.
- 3.2.4. Take appropriate action if when safety vests are not being used in accordance with this procedure. Appropriate action includes providing additional training and/or imposing progressive discipline to ensure future compliance.

3.3. Employees

- 3.3.1. Use the reflective safety vest as instructed to eliminate the hazards associated with a lack of visibility.

PROCEDURE REFLECTIVE SAFETY VESTS	Document Number:	600.009
	Version Number:	01
	Date:	01/10/2019

- 3.3.2. Maintain safety vests in a safe and sanitary condition and replace when lost, damaged, worn and/or no longer reflective.
- 3.3.3. Inspect the safety vest before use and notify their supervisor if the vest is found to be damaged. Defective vests shall not be worn.
- 3.3.4. Report any violations of this policy to their supervisor in accordance with SSS-SAF-IIPP-0100 and SSS-SAF-IIPP-0600.

4. Procedure:

- 4.1. VTA employees, contractors and visitors on, whether at operating divisions or in the field, are required to always wear a high-visibility, reflective safety vest in the following conditions:
 - 4.1.1. Within ten (10) feet of the rail right-of-way.
 - 4.1.2. In low light / low visibility conditions that include rain, night, dusk and dawn.
 - 4.1.3. Near congested traffic areas and/or conditions where there is a potential hazard of being hit by a moving vehicle.
 - 4.1.4. In or near construction zones.
- 4.2. VTA Safety Vest Standards
 - 4.2.1. Garments must meet the Performance Class 3 requirements. The safety vest manufacturers label must also state that the garment meets the aforementioned standard.
 - 4.2.2. High visibility vests must be fluorescent yellow-green.
 - 4.2.3. Employees working outside must wear safety vests on the outside of their gear unless Class 3 reflective foul weather gear is worn.
 - 4.2.4. Reflective high visibility vests must have the company logo or name on the front and the back of the garment.
 - 4.2.5. All vests that require flame-resistant or arc protection need to be Class 3 and labeled accordingly.
 - 4.2.6. Alterations and modifications are prohibited with the exception of labelling with name and badge number.
 - 4.2.7. VTA high visibility vests must have a reflective chevron or an "X" on the back.
- 4.3. VTA Safety Vest Procurement
 - 4.3.1. VTA's Safety and Compliance Department will only procure Performance Class 3 vests for employees exposed to the hazards outlines in section 4.1.
 - 4.3.2. VTA's Safety and Compliance Department reserves the right to charge the appropriate cost center of the party requesting permanent safety vests in the event where vests are lost, quickly damaged (beyond the reasonable expectation of wear

PROCEDURE REFLECTIVE SAFETY VESTS	Document Number:	600.009
	Version Number:	01
	Date:	01/10/2019

and tear for specific job classifications), ordered in excess, and/or not required for the job hazards of the requesting party or the intended user.

4.3.3. If department employees are equipped with Type E rated pants, vests meeting the Performance Class 2 rating may be purchased by department heads from their associated cost center, once approved by Safety and Compliance. Performance Class 2 safety vests paired with Class E rated pants, in combination, create a Class 3 rated ensemble.

5. Definitions:

- 5.1. American National Standard Institute/International Safety Equipment Association 107 (ANSI/ISEA 107): Industry standard for high visibility apparel for workers exposed to the occupational hazards associated with low visibility.
- 5.2. Personal Protective Equipment (PPE): Includes all clothing and other work accessories designed to protect against work place hazards.
- 5.3. Performance Class 2 or 3 Reflective Safety Vest (“Performance Class 2” or “Performance Class 3”): A rating that designates the visibility of a garment based on the amount of background and retroreflective material in ANSI/ISEA 107.
- 5.4. Type E: A rating for pants that is based on the amount of background and retroreflective material in ANSI/ISEA 107.

6. Records:

- 6.1. Safety Vest Logs
 - 6.1.1. When Safety and Compliance issues reflective vests, a log indicating the date, badge number and size of vest issued will be maintained.
 - 6.1.2. When supervisors request vests from the Safety and Compliance Department, a signature of receipt will be required once the vests are delivered or picked up.
 - 6.1.3. Once vests are in the possession of the supervisor, the Safety and Compliance Department recommends internal tracking when safety vests are issued to specific employees.
 - 6.1.4. Loaner vests issued to staff and visitors for temporary use will be tracked with a separate Loaner Vest Log.
 - 6.1.5. The Safety and Compliance Safety Vest logs will be maintained in accordance to the Safety and Compliance Department’s record retention schedule.

7. Appendices:

NA.



Original Date: 01/10/2019	Revision Date: NA.	Page 3 of 4
-------------------------------------	------------------------------	-------------

PROCEDURE REFLECTIVE SAFETY VESTS	Document Number:	600.009
	Version Number:	01
	Date:	01/10/2019

8. Training Requirements:

- 8.1. Training for the Reflective Safety Vest Procedure will occur alongside PPE tailgates and through the use of an Operations Notice annually.
- 8.2. PPE Tailgates are prepared by the Environmental Health and Safety Unit and are delivered by department supervisors in accordance with SSS-SAF-IIPP-0401.
- 8.3. The department issuing vests to staff, contractors and visitors shall ensure review of this procedure each time a vest is issued. The signing of the log will also signify that training has been completed.

9. Summary of Changes:

NA.

10. Approval Information:

<i>Prepared by</i>	<i>Reviewed by</i>	<i>Approved by</i>
DocuSigned by:  85108B4D547C4C5... Karly Hutchinson Environmental Health and Safety Specialist	DocuSigned by:  FFF7F2333043470... Angelique Gaeta VTA's Chief of Staff/Interim Director of Safety and Compliance	DocuSigned by:  E4CE93FA2C8C410... Nuria I. Fernández General Manager/CEO

Date Approved: 3/6/2019

APPENDIX Q
LIGHT RAIL SYSTEM SAFETY PROGRAM PLAN

Refer to Contract **Section 6.15 Contractor Safety and Light Rail Transit Operations** as an introduction to this Appendix Q.

[This Page Intentionally Left Blank]

February 2018

LIGHT RAIL SYSTEM SAFETY PROGRAM PLAN



Solutions that move you



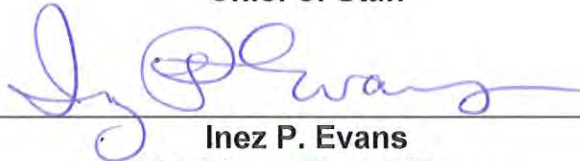
Nuria I. Fernandez
General Manager/CEO



Robert Fabela
Office of the General Counsel



Angelique M. Gaeta
Chief of Staff



Inez P. Evans
Chief Operating Officer



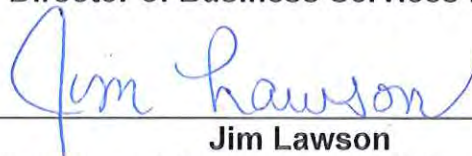
Rufus Francis
Director, Safety & Compliance
Chairperson, Rail System Safety Review Board



Carolyn Gonot
Chief Engineering &
Program Delivery Division



Alberto Lara
Director of Business Services Division



Jim Lawson
Director of Government Affairs Division

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16

Table of Contents

Element 1– Executive Policy Statement 7

Element 2 – Purpose, Goals and Objectives 9

 Purpose..... 9

 Goals 9

 Objectives 9

Element 3 – Organizational Structure and System Description..... 11

 System Description and Scope..... 11

 History..... 11

 Organizational Structure 12

 Board of Directors..... 12

 General Manager/CEO..... 12

 Office of the General Counsel 12

 Board Office..... 12

 Office of the Chief of Staff..... 13

 Safety and Compliance Department 13

 Operations Division 14

 Planning and Programing Division..... 14

 Business Services Division..... 15

 Engineering & Transportation Program Delivery..... 15

 Government Affairs Division 15

 Finance & Budget 16

 Safety Boards and Committees..... 16

 Joint VTA/ATU Local 265) Safety Committee and the VTA/SEIU Local 521 Safety
 Committee..... 16

 Rail System Safety Review Board (RSSRB)..... 16


 Fire and Life Safety Program Committee..... 17

 Rail Rules & Procedure Development Committee 17

 Light Rail Maintenance Rules & Procedure Development Committee..... 17

 Rail Activation Committee 18

 Rail Reliability Committee 18

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16


- Element 4 – Plan Review and Modification 19
 - Review and Modification Process 19
 - Departmental Review..... 19
 - Approval Process 19
 - CPUC Coordination..... 19
- Element 5 – Plan Implementation..... 20
 - Office of the Chief of Staff: 20
 - The Office of the Chief of Staff oversees VTA’s: 20
 - Safety and Compliance Department 20
 - Employee Safety Programs..... 21
 - Protective Services..... 22
 - Communications, Marketing, Customer Service, and Public Outreach 23
 - Communications, Marketing, and Customer Service 23
 - Customer Service and Public Affairs..... 23
 - Community Engagement and Media Relations 23
 - Operations Division 24
 - Rail Transit Operations 24
 - Technical Training Department 25
 - Rail Maintenance Training Department..... 25
 - Light Rail Vehicle Maintenance 26
 - Operations Engineering Unit 26
 - Way, Power & Signals (WP&S)..... 27
 - Facilities Maintenance 27
 - Business Services Division 28
 - Human Resources Department (HR) 28
 - The Substance Abuse Control Unit..... 28
 - Procurement & Contracts Unit..... 28
 - Government Affairs Division 28
 - Office of the General Counsel 28
 - Engineering & Transportation Program Delivery..... 28
 - Document Control..... 29
- Element 6 – Hazard Management Process..... 30

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16

Element 7 – System Modification.....	31
Element 8 – Safety Certification.....	32
Purpose.....	32
Existing System Process:	33
Review	33
RSSRB Panel	34
RSSRB Vote	34
CPUC Approval.....	34
Element 9 – Safety Data Acquisition & Analysis.....	35
Process	35
Management.....	35
Element 10 – Accident / Incident Reporting and Investigation.....	36
Purpose.....	36
Investigation Criteria	36
Investigation Procedures.....	36
Enterprise Risk Management.....	38
Notification thresholds.....	38
State Regulation	38
Federal Regulation	39
National Transportation Safety Board (NTSB)	39
Element 11 – Emergency Management Program	41
Preparedness	41
Prevention	41
Response & Recovery.....	42
Short-term recovery	42
Long-term recovery	42
VTA Emergency Operations (EOP) and Continuity of Operations Plan (COOP).....	42
Emergency Response Team (ERT).....	43
Fire and Life Safety Program.....	43
Injury and Illness Prevention plan (IIPP).....	43
Plan Review	43
Training and Distribution.....	44

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16

Element 12 – Internal Safety Audit Reviews.....	45
Process	45
Independent Review.....	45
Reporting to CPUC.....	45
Internal Review Items.....	46
Internal Audit Findings and or Recommendations	46
Element 13 – Rules Compliance.....	48
Notices, Rules, and Standard Operating Procedures	48
Compliance	49
Joint Freight Operations.....	49
General Order 172.....	49
Element 14 – Facilities & Equipment Inspections.....	50
Facilities and Equipment Inspections	50
Process	50
Checklists.....	50
Deficiency Tracking.....	51
Element 15 – Maintenance Audits & Inspections.....	52
Maintenance Audits and Inspection - Overview.....	52
Deficiency Tracking.....	53
SAP System	53
Element 16 – Training & Certification Program	54
Employee Training and Certification.....	54
Contractor Training.....	55
Compliance	55
Element 17 – Configuration Management & Control.....	56
Element 18 – Local, State, & Federal Requirements.....	57
Grade Crossings	58
Element 19 – Hazardous Materials Program	59
Element 20 – Drug & Alcohol Program	61
Element 21 – Procurement.....	62
Appendix 1 - Rail System Safety Review Board (RSSRB) Proceedings	64
Appendix 2 – Safety & Compliance Organizational Chart	65

	Light Rail System Safety Program Plan	
	Version Number:	16

Appendix 3 - VTA Organizational Chart..... 66

Appendix 4 - Operations Organizational Chart 67

Appendix 5 – Hazard Management Program (HMP) 68

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16

Element 1– Executive Policy Statement

The management of safety is a top priority and core value of the Santa Clara Valley Transportation Authority (VTA). The System Safety Program Plan (SSPP) has been developed as a means of integrating safety into all VTA transit system operations. We are committed to implementing, maintaining and constantly improving processes to ensure that all our operational and maintenance activities are supported by an appropriate allocation of organization resources, and aimed at achieving the highest level of transit safety performance. All levels of management and all front line employees are accountable for the delivery of the highest level of safety performance, starting with VTA’s General Manager/Chief Executive Officer (CEO), Executive Staff & VTA’s Board of Directors.

Our commitment is to:

- Support the management of safety by providing appropriate resources to support an organizational culture that fosters safe operational practices, encourages effective safety reporting and communication, and actively manages safety with the same attention to results as that given to the other management systems of the agency.
- Integrate the management of safety as an explicit responsibility of all managers and employees.
- Clearly define for all managers and employees their accountabilities and responsibilities for the delivery of safe transit services and the performance of our safety roles and responsibilities.
- Establish and Operate a safety reporting program/process as a fundamental tool in support of the agency’s hazard management program to eliminate or mitigate the safety risks of the consequences of hazards identified resulting from our operational activities to a point that is “as low as reasonably practicable” (ALARP).
- Ensure (a) no action will be taken against any employee who discloses a safety concern through the safety reporting program/procedure, unless such disclosure indicates, beyond any reasonable doubt, an illegal act, gross negligence, or a deliberate or willful disregard of regulations or procedures; (b) that sufficiently trained/skilled personnel are available and assigned to implement the agency’s SSPP processes, programs and related activities; (c) that all agency staff are formally provided with adequate and appropriate safety management information, are competent in SSPP activities, and are assigned only safety related tasks commensurate with their skills and abilities; and (d) that contracted services supporting our agency’s mission are meeting our safety performance requirements and standards.
- Comply with and, wherever possible, exceed any applicable legislative and regulatory requirements and standards.

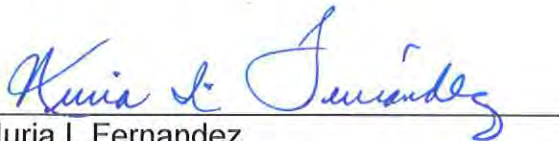
 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Establish and Measure our agency's safety performance against realistic safety performance indicators and safety performance targets.
- Continually improve our agency's safety performance through management processes that ensure relevant safety action is taken in a timely fashion and is effective when carried out.

VTA, in support of its mission to provide safe and secure transit services has also developed its agency security plan as a means of integrating security measures and initiatives throughout all levels of the organization. The agency security plan describes the policies, procedures, roles and responsibilities to be utilized by all employees and contractors, beginning with the highest levels of management.

The General Manager/CEO of VTA is ultimately responsible and accountable for the establishment and implementation of this SSPP. The VTA SSPP has been authorized by the General Manager/CEO and approved by Executive Staff with rail operations responsibilities and the Rail System Safety Review Board.

This safety policy supports VTA's mission, vision and values of safety within the organization. By following the processes described in this SSPP, we will have continuing opportunities to improve overall safety performance.



Nuria I. Fernandez
General Manager/CEO
Santa Clara Valley Transportation Authority

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 2 – Purpose, Goals and Objectives

Purpose

The purpose of the Light Rail System Safety Program Plan (SSPP) is to provide VTA with a comprehensive rail safety outline including reference to all current safety policies, procedures and activities that have been designed and implemented to maximize safe operations, and comply with all regulatory requirements.

The SSPP is a management tool which provides a clearly defined method for auditing and maintaining a high degree of management control for all safety responsibilities, at all levels within VTA. Management representatives from all departments within the organization contributed to the formulation, development and implementation of this SSPP, to ensure internal VTA acceptance and clearly define departmental safety responsibilities.

This SSPP has been developed in accordance with the guidelines for system safety program plans from: California Public Utilities Commission (CPUC), American Public Transit Association (APTA), and Federal Transit Administration (FTA). The SSPP has been approved for implementation under VTA authority and accepted by the General Manager/CEO and Senior Management staff at VTA.


Goals

The goal of the SSPP is to provide a clear understanding of our system and a clear outline to design, construct, test and operate a safe light rail transportation system. To attain a system with an optimum level of safety for passengers, employees, and the public which also minimizes damage to property. This System Safety Program Plan is directed towards achieving this goal within VTA's vision and mission.

Objectives

The primary objectives of the SSPP are to develop, implement and maintain a safety effort comprised of safety strategies and programs to improve the safety performance of VTA. Specified programs and processes are developed and implemented to:

- Identify and mitigate hazards to employees, patrons, or general public.
- Provide safe and effective operations and maintenance of VTA properties.
- Promote a working environment, which meets or exceeds all government and industry occupational health and safety standards and practices.
- Maintain an incident free environment.
- Effectively respond to all VTA related emergencies.
- Integrate and promote safety within each VTA organizational structure.

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

In order to achieve these safety objectives, VTA will satisfy the following:

- Perform annual internal audits and inspections to ensure compliance with the SSPP.
- Conduct annual emergency drills involving VTA staff and various external agencies.
- Conduct facility exercises as required in accordance with the VTA Emergency Operations Plan.
- Hold monthly Rail System Safety Review Board (RSSRB) meetings.
- Hold monthly joint safety meetings with the Amalgamated Transit Union (ATU) local 265 and the Service Employees International Union (SEIU) Local 521 to identify safety related issues or hazards and develop mitigation measures.
- Perform safety audits of the light rail system and assist with the development and implementation of corrective actions.
- Investigate all major incidents, identify and document incident causes, and implement corrective actions to reduce or prevent the possibility of recurrence.
- Incorporate the Hazard Management Program throughout VTA's organization; to identify, track; and mitigate reported hazards.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	15

Element 3 – Organizational Structure and System Description

System Description and Scope

VTA currently operates an urban transit service with a fleet of diesel, both hybrid powered and electric powered buses, along with light rail vehicles and historic trolleys within Santa Clara County. The Santa Clara County service territory contains 1335 square miles and has a population of nearly 2 million.

Rail service is provided from downtown Mountain View to south San Jose, through Sunnyvale, Santa Clara, Levi Stadium, and to many of the high technology campuses located within Santa Clara County. Bus service is provided in the residential areas of Palo Alto to Gilroy, Los Gatos to Milpitas and all cities in-between with some service routes extending up to the city of Fremont.

History

Planning for the Guadalupe Corridor project began in 1974. In 1983, Santa Clara County obtained funds from the U.S. Department of Transportation to construct the light rail project. Light rail revenue service began operations in Santa Clara County in 1987.


Additionally, there are two more rail lines that provide service to Campbell, and Milpitas along with eastern and western parts of San Jose. Furthermore, Historic trolley service may be provided to downtown San Jose on a seasonal basis.

Under the November, 2000 ballot “Measure A” other light rail lines and system improvements were added to the existing system such as: Northern Light Rail Express; Southern Light Rail Express and the extension of the Bay Area Rapid Transit (BART) from Alameda County to the cities of Milpitas and San Jose with future stations added including Downtown San Jose, Diridon Station in San Jose and Santa Clara Transit Center located in the city of Santa Clara. An additional project underway is the extension of Capitol Expressway Light Rail to the Eastridge Transit Center.

Below are the existing lines and segments with the date they opened.

Guadalupe Corridor

Old Ironsides to Younger Street	Open December 11, 1987
Younger Street to Downtown San Jose	Open June 17, 1988
Downtown San Jose to Tamien	Open August 17, 1990
Tamien to Santa Teresa and Lick Spur / Almaden Line	Open April 25, 1991

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Tasman West Corridor

Mountain View to Old Ironsides & Baypointe Open December 20, 1999

Tasman East Corridor

Baypointe to I-880 Milpitas Open May 17, 2001

I-880 Milpitas to Alum Rock Open June 24, 2004

Vasona Corridor

Convention Center to Diridon Open August 1, 2005

Diridon to Winchester Open October 1, 2005

Organizational Structure

The VTA organizational structure is shown in Appendices 2, 3 & 4.

Board of Directors

VTA is governed by the Board of Directors, which is the legislative, policy-making body of the agency. The Board consists of 18 members and ex-officio members, all of whom are elected City and County officials, appointed by the jurisdictions they represent. Twelve Directors serve as voting members with an additional six serving as alternates. The Board is responsible for providing policy direction and governance along with ensuring that the views of the region's citizens, VTA customers and local communities are reflected in board policies. The VTA organizational structure is displayed in more detail in Appendices 2 and 3.

General Manager/CEO

The General Manager/CEO is responsible for VTA's overall management. Responsibilities include reporting to the board on the activities, performance and status of agency activities; directing the management team; ensuring that VTA programs support regional economic development, while maintaining focus on agency programs; and assurance of overall quality and safety of VTA programs.

Office of the General Counsel

Serving at the direction of the Board of Directors, the Office of the General Counsel represents VTA in legal proceedings and provides legal counsel and services.

Board Office

The Board Secretary has oversight responsibilities for the Board Office, which provides VTA Board and Committee support including preparation of meeting agendas and minutes, distributing and responding to Board correspondence, developing and

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

maintaining relationships with Board and committee members and VTA constituencies, along with providing support services to the Board of Directors.

- Board & Committee Support
- Agendas and Related Materials Oversight
- Official Board Records

Office of the Chief of Staff

The Office of the Chief of Staff (COS) is responsible for ensuring Safety and Security information is shared regularly at the VTA Board meetings and at the Safety, Security, Transit, Planning and Operations (SSTPO) Committee meetings which is chaired by one of the Board Members. The COS also ensures that safety and security information is maintained and available on vehicles, the VTA website, and at the Downtown Customer Service Center. The Office of the COS also provides safety information through multiple social media platforms such as Twitter and Facebook and Service Alerts that are posted through GovDelivery subscription service.

In addition, the Office of the COS also oversees VTA's transit system security and law enforcement functions, which include oversight of the Protective Services Department, management of contracted security services provided by Allied Universal Security, and administration of VTA's contract with the Sheriff's Department for sworn law enforcement personnel.


In total, the office of the COS oversees:

- Public Communications, Marketing, Customer Service and Community Outreach
- Protective Services
- Contracted Sherriff Services
- Security
- Fare Enforcement
- Safety and Compliance Department

Safety and Compliance Department

Safety is the most important factor in everything we do at VTA. Safety is a shared responsibility in collaboration with leadership, all employees, contractors, and the public to whom we serve.

The Safety and Compliance Department's goal is to support transit and workplace safety for all VTA employees, customers, and contractors. These responsibilities are guided by the federal regulatory framework of Safety Management Systems (SMS), which focuses on: safety management policy; safety assurance; safety risk management; safety promotion; and the California Public Utilities Commission (CPUC), General Orders, who serves as the state safety oversight agency, as well as federal, state, and local authority.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Safety Management
- Transit System Safety
- Environmental Health and Safety
- Regulatory Monitoring & Compliance
- Emergency Management Coordination

The Director of Safety & Compliance, or designee, chairs the Rail System Safety Review Board (RSSRB), the Fire, Life & Safety Committee, jointly chairs the VTA/ATU Joint Safety Committee and SEIU 521 Safety Committee. The Director of Safety and Compliance also attends VTA Board meetings and the SSTPO meetings and provides pertinent Safety information at these meetings.

Operations Division

Under the direction of the Chief Operating Officer, the Operations Division operates, maintains, analyzes, schedules, and manages VTA's bus and rail transit system and facilities. It also oversees contracted shuttle and ADA paratransit services.

Operations consists of the Chief Operating Officer's Administrative unit - Operations Administration - as well as Bus & Rail Transit Operations, Facilities Maintenance, and Operations Analysis Reporting & Systems.


- Bus and Rail Operations
- Vehicle & Facilities Maintenance
- Interagency & Paratransit Services
- Operations Engineering Unit
- Analysis Reporting & Systems.

The Chief Operating Officer designates the Chairperson of the Rail Rules & Procedure Development Committee (RRPD).

Planning and Programing Division

The Planning & Programming Division is responsible for conducting all Congestion Management Program and VTA transportation and transit planning activities. In addition, the Congestion Management Division is responsible for capital project development activities, capital project approvals, programming and grants management, and property development and management functions.

- Multimodal Transportation Planning
- Congestion Management
- Capital Program Funding
- Grants Development & Administration
- Service and Operations Planning

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Transit Service Development

Business Services Division

The Business Services Division is proud to partner with the rest of the Divisions at VTA and provide, timely, reliable and career enhancing services to our customers. The Business Services Division is comprised of the following:

- Information Technology (IT)
- Employee Relations
- Human Resources
- Diversity Programs
- Procurement and Contracts
- Substance Abuse Control Program

Engineering & Transportation Program Delivery

This division is responsible for the design and construction of all capital projects and infrastructure required to provide a safe, reliable and efficient transportation system for the Santa Clara County. These responsibilities include program and project management, design development, engineering management, project controls, construction management, safety certification, and turnover of various projects that are part of VTA's rail, facilities and highway transportation improvement programs.


This division is also responsible for the implementation of the projects identified in the 2000 Measure "A" Program, which includes the planning, design, and construction of the Bay Area Rapid Transit (BART Silicon Valley) Project. This project will extend the BART regional heavy rail system to Milpitas, San Jose and Santa Clara.

- Capital Program Design and Construction
- Engineering Support
- BART to Silicon Valley Program Development and Construction
- Capital Projects Controls
- Construction Contract Compliance
- Survey & Mapping
- Transit Facilities Design and Construction
- Highway Construction

Government Affairs Division

Government Affairs maintains; VTA Executive Policy, intergovernmental policy at the local, state and federal level, and provides safety information at community meetings.

- Government Affairs
- Policy Advisement

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Rail Partnerships

Finance & Budget

The Finance and Budget division fulfills the Controller and Treasury functions for VTA including financial reporting, accounting, budgeting, investment services, cash management, debt administration, payroll, accounts receivable, accounts payable, real estate, and fare box revenue services.

The Division's goal is to maintain financial stability and to ensure that the monetary activities of VTA are performed, recorded and presented accurately in compliance with professional and ethical guidelines. This includes establishing & maintaining internal control, adequate recording of accounting data in conformity with Generally Accepted Accounting Principles and establishing appropriate policy and procedures.


- Financial Accounting
- Budget
- Disbursements & Payroll
- Debt & Investments
- Fare Programs & Systems
- Real Estate & Joint Development
- Enterprise Risk Management (See roles in Elements 9 & 10)

Safety Boards and Committees

VTA has multiple safety boards and committees. These committees often generate safety recommendations; however, the VTA General Manager/CEO retains full discretion and authority for safe operation of the light rail system.

Joint VTA/ATU Local 265) Safety Committee and the VTA/SEIU Local 521 Safety Committee.

Labor agreements with the Amalgamated Transit Union (ATU) Local 265, and Service Employees International Union (SEIU) Local 521, set forth specific provisions for Joint Safety Committees. These committees are directed to act in an advisory capacity to management. The ATU and SEIU Joint Safety Committees discuss safety hazards and make recommendations to the appropriate departments for corrective action. In order to accomplish safety reviews and develop recommendations, the committees may conduct periodic inspections of worksites, review and analyze reports of industrial illness or injury, and review safety training reports and safety procedures. Such reviews and worksite inspections are made during normal business hours and are scheduled in advance with appropriate VTA staff. The Safety & Compliance Department provides the management co-chairs for both committees which meet on a monthly basis.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Rail System Safety Review Board (RSSRB)

The Rail System Safety Review Board (RSSRB) is a high-level management board that provides a forum through which light rail staff and other VTA management review and act on various safety issues. The RSSRB is chaired by the Director of the Safety and Compliance Department or designee. Committee representation includes voting members from all affected VTA Departments. RSSRB assures that all actions permitting the waiver of (or deviation from) all established VTA safety policies, design standards, system changes, procedures, instructions and rules are documented and adhere to the RSSRB approved processes. Meetings are held on the first Wednesday of every month. Additional meetings may be scheduled as required, such as for the Safety Certification Processes. (Appendices 1 is the RSSRB Proceedings).

Fire and Life Safety Program Committee

The Fire and Life Safety Program has three major components: Committee Meetings; Training; and Drills. The Committee reviews the Fire/Life Safety Program Plan at least annually and makes revisions as necessary. This committee is chaired by the Director of Safety & Compliance or designee. Committee members include appropriate VTA personnel. Representatives from safety and emergency response agencies within cities and jurisdictions served by the light rail system are invited if meeting agenda items pertain to their departments. Meetings are held on a monthly basis and are generally scheduled in advance of a special event or modification to the rail system. Discussion subjects include fire protection, traction power safety, emergency planning and response, along with training exercises.

Rail Rules & Procedure Development Committee


The Rail Rules & Procedure Development (RRPD) Committee reviews the Rail Rulebook and Rail Standard Operating Procedures (SOPs). Recommendations from the Rail Rules & Procedure Development Committee are sent to RSSRB for a vote to adopt.

Committee membership includes representatives from Light Rail Operations, Light Rail Maintenance, Light Rail Training, Operations Control Center, Field Operations, Operations Engineering, Safety & Compliance, and members of ATU and SEIU. Meetings are held on a monthly basis.

Light Rail Maintenance Rules & Procedure Development Committee

The Light Rail Maintenance Rules & Procedure Development (LRMRPD) Committee prepares and reviews new and/or revised Light Rail Maintenance Standard Procedures (LRMSP). Recommendations from the LRMRPD Committee are sent to RSSRB for a vote to adopt.

Committee membership includes the Operations Manager of Rail Vehicle Maintenance and Engineering, Operations Manager Maintenance of Way, Light Rail Equipment

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Superintendent and/or supervisor, Way, Power & Signals Superintendent and/or supervisor, and a representative from Maintenance Engineering. As applicable, additional representatives from Light Rail Maintenance Training, Light Rail Maintenance Quality Assurance, System Safety and/or Security, Engineering & Transportation Program Delivery (ETPD), members of ATU, SEIU and other subject-matter-experts may be assigned to the committee for specific procedure development. Meetings are held on an as-needed basis.

Rail Activation Committee

(This element will be activated during rail expansion projects)

- Chair the Rail Activation Oversight Committee (RAOC) with representatives from all involved departments.
- Oversight of the Rail Activation process and assures that all necessary elements are available as needed to facilitate a safe and timely public opening for specific sections of railroad.
- Develop, publish and implement the Rail Activation Plan (RAP or Plan) for specific projects.
- Evaluate proposed system and operating procedures modifications and refer proposed changes to the RSSRB for review and approval.
- Serve as primary liaison between the Rail Operations departments and all other VTA divisions on matters relating to expansion plans, procedures and design standards.
- Responsible for the verification of the Safety Certification of the project.

Rail Reliability Committee

The Rail Reliability Committee may meet monthly to review concerns within Vehicle Maintenance and Way Power & Signal (WP&S). Topics usually consist of; fault trends, Service Change Bulletins (SCB), parts, and WP&S callouts. Operations engineering chairs this committee, attendees are primarily from the Operation Division, along with Safety and Compliance Department staff and California Public Utilities Commission (CPUC) representatives.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 4 – Plan Review and Modification

Review and Modification Process

The Safety and Compliance Department coordinates the annual review of the SSPP in accordance with GO 164-D which requires annual review and the provision of updates as needed. A formal letter shall be annually submitted to the California Public Utilities Commission (CPUC) declaring that SSPP has been reviewed to determine if the plan should be modified or updated.

Departmental Review


The Safety and Compliance Department notifies VTA Management staff of the requirement to review their section of the SSPP. Department Managers appoint representatives from their respective areas to ensure that their elements of the SSPP are reviewed and updated annually. The Department Managers shall forward updates to the Safety and Compliance Department, who will incorporate the changes into a draft SSPP, with all changes highlighted. The draft SSPP will then be submitted to the RSSRB members for additional review and comments.

Approval Process

After receipt, review, and approval of the draft SSPP is completed, the Safety and Compliance Department shall incorporate required changes into the revised SSPP. The revised SSPP is then presented to the Rail System Safety Review Board (RSSRB) for final review and approval. With RSSRB approval, the revised SSPP is forwarded for management approval and signatures.

CPUC Coordination

Upon approval by management, a copy of the approved SSPP is forwarded to the CPUC for review and acceptance. After receiving notice that the CPUC has accepted the newly revised SSPP the Safety and Compliance Department distributes the revised SSPP internally.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 5 – Plan Implementation

Office of the Chief of Staff:

The Office of the Chief of Staff oversees VTA's Safety and Compliance Department.

Director of Safety & Compliance

- The Director of Safety & Compliance provides management oversight of the development and implementation of VTA's long-range goals, policies, and objectives for system safety. The Director of Safety & Compliance is accountable for establishing and maintaining the department standards, managing department budgets, and directing department initiatives. The Director of Safety & Compliance, or designee, chairs the Rail System Safety Review Board (RSSRB), the Fire, Life & Safety Meeting and the ATU or SEIU Joint Safety Meetings. The Director of Safety & Compliance also attends VTA Board of Directors meetings and Safety, Security, Transit, Planning and Operations (SSTPO) meetings and provides Safety updates at these meetings. The Safety & Compliance department also organizes the Emergency Response Team (ERT) Program which is a joint effort between the System Safety and Environmental Health & Safety Units.

System Safety Unit

The System Safety Unit is responsible for the development and oversight of the implementation of the System Safety Program Plan (SSPP). The Safety Manager is the primary point of contact for all SSPP matters and supervises VTA bus/rail safety functions.

The System Safety Unit is responsible for the following activities:

- Administers the Hazard Management Program
- Coordinates VTA's Emergency Operations Plan.
- Manages VTA's Emergency Operations Center (EOC).
- Performs accident investigations.
- Provides National Incident Management System (NIMS) and Standard Emergency Management System (SEMS) training.
- Evaluates from a safety perspective system modifications and refers proposed changes to the RSSRB for review and approval.
- Development of compliance programs in response to pertinent legislation, regulations and standards.
- Provide technical support and oversight of VTA safety training and education programs.
- Prepare and maintains the LRT Safety Design Criteria Manual.
- Reviews proposed construction project design(s) and regulatory requirements.
- Monitor safe practices and Cal OSHA compliance on construction projects.
- Coordinate the annual review of the SSPP and provide updates to California Public Utilities Commission (CPUC).

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Serve as primary point of contact with CPUC and coordinates with the CPUC on rail system issues, inspections, and as well as the close out processes of any findings resulting from those events.
- Coordinates the CPUC triennial audit.
- New Employee Orientation.

Safety Audit Unit

- Manages the Internal Safety Audit Program
- Serves as primary point of contact with CPUC for both internal and triennial audits as well as the close out processes of any findings resulting from those events.
- Provides administrative support and coordination for FTA triennial audits of CPUC oversight responsibilities of VTA and follow through with monitoring of Corrective Action Plans (CAPs) and submittals to the CPUC.
- Performs onsite safety audits and field work observing actual practices
- Evaluates operating activities to identify existing or potential safety risks
- Coordinates the State Safety Oversight Agency (SSOA) / CPUC on-site Triennial Safety Reviews

Environmental Health and Safety (EHS) Unit

The Environmental Health and Safety (EHS) Unit is responsible for all regulatory submittals for Bus and Light Rail Maintenance Divisions. EHS provides guidance on health, safety and environmental concerns to VTA Maintenance and Operations by using Tailgate Safety meetings and specific training topics as required.


The EHS Unit is responsible for the following safety related activities:

- Provides Title 22 training and EHS tail-gate training topics for maintenance.
- Manages the Injury Illness Prevention Program (IIPP) and hosts the IIPP Committee
- Enforces hazardous waste/hazardous material(s) compliance
- Administers the Operator Safety Awards Program

Employee Safety Programs

The EHS Unit is responsible for developing and implementing safety policies, procedures, programs, and compliance which include the following:

- Injury and Illness Prevention Program (IIPP)
- Safety Data Sheet (SDS) Program, Globally Harmonized System (GHS) & Right-to-Know Programs
- Hazardous Materials (HAZMAT) Management Program, as described in the IIPP.
- Hazard identification and resolution process
- Environmental compliance programs
- Industrial hygiene programs
- Occupational safety
- Tailgate Safety Training Program

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018


- Industrial accident investigation
- Monthly facility safety inspections
- Occupational Health & Safety (OSHA) Regulatory Reporting, in coordination with VTA Enterprise Risk Management
- Under Ground Storage Tank (UST) Program
- Industrial General Permit - Storm Water Management
- Waste Water Management
- Air Emissions Management
- Ergonomics Program, in coordination with VTA Enterprise Risk Management Department
- Bloodborne Pathogens Program
- New Employee Orientation
- Automated External Defibrillator (AED) inspections and supplies

Protective Services

The Office of the Chief of Staff oversees VTA's Protective Services and the law enforcement contract, with the Sheriff's Department for sworn law enforcement personnel, and contracted security services provided by Allied Universal Security.

Protective Services is responsible for the following safety related activities:

- Provides contracted transit patrol services responsible for rail public safety, law enforcement and enforcement of VTA rules and regulations.
- Provides contracted uniformed security personnel deployed at selected rail platforms and facilities to protect life and property.
- Provides uniformed security personnel at the Light Rail Operations and Maintenance Facility for access/egress control, public and employee safety, and other protective services.
- Performs rail revenue collection and protection.
- Provides on board LRV passenger fare inspection and fare policy enforcement.
- Manages the CCTV Program, bus, light rail, and facilities.
- Manages the Lost and Found Program.
- Tracks law enforcement and security related incidents and proactively addresses trends.
- Oversees background investigations for new hires; and selected contractors as necessary.
- Provides input to HR and Technical Training for security awareness training.
- Reviews and manages Security Emergency Preparedness Program Plan (SEPP).
- Maintains controlled access of the SEPP since it is a Security Sensitive document. Review of this document is restricted to need-to-know.
- Ensures all Fare Inspectors, Transit Patrol (Deputies, Sergeants and the Captain), and selected contract unarmed officers, all contract armed officers and command

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

staff attend the Roadway Worker Safety Training annually (VTA Basic and Advanced and Union Pacific Rail Road (UPRR)).

- Provides input to Engineering & Transportation Program Delivery on system security design criteria.
- Participates in New Employee Orientation.

Communications

Communications has two sections:

- Media and Public Affairs
- Marketing and Customer Service

Media and Public Affairs


The Media and Public Affairs is responsible for the following safety related activities:

- Provides outreach and safety education to customers, schools, community groups, and businesses that walk, bike or drive near the light rail system Safety programs are developed to address safety concerns and public education opportunities as system extensions are added, or safety issues emerge.
- Provides safety related communications to the public via the media

Marketing and Customer Service

Marketing and Customer Service is responsible for the following safety related activities:

- Ensures that safety information is up to date and available on vehicles, the VTA website, and at the Downtown Customer Service Center.
- Ensures that the safety information is provided through social media including Twitter and Facebook. Alerts also posted through GovDelivery subscription service.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Operations Division

The Chief Operating Officer provides safe operation of Rail Transit Operations via the following functions:

Rail Transit Operations

Rail Transit Operations is responsible for the following safety related activities:

- Prepare Unusual Occurrence Reports and Telephone/Radio Logs.
- Operate sweep trains after service disruptions or when conditions warrant.
- Evaluate proposed system and operating procedures modifications and refer proposed changes to the RSSRB for review and approval.
- Conduct analyses of operating problems to identify trends and determine where corrective actions are needed.
- Coordinate emergency drills to improve the response of employees and provide training for emergency response personnel.
- Control and supervise all mainline operations in strict accordance with applicable written rules and procedures.
- Oversight and control of access to substations, signal facilities, right-of-way and overhead electrification system and elevator machine rooms.
- Perform primary investigation of all light rail accidents and incidents in accordance with Standard Operating Procedure (SOP)-9.14 "Light Rail Accident Investigation/Reporting Procedure" in compliance with SOP-530 "Light Rail Accident Investigation/Reporting Procedure" And SOP-531 "Internal Control Plan (ICP) / Federal Railroad Administration (FRA) Reporting Requirements for the Vasona Shared Corridor."
- Perform initial notification of reportable accidents / incidents to the CPUC.
- Document all evidence at the accident/incident scene using the appropriate report form(s) as a checklist. Complete Incident Report form and record additional information needed for a thorough investigation.
- Based on accident investigation, make recommendations for corrective actions to prevent similar accidents/incidents.
- Develop and implement system operating rules for communications, signaling and train control by issuing a Light Rail Operating Rulebook, Special Instructions, SOP's, Superintendent's Notices and Train Orders as required.
- Ensure that Engineering & Transportation Program Delivery contractors' employees strictly adhere to Restricted Area Access Procedures.
- Conduct Rule-of-the-Week programs to reinforce safety rules.
- Ensure that employees strictly adhere to VTA Policies dealing with the prohibited use of electronic devices including cell phones.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Technical Training Department


Technical Training Department is responsible for the following safety related activities:

- Provide orientation and safety training to all new light rail employees.
- Maintain permanent records for training provided in the Rail Technical Training Office.
- Provide initial certification and/or safety training as well as re-certification once per calendar year to all light rail personnel who either work on the main line and/or operate any rail vehicle upon any portion of the light rail system. Employees so certified are:
 1. Train Operators
 2. Electro-Mechanics
 3. Electronic Technicians
 4. Light Rail Service Workers
 5. Light Rail Maintenance Foreperson
 6. Transportation Supervisors
 7. Way, Power and Signal Overhead Line Workers
 8. Way, Power and Signal Maintainers
 9. Way, Power and Signal Supervisors
 10. Way, Power and Signal Senior Track Workers
 11. Way, Power and Signal Track Workers
 12. Way, Power and Signal Substation Maintainers
- Provide operating rules and procedures training to Vehicle Maintenance, Facilities and Way, Power and Signals personnel.
- Provide Historic Trolley certification and re-certification to selected employees as needed to operate Trolley's for special occasions.
- Provide Roadway Worker Protection (RWP) training to contractors, VTA employees and all others that require access to the right-of-way.

Rail Maintenance Training Department

Rail Maintenance Training Department is responsible for the following safety related activities:

- Provide orientation and safety training to employees.
- Maintain personnel training records in permanent files in the Training Office.
- Conduct training to familiarize personnel with the safety hazards in performing WP&S maintenance tasks.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Light Rail Vehicle Maintenance

Light Rail Vehicle Maintenance is responsible for the following safety related activities:

- Provide training to ensure that all vehicle maintenance personnel are aware of the safety hazards inherent in performing maintenance tasks.
- Participate in the investigation of accidents and incidents by providing technical support.
- Implement and maintain compliance with pertinent legislation, regulations and standards.
- Evaluate and recommend vehicle and facility modifications from a safety perspective and refer proposed changes to the RSSRB for review and approval.
- Use and follow the VTA Occupational Injury and Illness Prevention Plan (IIPP) as a reference source for safety and or environmental issues.
- Conduct and document Tailgate Safety Meetings at least monthly.
- Conduct and document monthly Safety Inspections.
- Perform daily inspections on each vehicle used in revenue service.
- Perform inspections, prevention maintenance cycles and overhauls at specified intervals to ensure safety and reliability in accordance with the Light Rail Vehicle Maintenance Department Standards and Practices Manual.
- Prepare and update applicable maintenance procedures (MTN-PR).
- Conduct audits/quality checks to assure required maintenance activities follow approved procedures and are being performed.
- Conduct failure analyses to determine the causes of the failures and to identify required corrective actions.

Operations Engineering Unit

Operations Engineering Unit is responsible for the following safety related activities:

- Integrate safety into designs and technical and procurement Request For Proposals (RFP).
- Determine the acceptability and performance characteristics of safety critical substitute parts, subassemblies and materials.
- Prepare, analyze, and submit / present to RSSRB and other departments the light rail occurrence reports for accidents, incidents, and near miss statistics maintained by Light Rail Technical Training Department.
- Oversight of post-accident vehicle impound and testing program.
- Conduct analysis of failures to determine the cause and identify applicable corrective actions.
- Submit a monthly Form V to CPUC per 164-D Section 7.6.
- Maintain configuration management process for all safety-critical light rail systems and refer proposed changes to the RSSRB for review and approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Maintain documentation of configuration changes for applicable safety-critical rail subsystems.
- Maintain Service Change Bulletin (SCB) process.
- Perform integrated testing to assure that all safety related systems, will perform satisfactorily prior to revenue service.
- Evaluate and recommend vehicle and facility modifications from a safety perspective and refer proposed changes to the RSSRB for review and approval.
- Implement and maintain compliance with pertinent legislation, regulations and standards.
- Oversight of preventive maintenance programs.
- Responsible Chair for the Rail Reliability Committee Meeting

Way, Power & Signals (WP&S)


Way, Power and Signals Unit is responsible for the following safety related activities:

- Perform prescribed system maintenance, tests and inspections on established schedules in accordance with WP&S Standard Operating Procedures (SOP) and MTN-procedures.
- Prepare and update maintenance directives and SOP's.
- Conduct training to familiarize personnel with the safety hazards in performing WP&S maintenance tasks.
- Participate in investigation of accidents and incidents if needed.
- Use and follow the VTA IIPP as a reference source for safety and or environmental issues.
- Evaluate proposed signaling, communications, power, track, or structural modifications from a safety perspective.
- Conduct and document Tailgate Safety Meetings at least monthly.
- Conduct and document monthly Safety Inspections.
- Conduct analysis of wear patterns and failures to determine the causes and to identify applicable corrective actions as needed.
- Develop/update emergency rules and procedures.
- Implement and maintain compliance with pertinent legislation, regulations and standards.

Facilities Maintenance

Facilities Maintenance Unit is responsible for the following safety related activities:

- Use and follow the VTA IIPP as a reference source for safety and or environmental issues.
- May need to participate in investigation of accidents and incidents.
- Conduct and document monthly Safety Inspections of Guadalupe Division.
- Prepare and update facilities directives and SOP's.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- May conduct analysis of wear patterns and failures to determine the causes and to identify applicable corrective actions.
- Implement and maintain compliance with pertinent legislation, regulations and standards.

Business Services Division

Human Resources Department (HR)

Human Resources Department is responsible for the following safety related activities:

- Coordinate medical evaluations related to Class B license renewal.

The Substance Abuse Control Unit

The Substance Abuse Control Unit in HR is responsible for the following:

- Coordinate VTA’s Drug and Alcohol Policy in accordance with the Personnel Policy and Procedure Manual Policies No. 416 “Drug Free Workplace” and No. 421 “Substance Abuse.”

Procurement & Contracts Unit

The Procurement & Contract Unit is responsible for the following:

- Procurement and coordination of rail related purchases.

Government Affairs Division

Safety functions performed by the Government Affairs Division are as follows:

- Promotes light rail safety through creation and distribution of public education material and information and provides safety information at community meetings.

Office of the General Counsel

Safety functions performed by the Office of the General Counsel are as follows:

- Prepare and submit at-grade crossing applications to CPUC and other local, State, and Federal regulatory correspondence for approval.

Engineering & Transportation Program Delivery

Safety functions performed by the Engineering & Transportation Program Delivery Division include:

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Refer proposed changes to the RSSRB for approval.
- Manage construction inspection program to verify conformance to design drawings and specifications, including safety requirements, such as, but not limited to, the Personal Electronics Device (PED) usage prohibition, therein.
- Provide oversight of construction site safety.
- Manage design and construction of system extensions/expansions and modifications of existing facilities.
- Manage the Hazardous Materials Investigation and Remediation Program for all system extensions/expansions and modifications, and facility modifications.
- Recommend modifications and extensions/expansions of facilities and systems projects to Operations.
- Develop and review for approval system/subsystem designs and all extensions/expansions to the system.
- Oversight and documentation of performance and hazard analysis to identify, evaluate, and resolve any unique hazards associated with extensions/expansions of the system during the design process.
- Provide safety input to rail operations through staff engineering functions.
- Document system modifications for new, extension or expansion rail capital projects.
- Assure appropriate design criteria are incorporated into applicable equipment and facility specifications, drawings and related contract documents for capital projects.
- Verify compliance with design and construction safety certification requirements for capital projects and submits to the RSSRB for approval.
- Provide technical analysis and engineering expertise to RSSRB.
- In cooperation with Operations, perform integrated testing for work performed by capital projects to assure that all safety related systems, subsystems, components, equipment and structures will perform satisfactorily in revenue service operations.
- Submit formal request to CPUC for system modification, configuration changes, and safety certification.
- Include CPUC in the preliminary engineering phase, Preliminary Hazard Analysis (PHA), and Threat and Vulnerability Analysis (TVA) of projects.

Document Control

Safety functions performed by Document Control include:

- Store RSSRB approved plans and reports
- Store as-built, system, and subsystem drawings

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 6 – Hazard Management Process

The hazard identification, analysis and resolution process is a structured approach whereby an attempt is made to discover conditions within the system which, if not altered, have the potential to cause incidents, injuries or other losses. The detailed procedure is outlined in the Hazard Management Program (HMP) COS-SAF-3002 (Appendix 5).

VTA has developed an HMP in which hazard identification, analysis and mitigation processes are based on U.S. Military Standard MIL- 882E and the U.S. Department of Transportation FT00564 – Safety Management System (SMS) Principles for Transit, Safety Risk Management methodology. The goal is to eliminate the hazard entirely if possible. When a hazard cannot be eliminated, the goal is for the associated risk to be reduced As Low As Reasonably Practicable (ALARP) within the constraints of cost, schedule, and performance to be resolved in a manner acceptable to management. In the event that an identified hazard receives the rating of “High”, the California Public Utilities Commission (CPUC) will be notified via form “R” as stipulated in the HMP section 3.6.5.

Also, as outlined in detail by the HMP, all employees and contractors are charged with the responsibility of identifying and reporting safety hazards and risks that have the potential to cause accidents, injuries or other losses without fear of reprisal. These conditions may be found in the form of physical hazards, unsafe actions, and policies that create hazards. Hazard reporting mechanisms are outlined in section 4.1.2 of the HMP.

Hazard monitoring related tasks are the responsibility of the Supervisor responsible for the department where the hazard is located as outlined in sections 3.4.6, 3.4.7 and 3.4.8. of the HMP. The Safety & Compliance Department maintains the hazard tracking process from identification through resolution as outlined in section 3.6.14 of the HMP.

Safety is of the utmost importance in all VTA activities. VTA is committed to developing, implementing, and improving strategies, management systems, and processes to ensure that all of our administrative, construction, transportation and maintenance activities uphold the highest level of safety performance and meet or exceed national and industry standards.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 7 – System Modification

Prior to the start of work on rail capital projects, System Safety and Compliance, Quality Assurance, the Operations Engineering Unit, and Engineering & Transportation Program Delivery (ETPD) shall review proposed methods of construction requirements to assure that safety is incorporated into both the General Provisions and the Technical Specifications. In order to protect customers/employees and ensure safe operations, appropriate “work around” plans are developed and implemented when necessary.

All **major** system projects must follow the Safety Certification process. In accordance with California Public Utilities Commission (CPUC) General Order (GO) 164D, major system projects are defined as: new rail systems or extensions, the acquisition and integration of new vehicles, the acquisition and integration of safety critical technologies into existing service, or major safety critical redesign or modification of existing systems, vehicles, or equipment, excluding functionally and technologically similar replacements. VTA will coordinate with the CPUC for all major system projects within their regulatory jurisdiction.

All personnel involved with modification to the system must comply with VTA’s Roadway Worker Protection (RWP) program which is required by Federal Regulation 49 CFR 214.345 and CPUC GO 175-A. Contractors may be required to submit a Site Specific Work Plan (SSWP).

During the course of modification to the system, if a safety hazard is identified by contractors, VTA Personnel, VTA Construction Inspectors, VTA System Safety Officers or any other person, the following actions may occur:

- Life safety work stoppage (stop work, clear area)
- Site work stoppage (unauthorized work near Right-of-Way)
- Project work stoppage (Executive management decision)
- Request to correct potential hazards (CalOSHA compliance)
- Request for Information (RFI) to project management
- Requests made by regulatory agencies

System modifications which do not fall under the Safety Certification requirement will receive a hazard risk assessment which will be maintained within the safety certification records library. If any hazard associated to the project is identified, the project manager is responsible and will work with the Safety and Compliance Department to mitigate the hazard utilizing the Hazard Management Program processes. All modifications to existing systems, equipment, vehicles, etc. shall be presented to the Rail System Safety Review Board (RSSRB) for review and approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 8 – Safety Certification

VTA's Safety and Security Certification Program complies with the requirements of California Public Utilities Commission (CPUC) General Order 164-D. The Safety and Security Certification process is documented in the 2011 VTA Safety and Security Design Criteria as well as Safety & Security Certification Design and Construction EC-CO-WI-0006.

Purpose

The work instruction, CO-WI-0006, establishes a process for safety and security certification of new VTA light rail projects and light rail system modifications to be performed during project design, construction, testing and training.

A project-specific Safety Certification Plan is required for all Major Projects which are defined in GO 164D as:

Major Projects (Projects) means new rail systems or extensions, the acquisition and integration of new vehicles and safety critical technologies into existing service or major safety critical redesign projects, excluding functionally and technologically similar replacements. Major Projects require a formal safety certification plan (SCP) to be submitted and approved by the CPUC in advance of the project.

Minor Projects – Any rail project that does not meet the definition of a Major Project will be considered a Minor Project and will require an internal safety certification only. Although formal CPUC approval for minor projects is not required, VTA shall notify the rail transit safety branch management through communication with the CPUC designated representative assigned to VTA, or their designee, with the project details and its scope of work at the time it is determined to be a "minor project".

The Safety Certification Program is supported by the following elements:

- Identification of safety requirements utilizing safety criteria derived from industry experience, codes standards, mandated regulations and best practices.
- Verification of compliance with safety requirements throughout the life cycle of the project (concept, design, construction, operation, maintenance and disposal).
- Review of safety critical elements or components affected by additions, deletions, substitutions, rebuilding, deferring maintenance or extension of service life.
- CPUC participation in discussion meetings.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Safety certification addresses requirements under four integrated functions:

- System Safety - elimination, minimization, or control of potential hazards and the protection of property from damage against injury and/or property damage.
- Fire/Life Safety – elimination, minimization, or control of potential hazards to customers, employees, emergency response personnel, the general public and or property; caused by human actions or natural disasters.
- Occupational Safety – elimination, minimization or control of potential hazards to employees and emergency response personnel.
- Public Safety – elimination, minimization or control of potential hazards to the general public and customers that result from operation of the system.


Existing System Process:

When the decision has been made to modify an existing VTA system, engineering will work with the CPUC to identify consideration(s) to be made or concern(s) which need to be addressed. CPUC is included at different design phases for input when concerning: a crossing or design requiring GO-88B request. Engineering is responsible for submitting GO-88B request(s). Upon GO-88B approval; Engineering initiates construction. When construction has concluded Engineering will submit a Form G GO 75D to CPUC to perform a final inspection. Throughout the process System Safety will be informed and or involved, and RSSRB will be updated throughout specific intervals of design, construction, and finalization. RSSRB will have different levels of control process depending on the type of project.

Review

The VTA RSSRB reviews all aspects of Safety Certification including:

- Operational safety impacts.
- Customer safety impacts.
- System safety requirements.
- Employee safety training requirements.
- System hazard elimination/management.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

RSSRB Panel

10-Day Review- (Prior to Vote)

An electronic correspondence is issued to a representative of each department, and staff members to provide substantive review of material.

Additionally, VTA's CPUC representative is included in correspondence for 10-Day Review.

RSSRB Vote

At the conclusion of the 10-Day Review period at the next available RSSRB meeting, all voting members will briefly discuss and go through a voting process. If there are major concerns or conflicts there may be a delay in vote.

CPUC Approval

At the conclusion of the project construction/implementation and all SCP activities a final Safety Certification Verification Report (SCVR) submittal to the CPUC shall occur 21 days prior to revenue operations. The report shall summarize the safety readiness of the light rail project for revenue service. The report shall include a Letter of Intent to Operate, Final Project Verification of Safety, and any remaining open items list with appropriate workarounds.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 9 – Safety Data Acquisition & Analysis

Process

Collection of safety data, quarterly loss reports, monthly workers compensation and public liability claim reports and analysis of such data performed by Enterprise Risk Management to assist in maintaining safe working conditions at VTA.

An accident is an undesired and unplanned event that results in a loss of property, injury, or fatality. The event results from a combination of errors which may include human performance, equipment and or environmental factors. Data acquisition and analysis assists in determining the cause of an accident and or accident trends.


Documentation assists in trend analysis and identification of hazards. The analysis assists in the development of corrective actions to prevent accidents and minimize risk. System Safety along with Operations document known hazards and control them to an acceptable level in accordance with the Hazard Management Program.

Management

VTA has an established safety data collection and analysis system for light rail. This system includes regular reporting to regulatory agencies and VTA departments through the Rail System Safety Review Board (RSSRB), Fire and Life Safety meetings (FLS), and Active Right-of-Way Review Committee.

Data collection includes the following:

- Employee on Duty, passengers on the train, people in adverse vehicles
- Description of accident and right-of-way equipment involved
- Date and time
- Location in the rail system

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 10 – Accident / Incident Reporting and Investigation

Purpose

The purpose of accident/incident reporting and investigation is to ensure that all accidents/incidents are investigated objectively with the goal of determining prevention strategies and contributing causal factors. All investigation findings, conclusions and recommended corrective actions to prevent reoccurrence are documented, and designated management personnel are assigned the responsibility to ensure that corrective actions are implemented and monitored for effectiveness.

Investigation Criteria

VTA will investigate all reported accidents/incidents on behalf of the California Public Utilities Commission (CPUC) in accordance with VTA policy and GO 164D. VTA will involve CPUC in meetings, field visits, reenactments, and other activities related to reportable accidents or incidents. Accidents, occupational illnesses and injuries are investigated at the first line supervisor level. Accident investigation reports are received, reviewed and filed by the System Safety Unit and are forwarded to all required regulatory agencies. Depending on the type and severity of the accident, a System Safety Unit representative will be involved in the investigation process of all accident/incidents meeting a regulatory reporting criteria or identified as a hazard in accordance with the Hazard Management Program.

An incident may also include a theft or security breach. A security breach is defined as an act that violates security policies, practices or procedures. Security breaches may be investigated by the appropriate law enforcement agency with representatives from VTA. A theft over a specified monetary amount identified in reporting thresholds may need to be reported. The results of an investigation may be considered Security Sensitive Information (SSI).

Investigation Procedures

Light Rail has a detailed accident/incident reporting and investigation policy contained in Light Rail Accident/Incident Investigation/Reporting Procedures SOP 530 (, Internal Control Plan (ICP) / Federal Railroad Administration (FRA) Reporting Requirements For The Vasona Shared Corridor SOP 531, California Public Utilities Commission (CPUC) General Order (G.O.) 143-B Safety Rules And Regulations Governing Light-Rail Transit, and G.O. 164-D Rules And Regulations Governing State Safety Oversight Of Rail Fixed Guideway Systems. The Safety Manager has the overall responsibility and management authority for conducting and documenting all reportable investigations and unacceptable hazardous condition occurrences.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

In the event of an accident, the System Safety Unit reviews accident reports and may recommend further examination of the accident. These examinations may include:

- On-site inspection of the accident scene.
- Review of reports written by involved personnel.
- Interviews with involved personnel and witnesses.
- Review of physical evidence:
 - Track configuration
 - Signal, OCS, and vehicle condition
- Accident recreation and safety test program.
- CPUC/National Transportation Safety Board (NTSB), Federal Railroad Administration (FRA) involvement.

When accident/incident reports and statistics show repetitive accidents/incidents that result in an inability to meet or exceed the safety goals, the System Safety Unit will initiate an investigation to determine causes. The System Safety Unit will participate with appropriate departments/offices to determine recommended corrective actions in accordance with VTA policy.


An employee involved in an accident/incident must do the following:

- Request medical attention, if necessary.
- Report and describe the accident/incident to a supervisor and OCC according to policy.
- Supply detailed information for reporting, as soon as possible but not later than the end of their shift.
- Submit to drug and alcohol testing as required, when criteria is met.

The responding supervisor will prepare and submit appropriate forms as soon as possible but not later than the end of their shift after notification of the accident/incident.

The supervisor will take the following actions:

- Ensure scene safety
- Make appropriate arrangements for medical attention, as required.
- Assess the accident/incident and depending on the nature and severity, request the appropriate departments to respond.
- Establish Incident Command as needed.
- Conduct an initial investigation of the accident/incident.
- Ensure conditions that could cause an accident/incident are protected until corrected.
- Ensure proper documentation is completed and submitted.
- Ensure drug and alcohol testing is completed when criteria is met.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- Ensure impound procedures are implemented when appropriate.

VTA will coordinate all reportable investigations with the CPUC as outlined in SOP 530, LR Accident/Incident reporting procedures. All pertinent supporting documentation for investigation will be included.

Employee accident reporting responsibilities.

- Notification procedures.
- Accident scene procedures.
- VTA notification and report forms.

VTA has a detailed procedure for train accident/incident reporting and investigation. The investigation may include representatives from Law Enforcement, Transportation, Maintenance, and the System Safety Unit.

Enterprise Risk Management

Enterprise Risk Management evaluates trends and frequencies of incidents as well as serious accidents. Meetings are convened on demand as part of an overall safety risk evaluation and mitigation process in light of potential future litigation.

Notification thresholds

State Regulation

The California Public Utilities Commission will receive a notification within 2 hours of the reported accident/incident and a final report within 60 days from date of Accident/Incident. If final report is not completed within the 60 days then a formal extension letter need to be submitted to the CPUC for an additional 30 days. The specific details for notification and reporting requirements to the California Public Utilities Commission (CPUC) are outlined in VTA's SOP 530 which shall be followed when any incident or security breach meets or exceeds any one of the following thresholds:

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- A fatality at the scene; or where an individual is confirmed dead within thirty (30) days of a rail transit-related incident;
- Injury to two or more individuals requiring immediate medical attention away from the scene;
- Property damage to any on-rail transit vehicles, non-rail transit vehicles, other rail transit property or facilities and non-transit property that equals or exceeds \$25,000;
- A collision at an at-grade crossing;
- A main-line derailment;
- A collision with an individual on a rail right-of-way;
- A collision between a rail transit vehicle and a second rail transit vehicle, or a rail transit non-revenue vehicle;
- An evacuation due to life safety reasons.

Federal Regulation

The National Response Center (NRC) also receives notifications of rail accidents for the National Transportation Safety Board (NTSB) (49 CFR part 840) by calling 800-424-0201 (NRC) or 800-424-8802 (FRA). Both numbers are managed by the NRC. There is a two hour window to call the report in. Only one Telephone call is to be placed to the NRC.

National Transportation Safety Board (NTSB)

Telephone reporting requirements:

- 1) Notification is required no later than 2 hours after an accident / incident which results in:
 - a) A passenger or employee fatality or serious injury of two or more crew members or passengers requiring admission to a hospital;
 - b) The evacuation of a passenger train;
 - c) Damage to a tank car or container resulting in release of hazardous materials or involving evacuation of the general public; or
 - d) A fatality at a grade crossing.

- 2) Notification is required no later than 4 hours after an accident / incident which does not involve any of the circumstances as stated in A above, but results in:
 - a) Damage (based on a preliminary gross estimate) of \$150,000 or more for repairs, or the current replacement cost, to railroad and non-railroad property; or
 - b) Damage of \$25,000 or more to a passenger train and railroad and non-railroad property.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

- c) Accidents involving joint operations must be reported by the railroad that controls the track and directs the movement of trains where the accident occurred.

Where an accident for which notification is required by paragraphs above occurs in a remote area, the time limits set forth in that paragraph shall commence from the time the first railroad employee who was not at the accident site at the time of its occurrence has received notice thereof.

Each railroad must report by telephone immediately whenever it learns of the occurrence of an accident/incident arising from the operation of the railroad, or an event or exposure that may have arisen from the operation of the railroad, that results in the:

- Death of a rail passenger or a railroad employee.
- Death of an employee or a contractor to a railroad performing work for the railroad on property owned, leased, or maintained by the contracting railroad.
- Death or injury of five or more persons.
- A train accident that results in serious injury to two or more train crewmembers or passengers requiring their admission to a hospital;
- A train accident resulting in evacuation of a passenger train (Fire Life Safety evacuation);
- A fatality resulting from a train accident or train incident at a highway-rail grade crossing when death occurs within 24 hours of the accident/incident;
- A train accident resulting in damage (based on a preliminary gross estimate) of \$150,000, to railroad and non-railroad property; or
- A train accident resulting in damage of \$25,000 or more to a passenger train, including railroad and non-railroad property.
- That involves a collision or derailment on a main line that is used for scheduled passenger service or that fouls a main line used for scheduled passenger service.

When providing preliminary notification for an Accident/Incident the basic information shall be identified. If a specific detail is not readily available within the 2 hour timeframe, it should still be reported as such.

Each report must state the:

- Name of the railroad
- Name, title, and telephone number of the individual making the report
- Time, date, and location of the accident / incident
- Circumstances of the accident / incident
- Number of persons killed or injured
- Available estimates of railroad and non-railroad property damage
- FRA crossing number, milepost number, or GPS Coordinates

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 11 – Emergency Management Program

Preparedness

Preparedness is one of VTA’s top priorities. VTA has incorporated the provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities such as the Sandy Recovery Improvement Act as of April 2013, the National Disaster Recovery Framework dated September 2011, and National Response Framework dated May 2013. VTA will coordinate with and review state, county, and local rules and ordinances to make sure our procedures are compliant. VTA works with allied agencies, and local Office of Emergency Services (OES) agencies to make sure we understand each other’s expectations.

To increase agency disaster response readiness, and to ensure compliance with the California Public Utilities Commission’s (CPUC) General Order (GO)164-D, VTA has established a training and exercise program which has senior management participation, buy-in, and ownership using the building block approach according to the Homeland Security Exercise and Evaluation Program (HSEEP). Exercises are held annually at a minimum, and depending upon the scenario outside agencies can be invited to participate either as participants or observers. VTA exercises to maintain consistency and to enhance employee confidence. After Action Reports (AARs) are completed and submitted to VTA Management. Any identified corrective actions are to be tracked electronically by System Safety. System Safety will provide an update of all open corrective actions at the RSSRB Committee meeting.

VTA emphasizes the National Incident Management System (NIMS) training requirements per Homeland Security Presidential Directive (HSPD) – 5. We provide Incident Command System (ICS) and NIMS training to our command staff, general staff, and senior managers. VTA coaches our staff in decision making and afford them the opportunity to work in a unified command environment.

Prevention

Prevention is what the whole community should do, upon the discovery of intelligence of an imminent threat in order to foil an initial or consequent terrorist attack. VTA exceeds the level of most agencies when it comes to prevention. Additionally, our contract Sheriff’s Department staff is connected to all the local law enforcement agencies within our service area. Furthermore, the Sheriff’s Department—and other select staff including—are connected with the Northern California Regional Intelligence Center (NCRIC), the National Operation Center (NOC), the National Infrastructure Coordinating Center (NICC), the Transportation Security Operations Center (TSOC), the Federal Bureau of Investigation (FBI) and the Secret Service.

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Response & Recovery

VTA's Response and Recovery procedures follows the National Disaster Recovery Framework dated September 2011 and the National Response Framework Second Edition dated May 2013.

Short-term recovery

Short-term recovery starts during the response phase; it refers to ensuring public safety, conducting damage assessment, establishing shelters for fire departments or the Red Cross, and restoring essential public services. All of our incidents involve short-term recovery. VTA excels in shifting resources during the response phase; many customers are unaware of our recovery process since there is little disruption to our customer service.

Long-term recovery

Long-term recovery, although not seen by most, focuses on restoring the economic viability of the communities we serve. Being a transportation and congestion management agency, our concern is getting people to and from point "A" to point "B". Distributing resources keeps people moving which allows business to stay open and helps limit financial impact to the area during an incident or disaster.

VTA Emergency Operations (EOP) and Continuity of Operations Plan (COOP)

VTA has implemented an Emergency Operations Plan and Business Recovery Plan. Key elements of the VTA Emergency Response Plan are as follows:

- Ensure that proper notification of emergencies is implemented throughout the agency.
- Provide training programs for employees and emergency response agencies.
- Coordinate emergency activities and planning with local, state and federal agencies.
- Ensure that necessary cooperative agreements are established.

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Emergency Response Team (ERT)

The Safety and Compliance Department has Emergency Response Team (ERT) members in most facilities for the purpose of assisting in evacuations. Members have been trained in the use of portable fire extinguishers, basic first aid, CPR and other emergency response activities.

Emergency planning includes coordination between the VTA bus operating departments and emergency responders. Joint inspections between VTA staff and emergency responders are conducted on existing and new facilities to address concerns.

Fire and Life Safety Program

VTA's Fire and Life Safety Committee coordinates training to all emergency service agencies that respond to calls on VTA property. These agencies include, but are not limited to, local fire departments, police departments, medical facilities, and Emergency Medical Services (EMS).

A safe transportation systems requires the cooperation and teamwork of all departments within the VTA organization and those external agencies involved in normal and emergency operations. These relationships are also included in the Emergency Response Plan (ERP).

Injury and Illness Prevention plan (IIPP)

The VTA Injury and Illness Prevention plan (IIPP) includes the VTA Facility Emergency Plan Procedure that contains the Emergency Action Plans for all VTA facilities. These plans specify the recommended sequence of actions to be taken by VTA personnel in the event of an emergency (fire, medical, security etc.). Components of the plan include recognition of the emergency, establishing proper notification procedures, proper response action to the emergency and the ERT Handbook. There are ERTs at all operating divisions and River Oaks for the purpose of assisting in facility evacuations. ERT members have been trained in using portable fire extinguishers, evacuation techniques and basic first aid.

The Facility Emergency Plans have been developed with the assistance of facility management and the operating departments occupying these facilities


Plan Review

Emergency Response Procedures are reviewed every five (5) years. Updates to the procedures are reviewed through Rail Rules and Procedures Development committee (RRPD) and then submitted to the RSSRB committee for final review and approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Training and Distribution

Safety & Compliance is responsible for ensuring employees receive initial training on the ERP and are provided with a copy. Routine training is administered proceeding a significant change or major revision to the ERP. EHS is responsible for ensuring employees receive, or have access to, the IIPP and that annual tail-gate training topics are provided. This training is documented. Routine training should be administered proceeding a significant change or major revision to the IIPP.

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 12 – Internal Safety Audit Reviews

Process

The Safety and Compliance Department has developed and implemented the CPUC required three-year Internal Audit schedule. This schedule ensures that all elements of System Safety Program Plan (SSPP) are audited every three years per GO 164-D. The Audit Policy/Program provides a proactive approach toward auditing safety compliance of rules, regulations, policies/procedures and work practices throughout the VTA light rail system.

The Protective Services Department has developed and implemented a three-year Internal Audit schedule for the Security Emergency Preparedness Plan (Security Plan). This schedule ensures that all elements of Security Plan are audited every three years. Safety Management and Protective Services forward copies of the Internal Audit checklists to the CPUC 30 days prior to conducting the Audits.

Independent Review

Departments conduct audits throughout VTA's light rail system and provide written reports on audit findings to the System and Compliance Department and Protective Services in a timely matter. Internal staff teams who are not directly responsible for the area being audited perform the audits.

Department Managers have the responsibility to assign staff to audit teams, provide assistance to the audit teams, and ensure compliance with respect to recommendations outlined in the VTA Internal Audit Checklist Form.

Supervisors and Employees are responsible to cooperate with the safety audit and follow the rules determined by the Department Manager, the Safety and Compliance Department and Protective Services.

Reporting to CPUC

As part of the audit preparation, the Safety and Compliance Department requires departments to assist in developing the list of reference documentation for the audit plan and checklist issues. All deficiencies noted during the internal audit are tracked by the Rail System Safety Review Board (RSSRB) until corrective action has been completed. The audit follows the requirements of General Order 164-D of the California Public Utilities Commission (CPUC).

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Internal Review Items

The following elements are evaluated under the VTA Internal Safety Audit Process:

- Element 1 Policy Statement & Authority for SSPP
- Element 2 Goals & Objectives
- Element 3 Overview of Management Structure
- Element 4 SSPP Control & Update Procedure
- Element 5 SSPP Implementation Activities & Responsibilities
- Element 6 Hazard Management Process
- Element 7 System Modification
- Element 8 Safety Certification
- Element 9 Safety Data Collection & Analysis
- Element 10 Accident/Incident Investigations
- Element 11 Emergency Management Program
- Element 12 Internal Safety Audit/Reviews
- Element 13 Rules Compliance
- Element 14 Facilities & Equipment Inspections
- Element 15 Maintenance Audits & Inspections
- Element 16 Training & Certification Program for Employees & Contractors
- Element 17 Configuration Management & Control
- Element 18 Local, State, & Federal Requirements
- Element 19 Hazardous Materials Program
- Element 20 Drug & Alcohol Program
- Element 21 Procurement

Internal Audit Findings and or Recommendations

At the conclusion of any internal audit, the participants will be provided a briefing on any findings or recommendations. The audit participant or management personnel may request an initial follow-up meeting of the performed audit to discuss findings, recommendation and or a reasonable corrective action plan to ensure compliance. All corrective actions will be documented through the system safety electronic database.

If an agreement about a corrective action cannot be reached RSSRB will assign a Subcommittee which should at least consist of the Director of Safety and Compliance or designee and the Deputy Director of Transit Operations, Rail Operations or designee to review description of disagreement; the audited department's documentation to support compliance or reasoning for disagreement.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

The RSSRB subcommittee will make a final decision on corrective action plan. All associated meetings and/or topics for discussion should be documented as a formalized decision or agreement.

At the conclusion of every calendar year an annual audit report will be generated by Safety and Compliance, and Protective Services. The annual report will include:

- Introduction
- List of Internal Audits – Findings and or Recommendations (if applicable)
- Internal Audit Reports for all audits performed within the calendar year
- Corrective Action Reports (If applicable) for findings
- Internal Audit Schedule for the 3-year calendar cycle

The Annual Internal Safety and Security audit report shall be completed jointly by the Safety and Compliance and Protective Services which will provide the RSSRB status reports. A certified letter signed off by the General Manager/CEO will be accompanied with submission to the CPUC. Submission of the final Annual Internal Safety and Security Audit report must be submitted on or before February 15th of each year to the CPUC for review and approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 13 – Rules Compliance

Notices, Rules, and Standard Operating Procedures

VTA's Light Rail Operations has three primary governing documents: Bulletins, Rules, and Standard Operating Procedures. The Bulletins are global in nature and provide direction to all Rail employees. The Light Rail Rules govern the daily operations of the rail system. The Standard Operating Procedures provide detailed information and instructions for performing specific tasks. All Bulletins, Rules and Procedures are reviewed and approved by the Rail System Safety Review Board (RSSRB) members to ensure safety.

Under the direction of the Light Rail Technical Training Supervisor, the Rail Rules and Procedures Development (RRPD) committee has the responsibility for reviewing modification and development of Rules and Standard Operating Procedures.

Under the direction of the Operations Manager of Rail Vehicle Maintenance and Engineering, the Maintenance Rules and Procedure Development (MRPD) committee has the responsibility for reviewing modification and development of Rules and Maintenance Procedures.

Rules and, or Standard Operating Procedures may require modification as a result of the following:

- System configuration changes.
- Incidents on VTA light rail or other comparable light rail systems.
- Safety Bulletins, Notices, General Orders, Code of Federal Regulations (CFR), Inspections, and other regulatory statutes.
 - a) California Public Utilities Commission (CPUC)
 - b) Federal Transit Administration (FTA)
 - c) Federal Railroad Administration (FRA)
 - d) National Transportation Safety Board (NTSB)
 - e) Division of Occupational Safety and Health Administration (CalOSHA)
- American Public Transit Association (APTA) recommended standards and practices.

The RSSRB ratifies all Bulletins, Rules and Standard Operating Procedures that are produced by the RRPD and MRPD. All items brought before the RSSRB are circulated to the stakeholder groups for a review period of 10 days. During this period the author of the item addresses any conflicts or concerns. Upon completion of this period, the item is presented to the RSSRB voting members for approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

When conditions or events indicate a need for a short-term modification of a Rule or Procedure, Light Rail Operations management issues a Train Order or Special Instruction. These two documents carry the force and authority of a Rule. During the RRPD review, Special Instructions may become incorporated into the Rulebook.

Compliance

Operational Evaluations and Proficiency Tests Light Rail Transportation management conducts ride checks and Safety Procedures and Rules Adherence Tests (SPRAT) periodically to ensure staff compliance with operating Rules and Procedures. The results of all ride checks and SPRAT are documented and appropriate corrective actions are taken. All rules violations shall be tracked and documented electronically to ensure proper investigation of violations. In addition, VTA staff conduct CPUC General Order (GO) 175, compliance checks to ensure Road Way Worker Protection. All compliance check results are documented in the Electronic Safety Management System.


Joint Freight Operations

The VTA Rail Operations comply with all Federal Transit and Federal Railroad Administration regulations regarding joint operations of freight trains and passenger trains. Written agreements for joint operations in place to define the following:

- Operating Rules
- Timetable Special Instructions
- Effective General Orders and Federal Register Notices and, or Rules

General Order 172

In accordance with General Order 172, VTA has issued Operations policy OPS-PL-0001 "Use of Personal Electronic Devices By Bus and Light Rail Employees and Contractor Staff (ATU)" along with Operations Notice# 2016-030 to comply with the requirements of the General Order. VTA conducts random monitoring of employees whose duties affect the movement of trains. In addition, VTA will conduct video based monitoring for compliance of employees operating light rail vehicles.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 14 – Facilities & Equipment Inspections

Facilities and Equipment Inspections

VTA facilities are inspected monthly to identify items needing corrective action. The majority of the light rail facilities are at the Guadalupe Division including the Operations Control Center (OCC), Maintenance of Way, Power and Signals, Vehicle Maintenance, Transportation, and Training. Other related rail facilities include but are not limited to the River Oaks Administration Buildings, parking lots, light rail stations, Hi-rail vehicles including Unimog and Peterbuilt equipment, Non-revenue vehicles, tools, and historic trolleys.

Process

Facilities and Equipment inspections are performed and documented in accordance with specified SOP's (3000, 6000, 7000 series).

All facility safety inspections are conducted following procedure SSS-SAF-IIPP-0701, Safety Inspections contained in the Occupational Injury and Illness Prevention Program (IIPP).

Inspection reports shall include the following:

- Date of Inspection.
- Name of Facility.
- Listing of Items Observed.
- Description of Observed Deficiencies.
- Recommendations to Improve Safety.
- Corrective action follow-up.
- Name of Inspector.

Checklists

Maintenance Superintendent(s) shall verify Personal Protective Equipment (PPE) is available at all times. The Facilities Maintenance Coordinator or designee is responsible for ensuring monthly safety inspections are conducted at their location and defects resolved. An electronic checklist is completed for safety inspection that verify; eyewashes, fire extinguishers, and spill kits are operational; general facility defects and hazards are noted. All other inspections performed are documented on forms detailed in specified SOP's.

Station Maintainer(s) perform station safety inspections in accordance with MTN-PR-6301, Monthly Platform Preventative Maintenance. Platform inspection include but are not limited to lighting, railings, signage, stairways, handrails, ramps, elevators, escalators, notifications, and digital message boards, retaining wall, fencing, seating.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018


Safety Inspections include observations of the following and identification of code deficiencies:

- Exterior Conditions.
- Building Construction.
- Building Facilities: i.e. Heating, Ventilation, and Air Conditioning, Electrical, etc.
- Means of Egress.
- General Housekeeping and Storage Practices.
- Occupants' Awareness of Emergency procedures.
- Portable Fire Extinguishers.
- Fire Detection and Alarm Systems.
- Fire Suppression Systems.

Deficiency Tracking

Identified deficiencies will be documented. Safety will take precedence to protect life and property. If a serious deficiency cannot be corrected immediately a temporary measure(s) may be mandated by Safety Inspector(s). Examples of immediate temporary measure include shut downs, evacuations, notifications, or signage advising of present conditions

If a deficiency is determined to be of a hazardous nature and cannot be corrected immediately, it will be reported as stipulated in the Hazard Management Program, SSPP Element #6 and entered into the Electronic Hazard Reporting and Tracking System (EHRTS). The corrective action and/or preventive measures taken to mitigate the hazard, along with accountability and all pertaining documentation will be recorded and tracked via the EHRTS. Missed inspections and/or incomplete work orders will also be reported and tracked via the EHRTS.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 15 – Maintenance Audits & Inspections

Maintenance Audits and Inspection - Overview

VTA's Way Power and Signal, vehicle, and facilities maintenance plans and procedures outline; the performance of preventative maintenance inspection activities, scheduled maintenance inspections activities, and unscheduled maintenance inspection activities. Way Power and Signals conducts semi-annual audits and inspections in accordance with the Standard Operating Procedure (SOP) MTN-PR-6801.

System Safety and Compliance will perform at least once during the established triennial period through the Internal Safety audits. At which maintenance plans, procedures, and inspection records are reviewed. There will be a written checklist prepared prior to audit to ensure items are within compliance.

Equipment monitored and Inspection Periodicity

The Way Power and Signals WP&S maintenance is detailed in the 6000 series of SOP's. Way, Power and Signals (WP&S) inspection(s) and maintenance include; track, traction power substations, train control, and communications systems. Track inspection(s) and maintenance include; measurements of track gauge, profile, alignment, cross level, twist, wear and flaws. Power inspection and maintenance includes substation equipment, the electrification system. Signal inspection and maintenance includes testing of switches, relays, track circuits, and wiring.

Vehicle maintenance refers to the inspection, maintenance and repair of rolling stock by performing scheduled inspections, scheduled maintenance and running repairs. Work Orders are prepared on defects discovered during the maintenance inspection process, which are used to document and monitor failure trends and to develop corrective and preventive actions. Schedule for the repair on these defects is based on severity.

Light Rail Maintenance Procedures (SOP series; 5000, 8500) are documented in the VTA Maintenance Standard Procedures Manual. This manual includes the following:

- Vehicle daily inspections
- Daily Inspections are performed on every Light Rail Vehicle (LRV) operated in revenue service. This inspection takes place each time the LRV is pulled into the maintenance facility at Guadalupe Division. If an LRV cannot return to the yard for inspection, the Daily Inspection will be completed on an auxiliary track or other suitable location prior to returning to revenue service.
- Vehicle maintenance work orders.
- Vehicle placement and status report.
- Vehicle preventative maintenance inspection intervals will be completed in accordance with Light Rail Maintenance Procedures.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

The Bridge Management Program (BMP), MTN-PR-7101, ensures structural integrity of bridges, tunnels and culverts. In accordance with this program, inspections will take place biennially through external contractors. Inspections and any resulting findings are entered into the Bridge Management System (BMS) for documentation, tracking and the development of repair schedules.

Safety Oversight activities include:

- Investigate accidents to determine causes and eliminate hazards.
- Design and provide maintenance engineering on all equipment necessary to provide passenger and employee safety.
- Conduct monthly safety meetings and disseminates safety material to employees.
- Issue safety equipment and ensure its proper use.
- Ensure required personnel are trained in safety and first aid.
- Ensure that quality control is reflected in all equipment maintenance activities.
- Participate in emergency drills and table-top exercises.
- Establish safety goals for the department.
- Correct unsafe conditions and practices.

Deficiency Tracking

All deficiencies should be corrective immediately or within a reasonable time frame. Documentation should be in accordance with the established SOP. In addition to the SOP outlined process all serious deficiency(s) should be entered into the Hazard Management Program with the corrective action plan including preventative measures taken to ensure mitigation of hazard or potential hazard.

SAP System

An electronic database which maintains a collection of all scheduled and unscheduled maintenance data, complete record of problems reported, maintenance performed and repair actions taken on each piece of equipment. This data will also allow for analysis of maintenance trends, staffing and material requirements and equipment performance. The detailed process is outlined in Light Rail Vehicle Maintenance Work Orders MTN-PR-5158 and Preventative Maintenance (PM) Scheduling for Light Rail Vehicles. MTN-PR-5156.

For a detailed maintenance schedule, refer to the applicable maintenance procedures.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 16 – Training & Certification Program

Employee Training and Certification

Light Rail Training and certification is conducted by the following departments:

- Light Rail Technical Training
- Light Rail Maintenance Training
- Service Management Unit (Operations Control Center [OCC] / Field Operations)

Light Rail Technical Training is responsible for:

- Training and certification programs for light rail operators, maintenance employees and light rail operations employees requiring certification.
- Re-certification for all rail certified employees once per calendar year.
- Re-training and refresher training as needed.
- New segment and configuration change training as needed.

Required Way, Power and Signal staff receives Hi-Rail Certification in addition to Re-certification. Hi-Rail training is also provided to Vehicle Maintenance Electro Mechanics. This training includes classroom and field training.

Light Rail Maintenance Training is responsible for:

- Training and certification programs for light rail maintenance employees.
- Re-certification for all maintenance certified employees.
- Re-training and refresher training as needed.
- Safety training for electrical and high voltage.
- Hi-Rail vehicle and on-track equipment training.
- Specialized training for maintenance staff.

Rail certified VTA employees are required to renew their RWP certification(s) once each calendar year as part of the recertification process, or no later than the end of each calendar year.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Renewal for all non-rail certified VTA employees:

- RWP training taken between January 1st and April 30st will expire on December 31st of the year in which training occurred.
- RWP training taken between May 1st and December 31st will expire December 31st of the following year in which training occurred.
- Trolley Operator Certification and Re-certification. Training will occur only when/if the trolley is scheduled to operate and is valid for 9 months.

Service Management Unit (OCC/Field Operations) is responsible for:

- Initial training for OCC and Field Operations staff
- Rail Controller Training
- Field Operations staff Recertification Training (bi-annually)
 - Field Operations staff Refresher Accident Training (as needed)

Contractor Training

All Contractors who may have a need to enter the right-of-way (ROW) are required to be Roadway Worker Protection (RWP) certified and maintain active certification(s).

The System Safety Unit is responsible for:

Oversight of the Fire/Life Safety Committee which certifies that the necessary outside agencies, such as the fire, police and other emergency response personnel have received safety training on the light rail system.

Compliance

All certification and re-certification programs require written exams to check for knowledge retention. All train operating certifications require performance evaluations in addition to written exams. VTA has established minimum exam scores for VTA employee certification and re-certification programs.

Technical Training and Maintenance Training maintain training records for all rail employees. Roadway Worker Protection (RWP) student registers and exams are maintained for all persons that received RWP Training. A database is also maintained by Technical Training so OCC can verify the status of any person working on the Right-of-Way.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 17 – Configuration Management & Control

Configuration Management refers to the systematic control of physical and operational infrastructures and establishes a structured approach to testing, documenting, and the decommissioning of assets. Therefore assuring all changes have been properly and systematically planned, evaluated and approved by all appropriate parties.

Safety is of the utmost significance in the overall configuration management process therefore all Divisions or Departments are responsible for the development of a System Development Life Cycle (SDLC) to comply with the agency wide policy. When a configuration change is requested, the change request will not be approved until risk(s) have been evaluated based on assets critically related to the design criteria, safety, and regulatory requirement of the asset or system being impacted.

VTA has established an agency-wide configuration management policy and has established specific configuration and change management procedures. These procedures cover: (a) Rail Operations; (b) Bus & Rail Vehicles; (c) Agency-wide Information Technology System Development Life Cycle; (d) Agency-wide Information Technology Configuration & Change Management; (e) Engineering & Transportation Program Delivery Change Management; and (f) SCADA Configuration Management.

The agency-wide configuration management policy outlines the purpose, scope, responsibilities, policy, compliance, enforcement, exceptions, and governance of this policy.

Any change impacting rail operations will be presented to the Rail System Safety Review Board (RSSRB) for approval.

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 18 – Local, State, & Federal Requirements

All VTA employees and contractors are responsible for ensuring compliance with Local, State & Federal Safety requirements which apply to work being performed on or with specified areas outlined in appropriate safety regulations.

All VTA employees and contractors are subject to Local, State and Federal Safety requirements including, but not limited to the following:


- Federal Railroad Administration (FRA)
- Federal Transit Administration (FTA)
- California Public Utilities Commission (CPUC)
- Occupational Safety and Health Administration (OSHA - FED & CAL)

VTA contracts out work for many Rail Construction projects. The execution of these projects involves contractor personnel who come under the direct jurisdiction of VTA. Contractor personnel work on VTA property, and are frequently on the railroad during operating conditions. Certain safety requirements must be applied to all members of the contractor work force to ensure safety of the public, VTA employees, contractor employees, as well as the protection of VTA property.

Prior to the start of work on Capital Projects System Safety, Quality Assurance and Engineering & Transportation Program Delivery review proposed methods of construction requirements to assure that safety is incorporated into both the General Provisions and the Technical Specifications. To protect customer and employee safety and to ensure continued safe operations, “work around” plans are developed and implemented.

All contractor personnel are instructed on the procedures. Safety problems are documented, and monitored until corrective action is taken by the contractor. In certain life threatening instances, the System Safety Unit and/or the Resident Inspector may “red tag” portions of contractor facilities to shut down operations until the situation has been corrected.

Contractors shall ensure proper procedures are in place and sufficient implementation of those specified safety requirements. Procedures in place can but do not have to be limited to; logs, reporting mechanisms and an accident/incident investigation process. It should be noted that the contractor must notify VTA’s Operations Control Center (OCC) at (800) 922-4321, within 15 minutes of any major occurrence.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Grade Crossings

VTA has numerous rail grade crossings on its light rail system. These grade crossings typically occur in two types:

- Street running, where crossings are governed by vehicular and pedestrian traffic signals, and light rail transit signals.
- Gated crossings, where crossings are governed by flashing lights, gates and bells.

Light rail system grade crossings are designed in accordance with industry safety standards, the California Manual of Uniform Traffic Control Devices (CA MUTCD), Federal Railroad Administration (FRA), California Department of Transportation (Caltrans), and California Public Utilities Commission (CPUC) requirements. All light rail system rail grade crossings must be approved by the CPUC, in accordance with General Order 75D. Crossing applications are developed during the design of the light rail system and submitted to the CPUC for review and approval. All modifications or changes to existing light rail system grade crossings are submitted to the CPUC for review and approval.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

Element 19 – Hazardous Materials Program

Hazardous Materials Programs/Globally Harmonized System of Classification (GHS): The proper storage, handling, and disposal of hazardous materials is taken very seriously at VTA. All departments have access to Safety Data Sheets (SDSs). SDSs includes technical information, instructions and procedures for safe storage, handling, disposal of hazardous materials, and first aid. Each department that generates hazardous waste maintains and updates information on the waste they generate and is responsible for safe storage and disposal.

Hazardous materials management is addressed through formal training programs that cover a variety of issues including the hazards of the materials, methods for safe handling of hazardous materials, disposal of hazardous waste and personal protective equipment (PPE).

The Environmental Health and Safety (EHS) Unit in the Safety & Compliance Department maintains a list of approved chemicals to be purchased and used by VTA. The Contracts and Material Management Department ensures that materials purchased by VTA for use on the property are properly labeled and packaged when received. Purchase of a chemical not on the approved chemical list must be evaluated by following the New Chemical Procurement procedure contained within the Injury and Illness Prevention Program (IIPP).

Environmental Health & Safety is responsible for the following hazardous materials activities:

- Oversight and administration of industrial hygiene inspections and monitoring.
- Response to exposure or spill emergencies.
- Perform reviews and audits of VTA policies and procedures.
- Review capital projects for hazardous materials/conditions & safety.
- Review chemical SDS's.
- Regulatory reviews and implementation.
- Provide technical expertise and advisement.
- Act as regulatory liaison for VTA.
- Oversight and audit performance on various hazardous material programs.
- Environmental audits of facilities, properties and projects.
- Administer and Maintain the Safety Data Sheet program.
- Administer the Injury And Illness Prevention Program (IIPP).
- Regulatory submissions for all VTA facilities.


 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

The Facilities Maintenance Department is responsible for the following hazardous materials activities:

- Capital program review and advisement.
- VTA policy and procedure review and implementation.
- Technical advisor and expertise.
- Regulatory review and implementation.
- Chemical review and approval.
- Administrative functions including asbestos/lead-paint abatement, industrial hygiene, hazardous waste and environmental lab contract preparation.
- Hazardous waste handling and management.
- Spill response, clean up, and investigation.

Compliance

Instances of non-compliance with the Hazardous Materials Management Program will be reported and tracked per the Hazard Management Program, COS-SAF-3002, and entered into the Electronic Hazard Reporting and Tracking System (EHRTS).

	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018


Element 20 – Drug & Alcohol Program

VTA is committed to maintaining an alcohol and drug free workplace, to provide a safe and productive work environment and to retaining the public’s trust and confidence in our transportation services. The purpose of the Drug and Alcohol Policies is to prevent accidents, incidents and losses resulting from alcohol and drug use. These policies also define alcohol misuse and requirements for testing for prohibited drugs, requirements and outlines applicable Employee Assistance Program services.

All VTA employees are covered by these policies. The policies include the following:

- The prohibition from the use or possession of alcoholic beverages, intoxicants or controlled substances by employees subject to duty, or while on duty or on VTA property. The prohibition from employees reporting for duty under the influence of or use on VTA property, any drug, medication or other substance including those prescribed by a doctor, that will in any way affect their alertness, coordination, reaction, response or safety.
- The illegal use, possession, manufacture, distribution, dispensing, or selling of any controlled substance on duty, or on VTA property is prohibited.

The Drug and Alcohol Policies also include provisions for detection and deterrence sanctions for violations, Employee Assistance Program, and definitions of special requirements for safety sensitive positions. These policies comply with The Federal Transit Administration (FTA) and the U.S. Department of Transportation regulations. The regulations mandate urine drug testing and breath alcohol testing for safety-sensitive positions. Additionally, drug and alcohol training is provided for safety-sensitive employees and Supervisors. Furthermore, VTA monitors contractors that perform safety-sensitive functions for VTA.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	15

Element 21 – Procurement

Procurement, Contracts & Material is responsible for the procurement of materials, services and public works. The receipt, control and distribution of inventory parts is the responsibility of the Operations Division Materials Management. Procurements are executed in accordance with quality standards, established user department work schedules and needs, and governing laws and regulations.

Generally, specifications are in the form of written description, performance requirements, drawings, prints, commercial industry standards and other descriptive literature references. All items to be procured shall be evaluated for health and safety compliance with current applicable regulatory specifications and in accordance with the Hazard Management Program.

Requesters of services from Procurement, Contracts & Material are responsible for identifying material or services that have potential safety impact and for ensuring that such material or services meet safety requirements of Federal, State, and local compliance regulations, OSHA standards, or identifying the requirement for Environmental Health & Safety Unit review.


Procurement, Contracts & Material has a Policy and Procedure for pre-procurement planning, specialty items requiring safety review, and requisition procedure.

Common supplies require user department review. Special supplies or services may require review by the System Safety Unit or the Environmental Health and Safety Unit. Procurement, Contracts & Material ensures that materials purchased by VTA for use on the property are properly labeled and packaged when received. Purchase of a chemical not on the approved chemical list must be evaluated by following the New Chemical Procurement procedure contained within the Injury and Illness Prevention Program (IIPP).




All Procurement, Contracts and Materials management (PCMM) personnel shall obtain reviews and written approvals from the Director of Safety & Compliance for all purchase orders and contracts that are:

- New
- Not previously approved, or
- Have any changes to specifications/parts of Light Rail Vehicle (LRV) requirements (including micro-purchases).

Such reviews may include review and approval by the Rail System Safety Review Board (RSSRB), as determined by the Director of Safety & Compliance. The timeline for approval by the RSSRB may require additional time, as the RSSRB meets monthly.

 <p>Santa Clara Valley Transportation Authority</p> <p><i>Solutions that move you</i></p>	Light Rail System Safety Program Plan	
	Version Number:	16
	Date:	2/6/2018

All PCMM personnel shall not require review or additional written approval from the Director of Safety & Compliance for LRV requirements (including micro-purchases) prior to issuing solicitation or awarding purchase orders and contracts, provided that a signed approval is already on file with the PCMM.

Prepared by	Reviewed by	Approved by
 Michael Brill System Safety Supervisor	 Denise Patrick Safety Manager	 Rufus Francis Director of Safety & Compliance

Appendix 1 - Rail System Safety Review Board (RSSRB) Proceedings

1. ITEMS BEFORE THE BOARD: An accurate record of all items brought before the Board shall be maintained in order to provide documentation of all Board actions. The disposition of each item and the rationale for such disposition shall be documented.

2. CORRECTIVE ACTION PLANS: All Corrective Action Plans (CAP) identified through regulatory inspections/audits, or VTA SSPP internal audits/inspections shall be maintained electronically. If corrective actions are not resolved within a reasonable time, the CAP status should be included with each agenda and brought before each meeting by the System Safety Department.
 - 2.1. Sub Committee: Will at least consist of the Director of Safety & Compliance and Deputy Director of Transit Operations, Rail Operations and or their designee(s).

3. INVESTIGATION / INFORMATION: In general, the Board shall assign issues to be investigated by appropriate Authority Staff or consultants who will be responsible for reporting back to the Board with a recommendation.

4. CLOSURE OF OPEN ITEMS: When items are closed by the Board, a statement of the Board's rationale will be incorporated into the minutes. Items will fall into one of the following closure categories:
 - 4.1. No Action - The Board finds that no action is required. Rationale for no action may include low probability of accident, little or no negative effect or excessive cost for minimal safety benefit received.
 - 4.2. Corrected - The item has been corrected and the action taken has been verified.

5. ITEMS IN PROCESS: Safety items not closed will be deferred pending further investigation and analysis. In this case, a schedule for resolution will be established and persons responsible identified. If the Board deems necessary, interim safety measures or work-arounds will be recommended.

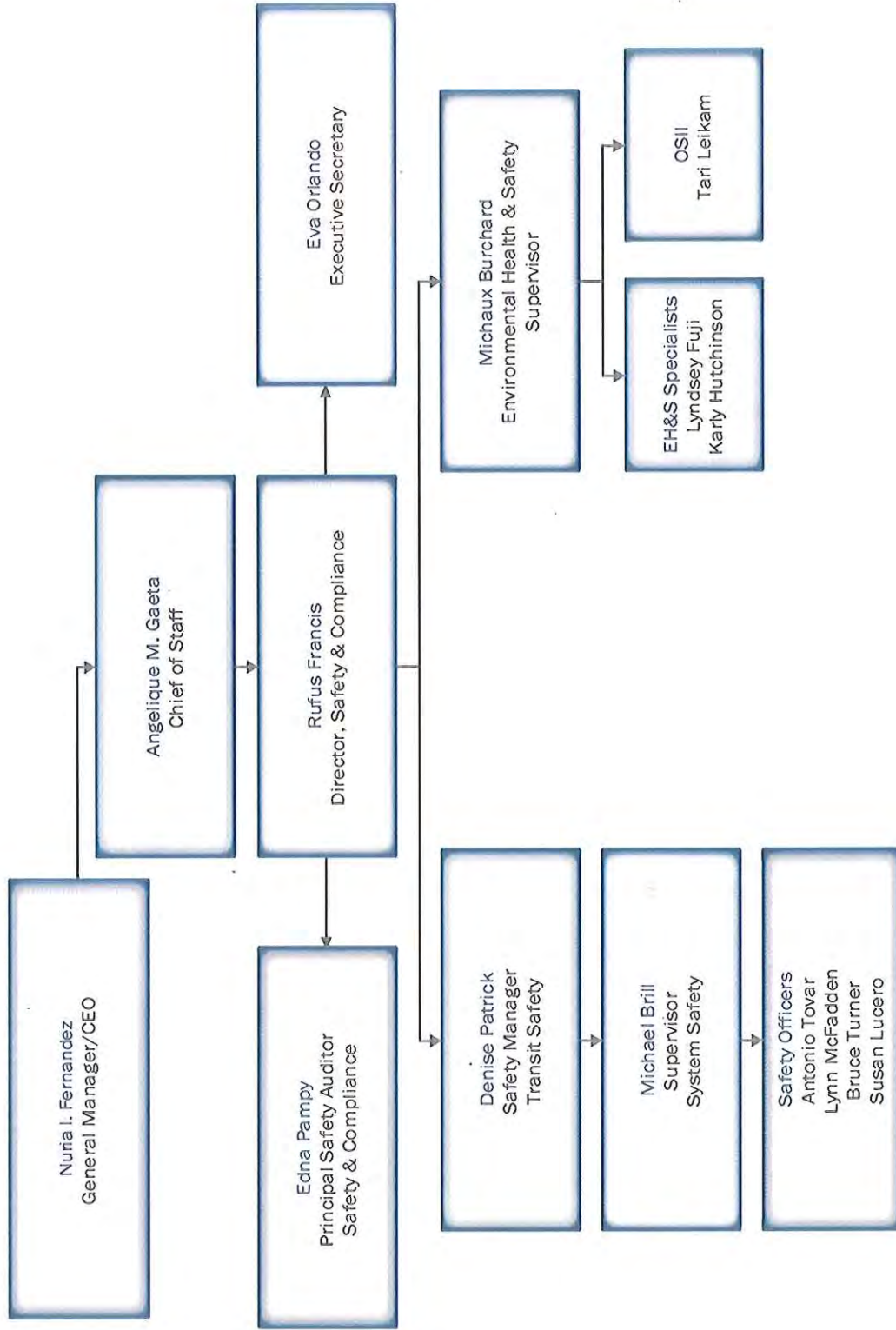
6. RSSRB MEMBERS:

Director of Safety & Compliance	Chair
Safety Manager	Member
Engineering Group Manager	Member
Superintendent of LR Transportation	Member
Superintendent of LR Vehicle Maintenance	Member
Superintendent of Way, Power & Signals	Member
System Design Manager	Member
Manager of Security Programs	Member
Manager of Construction Inspection	Member
Deputy Director Transit Operations, Rail Operations	Member
Operations Manager Light Rail Maintenance	Member
Light Rail Technical Training Supervisor	Member
Supervising Maintenance Instructor	Member

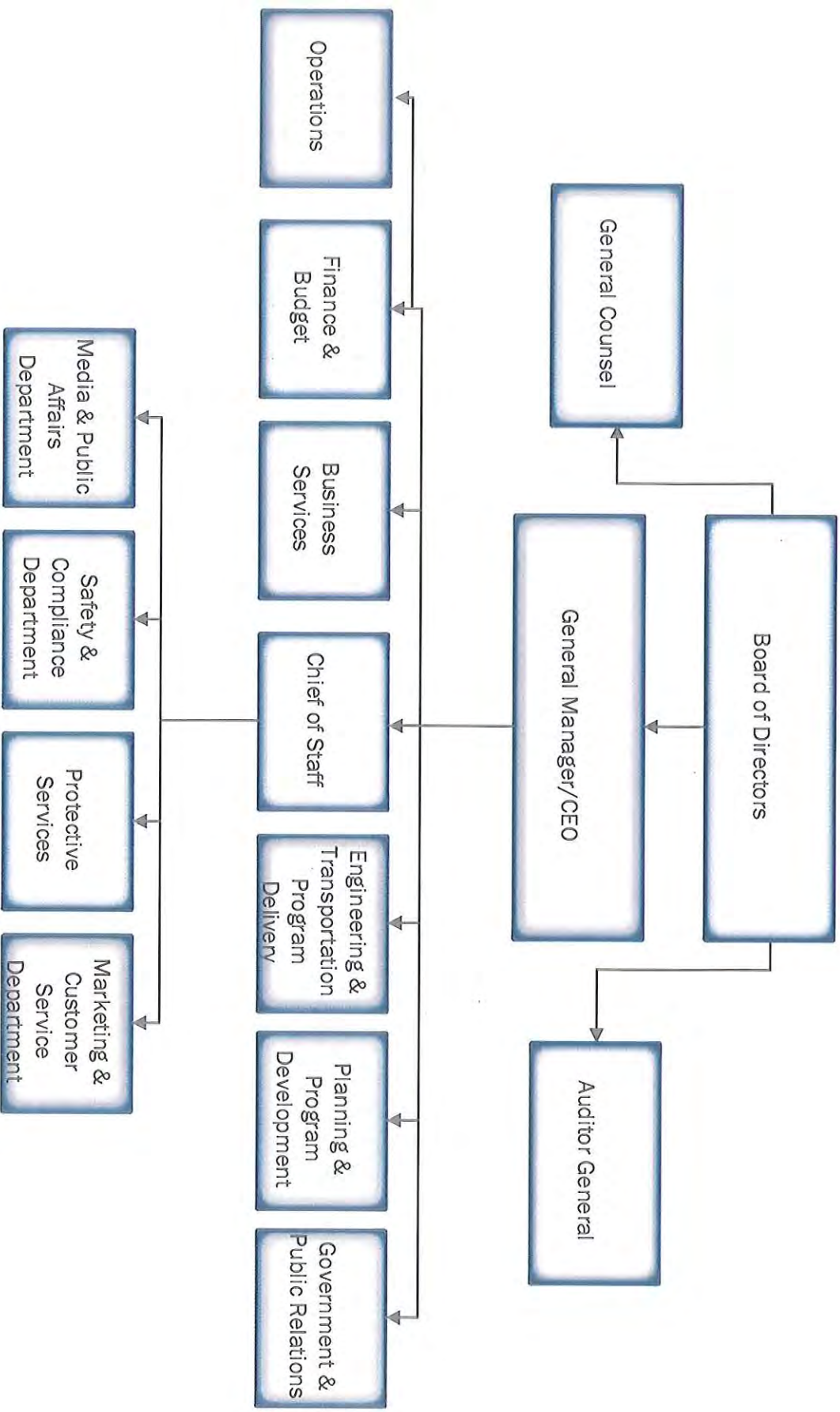
Revised Proceedings adopted by the RSSRB at its regular meeting on February 1, 2017.


Rufus Francis, RSSRB Chair

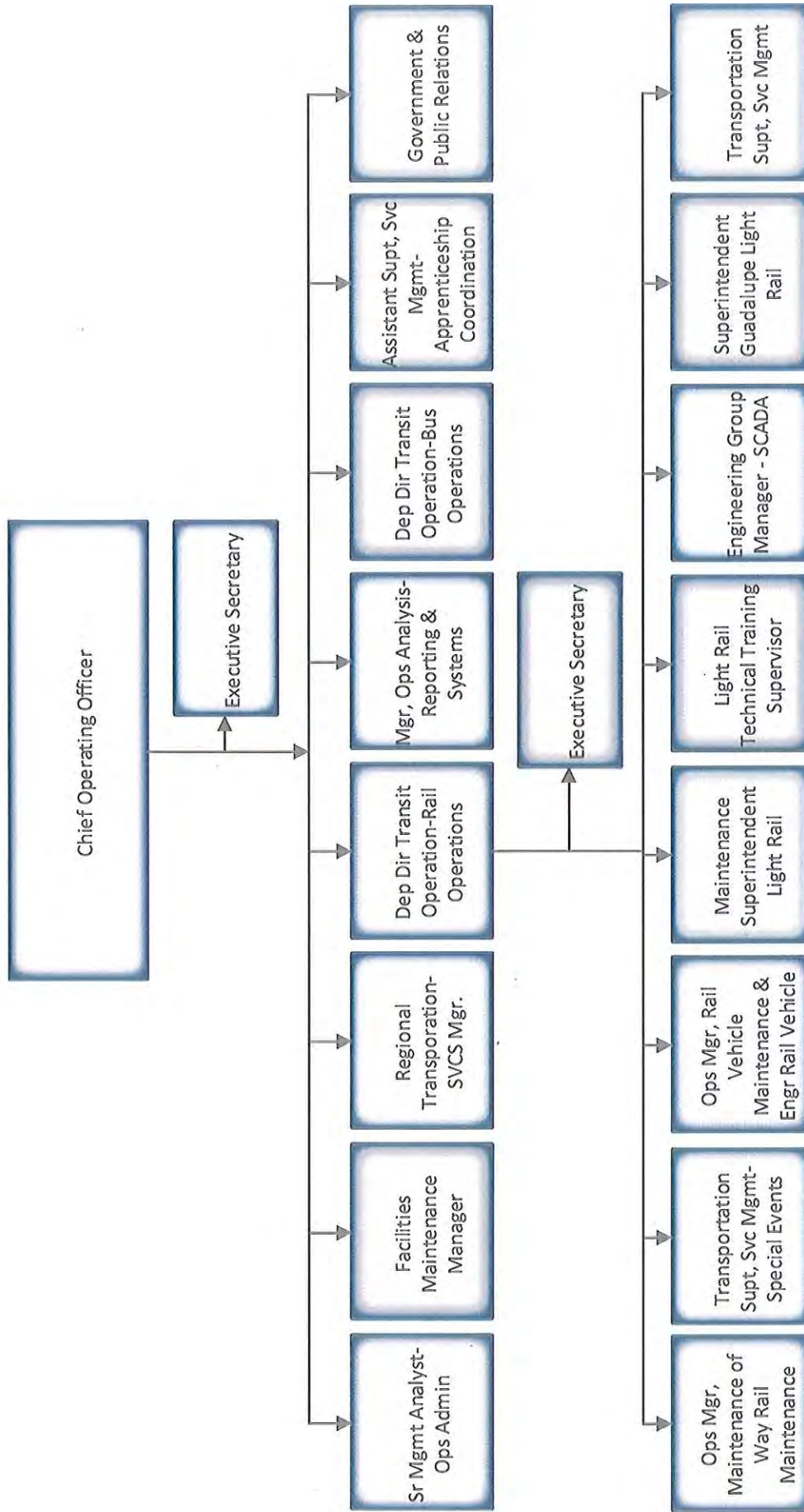
Appendix 2 – Safety & Compliance Organizational Chart



Appendix 3 - VTA Organizational Chart



Appendix 4 - Operations Organizational Chart



Appendix 5 – Hazard Management Program (HMP)

HAZARD MANAGEMENT PROGRAM	Document Number:	COS-SAF-PR-3002
	Version Number:	03
	Date:	01/24/2018

1. Purpose:

The purpose of the Hazard Management Program is hazard identification, reporting, assessment, mitigation, and follow-up. The program allows all employees and contractors methods to communicate recognized workplace hazardous conditions, unsafe acts/practices, and/or close call incidents to management without fear of reprisal. It provides a structured management approach for: the identification of hazards, risk level assessments, determination of department(s) accountability, corrective actions development and monitoring, along with a tracking system for corrective action status, and the processes needed to ensure action is taken to eliminate, mitigate or manage the risks as low as reasonably practicable (ALARP).

2. Scope:

This procedure applies to all Santa Clara Valley Transportation Authority (VTA) employees, and contractors doing work on behalf of VTA. Although this procedure is heavily weighted toward identifying, assessing, eliminating, mitigating and managing risks in the maintenance and operation of bus and rail transportation, the concepts and processes apply to all VTA departments.

Note: light rail vehicle related near-miss incidents are reported directly to the Operations Control Center (OCC) or as described in the Roadway Worker Protection (RWP) manual. The incidents are entered and tracked through a web based system, reviewed by the Active Right of Way Committee and reported monthly to the Rail System Safety Review Board (RSSRB). In the event that hazardous trends are discovered requiring mitigation, the identified hazard will be treated as any other hazard as applicable to this program.

3. Responsibilities:

3.1. The General Manager is responsible for:

- 3.1.1. Cultivating and promoting an Agency-wide Safety Culture.
- 3.1.2. Setting safety goals, safety performance objectives and reporting to the Board of Directors on safety activities of the agency.
- 3.1.3. Giving safety, security, and hazard management due consideration through all decision making processes.
- 3.1.4. Ensuring the overall quality and safety of VTA programs.

- 3.2. The Executive Staff is responsible for:
 - 3.2.1. Evaluating and approving the hazard analysis and mitigation measures and accepting or rejecting the residual risk level.
 - 3.2.2. Consulting with the Safety and Compliance Department on the mitigation of reported safety hazards and unsafe conditions.
 - 3.2.3. Actively promoting safety and safe work practices in policies and other verbal and written communications.
- 3.3. Department Head/Superintendents/Managers are responsible for:
 - 3.3.1. Ensuring all staff and contractors under their supervision are trained in hazard reporting and the Hazard Management Program.
 - 3.3.2. Establishing and maintaining safety performance by ensuring adherence to all established safety rules and procedures. Reporting new and repeat safety rule violations and unsafe behavior or work practices to the Safety and Compliance Department along with corrective action plans and timelines.
 - 3.3.3. Conducting hazard analysis on reported hazard and unsafe conditions by consulting with the Safety & Compliance Department and other stakeholder departments including tracking mitigation measures, and follow-ups.
 - 3.3.4. Performing and providing hazard analysis as required by the applicable configuration management procedure in accordance with the agency wide configuration management Standard Operation Policy (SOP).
 - 3.3.5. Performing and providing all hazard analysis results in connection with new construction and system modification projects, safety certification, procurement processes, and service change bulletins to the Safety and Compliance Department.
- 3.4. Supervisors are responsible for:
 - 3.4.1. Ensuring all staff and contractors under their supervision are trained in hazard reporting and the Hazard Management Program.
 - 3.4.2. Notify the Safety and Compliance Department of any reported possible hazardous exposure as consistent with the VTA Hazard Communications Program.
 - 3.4.3. Notifying their department head and the Safety and Compliance Department of any employee injury resulting from unsafe behavior, work practice or process, along with any unsafe or hazardous condition in VTA property, equipment or facility.

- 3.4.4 Ensuring risks/hazards, including those identified through facility inspections, are assigned corrective action plan with schedule, responsible staff member/s and are communicated to their department head and to the Safety and Compliance Department either as described in section 4.1 or by entry into the Electronic Hazard Reporting and Tracking System (EHRTS).
- 3.4.5 Assessing, documenting, and correcting reported hazards/risks within a timely manner. Communicate advisories to all employees who have the potential of exposure to an unsafe condition as soon as practicable before mitigation measures have been completed.
- 3.4.6 Ensuring implementation of mitigation measures developed through the hazard analysis. Report any delays in implementing the mitigation measures to their department heads and the Safety & Compliance Department.
- 3.4.7 The follow-up and resolution of all reported hazards/risks applicable to their departments and providing status updates through either the electronic hazard reporting and tracking system or directly to the Safety and Compliance Department.
- 3.4.8 All hazards not capable of resolution by the Supervisor will be communicated to the department head, superintendent or manager, and the Safety and Compliance Department.
- 3.4.9 Providing feedback to the reporting staff member affected by the hazard/risks.
- 3.5. All Employees and Contractors are responsible for:
 - 3.5.1 Communicating all hazards or risks identified to either their immediate Supervisor via the Hazard and Close Call Report Form - COS-SAF-PR-3002A Appendix A, the Safety or Health Hazard Report Form – SSS-SAF-IIPP-0201B Appendix B, or notification to the Operations Control Center (OCC). A copy of all forms submitted, and all hazards identified via other means will be reported to the Safety & Compliance Department either by email communication or forwarding the forms received.
 - 3.5.2 All employees and contractors are responsible for following the procedures outlined in this Hazard Management Program upon receiving initial training on the VTA procedures.
- 3.6 The Safety and Compliance Department is responsible for:
 - 3.6.1 Develop and implement the Hazards Management Program.

- 3.6.2 Document, investigate, follow-up, and track hazards reported by VTA employees, contractors, government agencies, and members of the public.
- 3.6.3 Perform analysis on reports such as, but not limited to, close call, near miss incidents including RWP violations, loss control, accidents/incidents, hazards, and inspections.
- 3.6.4 Determination of the final risk rating of all reported hazards by utilizing the Hazard Classification Matrix.
- 3.6.5 Notification to the California Public Utilities Commission (CPUC) via Form-R in the event that a finalized risk rating is identified as "High".
- 3.6.6 Review of accident/incident reports for any unsafe conditions or acts that may warrant a corrective action plan.
- 3.6.7 Providing support for VTA's various training departments for any added insight into safety topics and instruction.
- 3.6.8. Providing oversight and support of VTA's Hazardous Material Management Program and environmental compliance requirements.
- 3.6.9. Managing VTA's internal safety auditing program and identifying any unsafe conditions that would constitute a corrective action plan.
- 3.6.10. Providing oversight of environmental compliance inspections as required and the identification of any unsafe conditions that would constitute a corrective action plan.
- 3.6.11. Maintaining the VTA Injury and Illness Prevention Program (IIPP).
- 3.6.12. Participating, when applicable, in the review of configuration management, new and system modification construction project plans, design development and safety certification processes. Ensuring Preliminary Hazard Analyses (PHA) are performed to mitigate hazards to an acceptable level and are in compliance with all regulatory standards and best industry practices.
- 3.6.13. Performing document reviews of new or changed procurements, new system modification construction projects, and permit applications, including but not limited to, construction and light rail Right-of-Way (ROW) access, contractor's IPPs, Site Specific Safety Plans (SSSP) and chemical Safety Data Sheets (SDSs) to ensure safety and rules/regulatory compliance.
- 3.6.14. Maintain hazard tracking from identification through mitigation or resolution including corrective action plans, schedule and responsible management.

3.6.15. Serve as a Liaison between VTA and external safety regulatory agencies and ensure compliance with applicable local, state, and federal regulations.

3.7. The Enterprise Risk Management Department is Responsible for:

3.7.1 Notifying the Safety and Compliance Department of any employee injury resulting from a hazardous or unsafe condition on VTA property, equipment or facility.

3.7.2. Performing industrial injury or illness trend analysis, identification of corresponding hazardous conditions and reporting through the established hazard reporting mechanisms listed in section 4.1 or directly entering the hazard into the EHRTS.

4. Procedure:

4.1. Hazard Reporting

4.1.1. Internal and external reporting method options: (1) notification directly to front line staff; (2) notification to the customer care center; (3) VTALERTS notification system.

4.1.2. All employees complete any one of the following:

1. Hazard and Close Call Report Form COS-SYS-PR-3002A Appendix A.
2. Safety or Health Hazard Report Form SSS-SAF-IIPP-0201B Appendix B.
3. Operator comment cards.
4. Notifying their direct supervision.
5. Notifying the Safety and Compliance Department
6. Email notification to the applicable department head or supervisor and the Safety & Compliance Department.
7. Reporting unsafe or hazardous conditions identified in Configuration Management procedures or directly in-line with configuration processes or change management functions.

4.1.3. The direct supervisor receiving the report will discuss the hazard and will document/enter into the EHRTS, as per the Hazard Classification Matrix.

- 4.1.4. After initial documentation into EHRTS, the responsible party will perform an investigation of the reported hazard. The investigation will include documentation in both written and visual formats.
- 4.1.5. During the course of the investigation, the responsible party may utilize the following investigatory methods:
 1. Contact the reporting party to gather all potential information about the reported hazard.
 2. Conduct a walkthrough of the affected area and location, assess the possible hazardous condition, and generate visual documentation (photographs, video) as well as taking any measurements deemed necessary at the location.
 3. Conduct interviews with employees in the area to gather relevant information on the reported hazard.
 4. Review any documentation associated to the hazard (records, reports, procedures, inspections, technical documents, etc.)
 5. Contact other departments which may have association or technical insight into the reported hazard.
 6. Review any past reported hazards similar in nature with the support of Safety and Compliance Department.
 7. Evaluate work and/or task processes connected to the reported hazard.
 8. The methods of investigation are not limited to the listed procedure. Safety and Compliance Department can provide assistance in pursuing further investigation.
- 4.1.6. During the course of investigation, all documentation will be entered into the electronic hazard reporting and tracking database.
- 4.1.7. When requested person(s) who provide information regarding safety hazards and/or violations will remain anonymous, and will be protected by the extent permissible by law.

4.2 Hazard Risk Assessment

- 4.2.1. Hazard Risk Assessment will be performed as set forth by the VTA System Safety Program Plan (SSPP), which utilizes the Safety Management System (SMS) approach to Safety Risk Management (SRM) Appendix C, and the MIL-STD-882E Safety Risk Assessment Matrix Appendix D.

4.3 Hazard Resolution

- 4.3.1 Hazard Resolution will be performed as set forth by the VTA SSPP and may have three outcomes as a result.
 - 4.3.1.1. Resolved – The hazard was eliminated and no further action is required.
 - 4.3.1.2. Not Resolved – The hazard was not eliminated. Further action is necessary to mitigate the identified risk to acceptable levels.
 - 4.3.1.3. Monitoring – The hazard was not eliminated but has been mitigated to a level of acceptable risk. Monitoring shall continue to ensure the risk level is maintained at a continued acceptable level.

4.4 Hazard Tracking

- 4.4.1 Upon receipt of a hazard report, the details will be entered into the EHRTS.
- 4.4.2 A unique identification number will automatically be assigned electronically when entered into the EHRTS to allow for tracking individual hazard reports.
- 4.4.3 Corrective actions will be automatically linked to individual hazards for tracking when generated in the EHRTS.
- 4.4.4 The EHRTS corrective action form will identify the following information relating to the hazard: problem/deficiencies, recommendations, responsible parties, required and actual completion dates, status, and corrective action taken.
- 4.4.5 Responsible parties will receive notification via e-mail from the EHRTS when assigned to a corrective action, of an approaching deadline, past due, and the completion of corrective action.
- 4.4.6 The VTA Safety and Compliance Department will follow Section 3.6 and provide oversight of departments in order to verify hazard(s) are being entered into EHRTS for proper tracking.
- 4.4.7 A Safety and Compliance Department designee will create a hazards report identifying open corrective actions.
- 4.4.8 A status report will be provided to the Rail System Safety Review Board (RSSRB) to ensure required staff are working together to eliminate and mitigate hazard(s) to the lowest practical level.

4.4.9 The VTA Safety and Compliance Department will provide the final approval of tracked hazard(s); risk assessment rating identified in Section 4.3.5 and hazard resolution identified in Section 4.5.1.

5. Discipline:

In cases of self-reporting connected to incidents or accidents resulting from safety rules or procedures violations, lenience may be considered in regard to disciplinary action. However, this policy shall not apply to information received from an anonymous source other than the employee involved, or which involves illegal acts or willful and deliberate disregard of established rules, procedures, policies, and regulations. Whistleblowers shall be protected from any form of retaliation, consistent with State and Federal guidelines and regulations.

6. Definitions:

Accidents – An event or occurrence that results in death, injury, or property damage.

Close Call – A narrowly avoided dangerous or hazardous occurrence that *could have* caused death, injury or property damage. (Not to be confused with a *Near Miss*, see below.)

EHRTS – Electronic Hazard Reporting and Tracking System.

Hazard – Any real or potential situation or condition that can cause injury or death, or damage to or loss of equipment or property in undesirable consequences if left unaddressed.

Incident – An event or occurrence that does not necessarily result in death, injury or property damage.

Near Miss - A narrowly avoided dangerous or hazardous occurrence that *could have* caused death, injury or property damage *specifically connected to a light rail vehicle*.

Risk – The assessed likelihood, severity, and frequency or undesirable consequences resulting from a hazard.

Safety – The state in which the risk of injury to persons or damage to property is reduced to, and maintained, at or below an acceptable level through a continued process of hazard identification and risk management.

System – A composite of personnel, procedures, materials, tools, equipment, facilities, and software, at any level of complexity. The elements of this 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.

System Safety – The application of management and engineering principles, criteria, and techniques to the safety aspects of a system within the constraints of operational effectiveness, time, and cost throughout all phases of the system, life cycle.

VTALERTS – A mobile phone app for calling 911 and reporting security concerns instantaneously to the VTA Protective Services Department.

VTA Manager – Management staff including, but not limited to, the following positions: General Manager, Chief, Director, Deputy Director, Safety Manager, Manager, Operations Manager, Project Manager, Superintendent, Assistant Superintendent and Supervisor

7. Records:

- 7.1. All documents shall be retained according to the VTA Records Retention Schedule.
- 7.2. Documentation of training will be done through VTA's electronic program utilized to track employee training.

8. Appendices:

- 8.1. Hazard and Close Call Report Form COS-SYS-PR-3002A - Appendix A
- 8.2. Health Hazard Report Form SSS-SAF-IIPP-0201B - Appendix B
- 8.3. Safety Risk Management System, Safety Management System for Transit – Appendix C
- 8.4. Department of Defense: Standard Practice – System Safety MIL-STD-882E – Appendix D

9. Training Requirements:

- 9.1. Safety and Compliance Department will provide an initial new hire training overview of the procedures listed in this SOP during new hire orientation.
- 9.2. Safety and Compliance Department will provide “train the trainer” training for each department designee on the procedures listed in this SOP.
- 9.3. Department heads are required to assign a designee to attend the “train the trainer” training.
- 9.4. Department designee will provide training to their department staff on the procedures listed in this SOP.


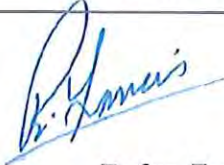

10. Communications Plan:

Safety and Compliance Department will ensure that continued awareness on this SOP will be incorporated into Tailgate safety briefs normally circulated through the different yards. These briefs along with additional outreach via printed materials, electronic communications, social media, or verbal communication will be created and distributed on a regular basis.

11. Summary of Changes:

Revisions and changes throughout as a result of the transition from a procedure to an agency wide hazard management program and new numbering format to reflect the re-organization of the Office of the Chief of Staff. This document supersedes AS-RM-4106 and COS-SAF-3002 v.2.

12. Approval Information:

<i>Prepared by</i>	<i>Reviewed by</i>	<i>Approved by</i>
 Denise Patrick Safety Manager	 Rufus Francis Director, Safety & Compliance	 Nuria I. Fernández General Manager/CEO

Date Approved: 2/5/18

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

1.0 Purpose:

- 1.1 To identify and describe the roles and responsibilities of the various VTA departments involved in the investigation and documentation of reportable accidents.
- 1.2 To facilitate, to the fullest extent possible, the participation of designated California Public Utilities Commission (CPUC) staff in all aspects of the accident investigation process.
- 1.3 To meet the requirements of the CPUC for conducting and documenting CPUC-reportable accident investigations that are carried out by VTA staff on behalf of the CPUC, per the requirements of 49 CFR659.35.

2.0 Scope:

Includes all departments involved in the response, investigation, management and notification process associated with Light Rail Accidents/Incidents that meet the reporting criteria of 49 CFR 659.

3.0 Responsibilities:

- 3.1 Under the direction of the General Manager, the Director of Safety & Compliance is responsible for:
 - 3.1.1 Managing, conducting, and documenting all CPUC-reportable investigations and hazardous condition occurrences.
 - 3.1.2 Reviewing accident report, assessing the severity of occurrence.
 - 3.1.3 Coordinating with Enterprise Risk Management in convening the "on demand" meetings to review occurrences and make recommendations.
 - 3.1.4 Initiating and facilitating requests for use of outside consultant services or specialists as necessary.
 - 3.1.5 Ensuring the System Safety staff prepares regulatory correspondences.
 - 3.1.6 Ensuring the System Safety staff facilitates the development, documentation, and follow-up of corrective action recommendations.
 - 3.1.7 Ensuring the System Safety staff obtains written report from the Coroner's Office in the event of a fatality (s).
 - 3.1.8 Ensuring the System Safety staff retains archive of final reports according to applicable regulations.



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 1 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

- 3.2 Safety Manager is responsible for:
- 3.2.1 The final accident investigation report, corrective action plan with implementation schedule, which must be signed and submitted to the CPUC by the Safety Manager within 60 days of the date of occurrence.
 - 3.2.2 Provide an interim status reports to the CPUC every 30 calendar days.
 - 3.2.3 Provide a written request for a 30 day extension which will be submitted for the initial, and all subsequent 30 day periods required until completion.
- 3.3 System Safety staff are responsible for:
- 3.3.1 Responding to the accident/incident if it meets or exceeds reportable thresholds.
 - 3.3.2 Providing initial notification to the CPUC via telephone within 2 hours of a reportable incident, if the Transportation Superintendent, Guadalupe Division or designee cannot be reached for notification within the 2-hour reporting window.
 - 3.3.3 Providing advance notification to the CPUC staff for attendance at pertinent investigations, tests, interviews, meetings, and review boards
 - 3.3.4 Submitting the final Accident Investigation report using documents identified in Section #4.4, of this SOP to the Safety Manager for review and submittal.
 - 3.3.5 Review of relevant rules and procedures, maintenance records, training records and certifications, data/event recorder logs, and other pertinent files and records.
 - 3.3.6 Review of reports by external agencies pertinent to the incident.
 - 3.3.7 Requesting or conducting follow-up inspections and tests as applicable.
 - 3.3.8 Evaluate possible contributing human factors, such as but not limited to, fatigue, work schedules, hours on duty and drug or alcohol effects.
- 3.4 Guadalupe Operations Control Center (OCC) Rail Controller staff are responsible for:
- 3.4.1 Dispatch and notify appropriate personnel in accordance with Administrative Call-Out Procedures.
 - 3.4.2 Providing initial notification to the CPUC within 2 hours of a reportable incident, if the Transportation Superintendent, Guadalupe Division or designee, or System Safety cannot be reached for notification within the 2-hour reporting window.



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 2 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

- 3.5 Transportation Superintendent, Guadalupe Division, is responsible for:
- 3.5.1 Providing initial notification to the CPUC by telephone within 2 hours of an incident meeting the reportable thresholds listed in Section 4.1 of this procedure.
 - 3.5.2 Preparing and sending a VTA Form R to the CPUC and System Safety following a reportable incident.
 - 3.5.3 Approving and forwarding Operator Occurrence Reports to Light Rail Technical Training Department.
 - 3.5.4 Reviewing all rail accident Occurrence Reports coded “Preventable” by Light Rail Technical Training.
 - 3.5.5 Interviewing the Operator(s) and Supervisor(s).
 - 3.5.6 Review post-accident test results and authorize employees to return to work.
- 3.6 Investigating Supervisor is responsible for:
- 3.6.1 Documenting physical evidence at the scene, per Light Rail Standard Operating Procedure 9.14.
 - 3.6.2 Documenting items of physical evidence taken away from the scene.
 - 3.6.3 Completing a Supervisor Report.
 - 3.6.4 Coordinating with Emergency Response personnel.
 - 3.6.5 Assisting in the continuity of service delivery.
- 3.7 Superintendent of Way, Power and Signal is responsible for assigning staff in:
- 3.7.1 Gathering and document pertinent wayside evidence.
 - 3.7.2 Certifying all wayside equipment is operational prior to returning to normal service.
- 3.8 Light Rail Equipment Superintendent is responsible for assigning staff in:
- 3.8.1 Impounding the Light Rail Vehicle (LRV) as described in Standard Operating Procedure OPS-PR-0025: Light Rail Impound Procedure and Maintenance Standard Operating Procedure MTN-PR-5101: Impounding Light Rail Vehicles.
 - 3.8.2 Managing the impound process.
 - 3.8.3 Managing and participating in the Impound Test of the vehicle.
 - 3.8.4 Receiving and reviewing the final Impound Report.
 - 3.8.5 Providing a preliminary estimate of damages, rail equipment, to the System



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 3 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

Safety staff or designee and Risk Management.

- 3.8.6 Providing vehicle maintenance records, brake test results, body shop estimate, and defect cards to the System Safety staff or designee.
- 3.8.7 Releasing the vehicle for repair and/or return to service.
- 3.9 The involved employee's supervisor or designee is responsible for:
 - 3.9.1 Reviewing relevant work procedures involved in the incident.
 - 3.9.2 Contacting Light Rail Technical Training and/or Light Rail Maintenance Training to verify maintenance and training records and/or certifications as applicable for major incidents or any event meeting the CPUC reportable threshold.
- 3.10 Light Rail Technical Training staff is responsible for:
 - 3.10.1 Reviewing all Operator Occurrence Reports and coding incidents preventable or non-preventable before forwarding the coded report to System Safety Department.
 - 3.10.2 Maintaining records of Roadway Worker Protection, Light Rail rulebook and hi-rail training and certification for all employees.
- 3.11 Light Rail Maintenance Training is responsible for:
 - 3.11.1 Maintaining records of classification specific training and certification for maintenance employees.
- 3.12 Maintenance Engineering is responsible for:
 - 3.12.1 Preparing and submitting mandated monthly accident reports and unacceptable hazards condition reports to the CPUC and to System Safety Department.
 - 3.12.2 Participating in post-accident vehicle impound and testing program.
 - 3.12.3 Providing technical support for accident/incident investigations.
 - 3.12.4 Conducting analysis of any system failures to determine the cause; identify applicable corrective actions.
 - 3.12.5 Assisting other VTA rail departments to maintain document configuration control of drawings and schematics of safety-critical systems and sub-systems.
 - 3.12.6 Preparing reports showing all accidents/incidents that have occurred at a specific location and providing a copy to the System Safety staff or designee.



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 4 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

- 3.13 Substance Abuse Program Manager is responsible for:
- 3.13.1 Maintaining documentation of post-accident drug and alcohol test results of employees involved in accidents/incidents.
 - 3.13.2 Sending post-accident test results to the appropriate Superintendent authorizing employees to return to work.
- 3.14 Protective Services:
- 3.14.1 Assist with scene protection and report to the VTA IC for further instructions.
 - 3.14.2 Recover CCTV footage from VTA vehicles, stations, and other VTA facilities.
- 4.0 Procedure:**
- 4.1 Notification and reporting requirements of this procedure shall be implemented when any accident/incident meets or exceeds any one of the following thresholds:
- 4.1.1 A fatality at the scene, or where an individual is confirmed dead within 30 calendar days of a rail transit-related incident.
 Note: A determination of whether a fatality was a suicide is subject to a written confirmation by the coroner.
 - 4.1.2 Injury to two or more individuals requiring immediate medical attention away from the scene.
 - 4.1.3 Property damage to rail transit vehicles, non-rail transit vehicles, other rail transit property or facilities and non-transit property that equals or exceeds \$25,000.
 - 4.1.4 A collision at an at-grade crossing.
 - 4.1.5 A mainline derailment.
 - 4.1.6 A collision with an individual on a rail right-of-way.
 - 4.1.7 A collision between a rail transit vehicle and a second rail transit vehicle, or a rail transit non-revenue vehicle.
 - 4.1.8 Any evacuation due to life safety reasons.
- 4.2 Following the report of an Accident/Incident, responsible staff shall:
- 4.2.1 Identify the primary causes.
 - 4.2.2 Interview and document involved persons and witnesses.
 - 4.2.3 List all possible factors that should be considered during the investigation. i.e.,



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 5 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

equipment and infrastructure, human factors, criminal activities (man-made security threats contributing to an accident/incident), weather conditions, geography, traffic conditions, position and status of signals, switches, cab controls, cab cutout controls, annunciators, track, wheels, braking systems sand, prior and final location of involved vehicles.

- 4.2.4 Reconstruction of accident scenes and scenario testing under similar operating conditions, when appropriate.
- 4.2.5 Require comparative analysis with similar prior accidents.

4.3 Submission of Final Report(s):

- 4.3.1 The final accident investigation report and corrective action plan must be signed and submitted to the CPUC staff by the Safety Manager within 60 days of the date of occurrence.
- 4.3.2 Should the investigation require more than 60 days to complete, the Safety Manager will provide an interim status reports to the CPUC every 30 calendar days. A written request for a 30 day extension will be submitted for the initial and all subsequent 30 days required for completion.

4.4 VTA Exhibits:

The following applicable documents, identified as VTA Exhibits when used to prepare the accident investigation report, are held and can be viewed at the following location:

Santa Clara Valley Transportation Authority (VTA)
System Safety Department
3331 North First Street
San Jose, CA 95134

- 4.4.1 Light Rail Operator Report
- 4.4.2 Supervisor Report
- 4.4.3 Post-Accident Drug Questionnaire
- 4.4.4 Unusual Occurrence Report
- 4.4.5 Law Enforcement Agency Accident Report
- 4.4.6 Transit Patrol Incident Report
- 4.4.7 Security Incident Report



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 6 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

- 4.4.8 Santa Clara County Medical Examiner-Coroner Report and Notice of Death
- 4.4.9 National Response Center Notice
- 4.4.10 Light Rail Occurrence Statistics Report
- 4.4.11 Light Rail Vehicle Defect Cards
- 4.4.12 Light Rail Vehicle Damage Report Body Shop Estimate
- 4.4.13 Minor LRV Performance Evaluation
- 4.4.14 Full Mainline LRV Performance Evaluation
- 4.4.15 LRV Maintenance Records
- 4.4.16 Way Power & Signal Maintenance Record

4.5 The final report to the CPUC shall include the following information:

- 4.5.1 Summary: Brief overview of the incident including injuries or fatalities and estimated damages.
- 4.5.2 Narrative: Detailed description of the incident including party's actions and the scope of the investigation.
- 4.5.3 Photographs
- 4.5.4 Location Map or Diagram
- 4.5.5 CCTV footage
- 4.5.6 Statements
- 4.5.7 Probable Cause
- 4.5.8 Contributing Factors
- 4.5.9 Corrective action plan to specify responsible department.

5.0 Definitions:

Investigative Supervisor -The corresponding department supervisor completing the investigation report.

6.0 Records

6.1 All VTA individuals and departments identified in Section 3.0 of this SOP with



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 7 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

document control responsibilities shall so implement same in accordance with the CPUC and FTA requirements.

- 6.2 All revisions to this document shall be approved by the Rail System Safety Review Board.
- 6.3 All Documents shall be retained according to the current Records Retention Schedule.

7.0 Appendices (included by reference):

- 7.1 CPUC General Order (G.O.) 164-D
- 7.2 OPS-PR-0025, Impound, Light Rail Vehicle Procedures
- 7.3 SOP 1.9 Light Rail Technical Training Refresher/Retraining
- 7.4 SOP 9.1 OCC Emergency Procedures
- 7.5 SOP 9.4 LRV Emergency Evacuation Procedure
- 7.6 SOP 9.13 Light Rail Emergency Guidelines
- 7.7 SOP 9.14 Light Rail Accident/Incident Investigation/Reporting Procedure.
- 7.8 SOP 9.15 Earthquake Procedures
- 7.9 Internal External Call-Out Procedure

8.0 Training Requirements:

- 8.1 All VTA individuals and departments identified in Section 3.0 of this SOP, who are charged with responsibilities in the response, investigation, management and notification of Light Rail Accidents, shall be trained by their department supervisor or Light Rail Technical Training.
- 8.2 It is the responsibility of the Chiefs, Deputy Directors, Managers and Superintendents to ensure that this procedure is adhered to, that employees have knowledge of and are trained in this procedure, and that the procedure is kept in an accessible location.

9.0 Summary of Changes:

- 9.1 Deleted text from 2nd row *This procedure contains provisions that are designed*
- 9.2 Moved the VTA Risk Manager will provide advance notification to CPUC staff for attendance at pertinent investigations, tests, interviews, meetings, and review boards. The VTA Risk Manager will provide advance notification to CPUC staff for attendance at pertinent investigations, tests, interviews, meetings, and review boards.



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 8 OF 10
04/04/2001	06/07/17	02/07/18	

RAIL OPERATIONS SOP 530 LIGHT RAIL ACCIDENT/INCIDENT INVESTIGATION/REPORTING PROCEDURES	<i>Procedure</i>	
	<i>Document Number:</i>	LRA-PR-0530
	<i>Version Number:</i>	13

- 9.3 All references to the Risk Manager have been changed to Director of Safety & Compliance.
- 9.4 Added Section 4.4 and 4.5.
- 9.5 Updated signature block
- 9.6 Added Safety Manager responsibilities
- 9.7 Added sections 3.3.5, 3.3.6, 3.3.7, and 3.3.8 to System Safety responsibilities due to CPUC comments for approval notice June 7, 2017.
- 9.8 Added section 3.9 involved employees supervisor responsibility.
- 9.9 Added section 3.10.2 to Light Rail Technical Training.
- 9.10 Added section 3.11 Light Rail Maintenance Training responsibilities.
- 9.11 Added Protective Services responsibilities.
- 9.12 Added examples of factors to section 4.2.3
- 9.13 Added “estimated damages” to section 4.5.1



<i>Original Date:</i>	<i>Supersedes:</i>	<i>Revision Date:</i>	PAGE 9 OF 10
04/04/2001	06/07/17	02/07/18	

Hamilton Station Stabilization
C20046F

(This page is intentionally left blank)