

SECTION 10
GENERAL CONSTRUCTION

10-1 GENERAL

Unless otherwise indicated, all system installation, testing, and construction workmanship shall conform to or exceed all regulations and codes indicated in Section 86-1.02, "Regulations and Code," of the Standard Specifications and the latest revisions of the regulations, codes and standards indicated herein.

NATIONAL

1. AASHTO, American Association of State Highway and Transportation Officials
2. ACI, American Concrete Institute
3. ANSI/AWS D12.1, Reinforcing Steel Welding Code
4. ANSI/AASHTO/AWS D1.1
5. ANSI/NFPA-70, National Electric Code
6. ANSI/TIA/EIA-568-A, Commercial Building Telecommunications Wiring Standard, October 1995
7. ANSI/TIA/EIA-569-A, Commercial Building Standard for Telecommunications Pathways and Spaces, October 1990
8. ANSI/TIA/EIA-606, Administration Standard for Telecommunications Infrastructure, February 1993
9. ANSI EIA/TIA-607, Commercial building Grounding and Bonding Requirements for Telecommunications
10. APA, American Plywood Association
11. AREMA, American Railway Engineering and Maintenance-of-Way Association
12. ASTM, American Society for Testing and Materials
13. FCC, Part 15, Rules and Regulations, Private Land Mobile Services
14. FCC, Part 90, Rules and Regulations, Private Land Mobile Services
15. Building Industry Consulting Services International's Telecommunications Distribution Method's Manual
16. NESC, National Electric Safety Code
17. NFA-297, Guide on Principles and Practices for Communications Systems
18. NFPA-70E, Standard for Electrical Safety Requirements for Employee Workplaces
19. NFPA-71, Central Station Signaling Systems
20. NFPA-72, National Fire Alarm Code
21. NFPA-75, Protection of Electronic Computer Data Processing Equipment
22. NFPA-101, Life Safety Code
23. NFPA-130, Fixed Guideway Transit Systems
24. NFA-297, Guide on Principles and Practices for Communications Systems
25. NFPA-780, Standard for the Installation of Lightning Protection Systems
26. A 262 Method of Test for Fire and Smoke Characteristics
27. SSPWC, Standard Specifications for Public Works Construction
28. TIA/EIA TSB67, Transmission Performance Specifications for Field Testing of Unshielded Twisted-pair Cabling Systems
29. TIA/EIA TSB72, Centralized Optical cabling Guidelines
30. TIA/EIA TSB75, Additional Horizontal Cabling Practices for Open Offices
31. Isolator for Metals Causing Electrolytic Action: Asphalt bitumen emulsion.

STATE

The following General Orders (GO) of the California Public Utilities Commission of the State of California shall apply:

1. GO 26-D, Clearances of Railroads and Street Railroads as to Side and Overhead Structures, Parallel Tracks and Crossings
2. GO 52, Construction and Operating Power and Communication Lines for the prevention or Mitigation of Inductive Interference
3. GO 75-C, Protection of Crossings at Grade of Roads, Highways and Streets with Railroads
4. GO 95, Overhead Electric Line Construction
5. GO 118, Regulations Governing the Construction, Reconstruction, and Maintenance of Walkways Adjacent to Railroad Trackage and the Control of Vegetation Adjacent Thereto
6. GO 128, Construction of Underground Electric Supply and Communication Systems
7. GO 143-A, Rules for the Design, Construction and Operation of Light Rail Transit Systems including Streetcar Operations
8. State of California Electrical Safety Orders
9. Caltrans, California Department of Transportation Standard Plans and Specifications, 2006
10. California High Voltage Electrical Safety Orders
11. State of California Industrial Safety Orders
12. State of California Building Code (CBC)

LOCAL

1. Standard Specification for Public Works Construction (SSPWC)

10-1.01 SEQUENCING RESTRICTIONS AND PARAMETERS

The Contractor shall conform their order of work to the provisions of this section, Section 5-1.05 "Order of Work," and Section 5-1.18 "Maintaining Rail Traffic," in these Special Provisions.

The Contractor has been provided with phasing plans for the proposed work. The phasing plans indicate general sequencing and restrictions and parameters for the work required.

The Contractor shall schedule and stage the work by Station Work Group as herein defined. The work within the Station Work Groups shall generally include all work to reconstruct trolley stations; reconstruct station parking areas and transit centers; track improvements including highway grade crossing replacements; railroad signaling system improvements; and overhead catenary system improvements as shown on the plans and described in these Special Provisions.

The Contractor shall prepare and submit to the Engineer a proposed plan for staging of construction ("Construction Staging Plans") for a Station Work Group according to Section 10-3, "Construction Staging Plans." The Construction Staging Plans for a Station Work Group are comprised of the "Construction Work Area Plan" and the "Traffic Control Plan."

All construction shall be performed in the sequence shown in the Contractor's approved Construction Staging Plans and according to the restrictions and parameters defined herein.

- 1) The station and track improvements are combined into Station Work Groups based on the permissible limits of single track closures. See Section 10, Attachment A for the limits of each Station Work Group.
- 2) The work for each station within a single Station Work Group shall be performed in the order listed below. See Section 8-1.06, "Time of Completion" for Station Work Group durations.
 1. Group E – Pacific Fleet, Harborside, and Barrio Logan Stations
 2. Group D – E Street, 24th Street, and 8th Street Stations
 3. Group C – Palomar Street and H Street Stations
 4. Group B – Iris Avenue and Palm Avenue Stations
 5. Group A – Beyer Boulevard Station
- 3) Upon commencement of work at any Station Work Group, the work within the Station Work Group shall be continuously and diligently pursued to Station Substantial Completion, as defined in this section, within the durations specified in Section 8-1.06, "Time of Completion."
- 4) Work at San Ysidro Station shall be completed concurrent with Group C or B work. At no time shall San Ysidro Station be under construction concurrent with Station Work Groups E, D or A.
- 5) Single track closures shall be permitted in only one Station Work Group at a time.
- 6) Construction of the precast concrete platform turndown at each station is required prior to construction of any station area track work.
- 7) Station area track work shall include construction of track and reconnection of the signaling system, track utility/pipe crossings, and grade crossings within the limits shown in the plans.
- 8) Prior to commencing work in a subsequent Station Work Group, the Contractor shall:
 - (a) Notify the Engineer, in writing, at least 30 days in advance of anticipated start date,
 - (b) Have requested in writing, and received, written acceptance from the Engineer that the construction of all station area track work in the current Station Work Group has been completed, and
 - (c) Have received written approval of the Construction Staging Plans for all work within the subsequent Station Work Group as defined in Section 10-3 "Construction Staging Plans" of these Special Provisions.
- 9) The Engineer's written notification acceptance, as described in 8 above, shall specify the start date for the subsequent Station Work Group. The duration specified in Section 8-1.06, "Time of Completion" for that Station Work Group shall commence on the date specified.
- 10) Work activities at more than three (3) Station Work Groups at one time are prohibited.

- 11) Unless otherwise prohibited in these Special Provisions, work may be performed 24 hours per day, 7 days per week.
- 12) Flaggers shall be required for any entry by the Contractor into the track Right of Way, including crossing of the tracks. Refer to Section 5-1.18 "Maintaining Rail Traffic.
- 13) The following restrictions and parameters apply to single track closures:
 - a) The existing signaling system shall remain in service on the operating track to permit bi-directional operations on the operating track.
 - b) Any track removed from service shall be limited to a single track direction within a Station Work Group.
 - c) Construction activities during single track operations require accessible trackside boarding for reverse running trains, see phasing plans and Section 10-3.01-3 "Minimum Operational Standards" for details.
 - d) Contractor shall coordinate and cooperate with additional flaggers and/or station ambassadors that may be on-site to assist the public during single track closures. Refer to Section 5-1.18 "Maintaining Rail Traffic."
 - e) Contractor shall take special care to maintain the integrity of the existing track section during precast concrete turndown construction and shall demonstrate their approach in their Construction Area Work Plan.
 - f) Contractor shall take special care to maintain the integrity of the precast concrete turndown during construction of all station area track work and shall demonstrate their approach in their Construction Area Work Plan.
 - g) Contractor shall take special care to maintain the integrity of operational track sections during other nearby track section construction and shall demonstrate their approach in their Construction Area Work Plan.
- 14) Revenue operations shall be transferred to temporary platforms no less than 5 business days before the start of single track activities at each station. The temporary platforms shall be constructed and ready for use for revenue operations according to Section 10-3.01-5, "Provisions for Temporary Platforms and Temporary Grade Crossings." The Contractor shall request approval from the Engineer, in writing, no less than 5 business days prior to the transfer of MTS Trolley revenue operations from the existing platform to the temporary platform. Revenue operations for a station within a Station Work Group shall be transferred from the existing platform to the temporary platform progressing sequentially from one station to the next in a southerly direction. The minimum criteria for transfer of revenue operations to the temporary platform shall mean that:
 - a) The operational components are in place and functional on the temporary platform per Section 10-3.01-3 "Minimum Operational Standards" and the phasing plans.
 - b) Temporary platform lighting is completely in place and functioning.
 - c) Electrical service is completely in place and functioning to all temporary Ticket Vending Machines and Fare Validating Devices, which will be installed by MTS.
 - d) Temporary platform paving is completely in place and functioning including, but not necessarily limited to, the installation of detectable warning pavers along the full length of platforms, pedestrian curb ramps, tactile surfaces, and accessible path signage per ADA requirements.

- 15) The phasing plans identify requirements for relocating bus stops within a station site. Relocated temporary bus stops within a station site shall be provided as shown in the phasing plans prior to and during when temporary platforms are used for MTS Trolley revenue operations. Coordination of transferring temporary bus operations and trolley operations from their respective existing, temporary, and permanent locations shall be reflected within the Contractor's approved Progress Schedule and Construction Staging Plans.
- 16) The Contractor shall request, in writing, and receive acceptance from the Engineer prior to the transfer of MTS Trolley revenue operations from the temporary platform to the permanent platform and the subsequent removal of the temporary platform. Revenue operations for a station within a Station Work Group shall be transferred from the temporary platform to the permanent platform progressing sequentially from one station to the next in a southerly direction. Notification to the Engineer shall be made 5 business days prior to transfer. The minimum criteria for acceptance of the permanent platform for revenue operations shall mean that:
 - a) The operational components are in place and functional on the permanent platform per Section 10-3.01-3 "Minimum Operational Standards" and the phasing plans.
 - b) Platform lighting is completely in place and functioning in accordance with the specifications.
 - c) Electrical service is completely in place and functioning to all Ticket Vending Machines and Fare Validating Devices.
 - d) One working payphone is in place and functioning.
 - e) All underground electrical, handholes, and pullboxes are completely in place with covers.
 - f) Platform paving is completely in place and functioning including, but not necessarily limited to, the installation of detectable warning pavers along the full length of platforms, pedestrian curb ramps, tactile surfaces, and accessible path signage per ADA requirements.

For the 8th Avenue and Beyer Boulevard Stations, the minimum criteria for acceptance of the permanent platform for revenue operations applies to the portion of the permanent platform not overlapping with the temporary platform, as show in the plans.

- 17) The Contractor shall cooperate and allow access for the Traction Power Substation (TPSS) Construction Project Contractor as described in Section 8-1.06, "Time of Completion." Coordination with the TPSS Project Contractor shall proceed according to Section 7-6.01, "Cooperation and Coordination."
- 18) The Contractor shall cooperate and allow access for the rail procurement contractor as described in Section 11-2.01, "Trackwork Materials, Owner Furnished." Coordination with the rail procurement contractor shall proceed according to Section 7-6.01, "Cooperation and Coordination."
- 19) The Contractor shall be responsible for protecting all work and maintaining the station area between the day the Contractor starts work at a station area and Station

Substantial Completion. Maintaining the station area shall be in accordance with the minimum operational platform and site requirements per Section 10-3.01-3 "Minimum Operational Standards." and shall mean collecting and removing trash on a daily basis, cleaning the existing, temporary, or permanent platform surface once a week, removing graffiti, watering and maintaining landscaping, maintaining lighting and other general maintenance functions typically performed by MTS.

- 20) The stations, including platform, parking lot, transit center and station area shall remain open at all times during revenue service.

Station Substantial Completion shall be defined as the state at which the work at a Station (the station platforms, site work in the vicinity of the station, station area track work, parking lots, and transit centers/bus facilities), is complete, in accordance with the Contract Documents. The Engineer shall be the sole determinant of Station Substantial Completion.

The following requirements apply to Station Substantial Completion:

1. Contractor has completed all work at the Station including final cleanup; and
2. The Engineer, in the company of the Contractor, shall inspect the Station. During the joint inspection, the work shall be examined and quality control documentation shall be reviewed. The Contractor shall prepare a written list of outstanding items, if any, to be completed or corrected before issuance of Station Substantial Completion. The list shall be approved by the Engineer and included in the QA/QC documentation with an agreed date of correction for each deficiency. The Contractor shall complete or correct the outstanding items, if any, to be done before issuance of Station Substantial Completion and request re-inspection by the Engineer in writing. The Engineer shall re-inspect the Station within 5 working days after receipt of the Contractor's request for re-inspection.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed.

10-1.02 OBSTRUCTION AND UNDERGROUND FACILITIES

Attention is directed to the provisions in Section 8-1.10, "Utility and Non-Highway Facilities," and Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions.

The Contractor's attention is directed to the existence of certain underground facilities that may require special precautions to be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: overhead electrical wires; conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi (gage); underground electric supply system conductors or cables either directly buried or in duct or conduit that do not have concentric neutral conductors or other effectively grounded metal shields or sheaths; and underground electrical grounded metal shields or sheaths; and underground electrical conductors with potential to ground more than 300 volts.

The Contractor shall notify the Engineer and

Underground Service Alert (USA)	811
Sewer: City of Chula Vista Wastewater	(619) 397 – 6000
Sewer: City of San Diego Metro Waster	(619) 292 – 6300
Sewer: City of National City Sewer	(619) 336 – 4587
Water: Sweetwater Authority	(619) 420 – 1413
Water: City of San Diego Water	(619) 527 – 7482
Gas: San Diego Gas and Electric	(858) 636 – 6856
Phone: AT&T	(619) 266 – 4651
Cable: COX Cable	(619) 263 – 9251 ext. 5125
Fiber Optic: Sprint	(800) 659 – 9698
Cable Pipe and Leak Detection	(619) 574 – 0844
Cable Pipe and Leak Detection	(619) 574 – 0171
SANDAG Commute (Bike Lockers)	(619) 515 - 1177

at least two working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure.

The Contractor shall locate existing signal wires, track circuits, platform lighting cables, irrigation lines, Sprint, and other MTS underground facilities as necessary to complete the improvements without damage to existing facilities. The contractor shall have said facilities located and marked out by

Cable, Pipe& Leak Detection (CPL) (619) 595-4938

or other approved utility locating subcontractor familiar with MTS facilities. Any work on the underground facilities shall be coordinated with the Engineer. If the Contractor cannot protect in-place existing underground facilities, the Contractor shall replace any damaged or removed underground facilities in a timely manner as to not allow for extended delays to the trolley services. If the services are subject to extended delays, the Contractor shall notify MTS prior to the expiring of the original scheduled work time. All underground facilities located shall be as-built and included on the contractor's as-built drawings.

The Contractor's attention is directed to the existence of overhead power lines, energized trolley wires, catenary poles, signals and grade-crossing signals at the locations of work. Any one or a combination of these obstructions could exist at any one location. No obstructions shall be permitted within 10 feet of operating tracks.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section, including underground location services, not otherwise provided for, shall be considered as included in the contract prices paid for various items of work involved, and no additional compensation will be allowed therefore.

10-1.03 DUST CONTROL

Dust control shall conform to the provisions of Section 10, "Dust Control," of the Standard Specifications, and these Special Provisions. However, the Contractor shall endeavor, whenever possible, to restrict the use of water to control dust for his convenience due to the current need to conserve water.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.04 DEVELOP WATER SUPPLY

Developing a water supply and applying watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications and these special provisions. Existing LRT station water supply system shall not be used for construction purposes.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.04.A CONSTRUCTION AREA LIGHTING

During the hours of darkness, all working areas utilized by the Contractor to perform work shall be lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders.

All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic and shall not be directed parallel to the track to avoid interfering with the vision of the train crews. In addition, lighting fixtures shall not obscure any railroad signals.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.05 PROJECT APPEARANCE

The contractor shall maintain a neat appearance to the work at all times. In any area visible to the public, the following shall apply:

Broken concrete and debris developed during construction operations shall become the property of the Contractor and be disposed of concurrently with its removal. No stockpiling of demolition materials or debris will be permitted within the MTS right-of-way.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section, not otherwise provided for, shall be considered as included in contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.06 WASTE MANAGEMENT

SOLID WASTE

Do not allow litter or debris to accumulate anywhere on the platform, including storm drain grates, concrete debris, construction materials, trash racks, and ditch lines. All products to be included in the construction shall not be stored on the platform. All material must be stored at ground level. Pick up and remove trash and debris from the platform daily. Contractor must monitor solid waste storage and disposal procedures on the job site.

If practicable, recycle nonhazardous job site waste and excess material. If recycling is not practicable, disposal must comply with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

Furnish enough closed-lid dumpsters of sufficient size to contain the solid waste generated by work activities. When refuse reaches the fill line, empty dumpsters. Dumpsters must be watertight. Do not wash out dumpsters at the job site. Furnish additional containers and more frequent pickup during the demolition phase of construction.

Solid waste includes:

1. Brick
2. Mortar
3. Timber
4. Metal scraps
5. Sawdust
6. Pipe
7. Electrical cuttings
8. Non-hazardous equipment parts
9. Styrofoam and other packaging materials
10. Vegetative material and plant containers from highway planting
11. Litter and smoking material, including litter generated randomly by the public
12. Other trash and debris

Furnish and use trash receptacles on the platform, field trailers, and locations where workers gather for lunch and breaks.

HAZARDOUS WASTE

For hazardous material encountered in excavation, the Contractor is directed to Section 10-5.04, "Hazardous Waste In Excavation," of these Special Provisions. For all other hazardous waste encountered in or generated by all other construction activities, the contractor is directed to this Section (10-1.08) of the Special Provisions.

Use hazardous waste management practices if waste is generated on the job site from these substances:

1. Petroleum products
2. Asphalt products
3. Concrete curing compound
4. Pesticides
5. Acids
6. Paints
7. Stains
8. Solvents
9. Wood preservatives
10. Roofing tar
11. Road flares
12. Lime
13. Glues and adhesives
14. Materials classified as hazardous by California Code of Regulations, Title 22, Division 4.5; or listed in CFR Title 40, Parts 110, 117, 261, or 302

Contractor's WPC manager must oversee and enforce hazardous waste management practices. Minimize the production of hazardous materials and hazardous waste at the job site. If damaged, repair or replace perimeter controls, containment structures, and covers.

If hazardous material levels are unknown, use a laboratory certified by the Environmental Laboratory Accreditation Program (ELAP) under the California Department of Public Health (CDPH) to sample and test waste to determine safe methods for storage and disposal.

Separate potentially hazardous waste from nonhazardous waste at the job site. Hazardous waste must be handled, stored, and disposed of under California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

Store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated under California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Keep hazardous waste containers in temporary containment facilities under "Material Storage" of these special provisions.

Furnish containers with adequate storage volume at convenient locations for hazardous waste collection. Do not overfill hazardous waste containers. Do not mix hazardous wastes. Do not allow potentially hazardous waste to accumulate on the ground. Store containers of dry waste that are not watertight on pallets. Store hazardous waste away from storm drains, watercourses, moving vehicles, and equipment.

Clean water based or oil based paint from brushes or equipment within a contained area and in a way that does not contaminate soil, watercourses, or storm drain systems. Handle and dispose of these as hazardous waste: paints, thinners, solvents, residues, and sludges that cannot be recycled or reused.

When thoroughly dry, dispose of these as solid waste: dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths.

Dispose of hazardous waste within 90 days of being generated. Use a licensed hazardous waste transporter to take hazardous waste to a Class I Disposal Site. Submit a copy of uniform hazardous waste manifest forms within 24 hours of transporting hazardous waste.

Contractor must inspect these daily:

1. Storage areas for hazardous materials and wastes
2. Hazardous waste disposal and transporting activities
3. Hazardous material delivery and storage activities

CONCRETE WASTE

Use practices to prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Collect and dispose of portland cement concrete, AC, or HMA waste at locations where:

4. Concrete material, including grout, is used
5. Concrete dust and debris result from demolition
6. Sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry
7. Concrete truck or other concrete-coated equipment is cleaned at the job site

SANITARY AND SEPTIC WASTE

Do not bury or discharge wastewater from sanitary or septic systems within MTS right of way. Contractor must inspect sanitary or septic waste storage and monitor disposal procedures at least weekly. Sanitary facilities that discharge to the sanitary sewer system must be properly connected and free from leaks. Place sanitary facilities at least 50 feet away from storm drains, watercourse, and flow lines.

Obtain written approval from local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system, and submit a copy to the Engineer. Comply with local health agency provisions while using an on-site disposal system.

LIQUID WASTE

Use practices to prevent job site liquid waste from entering storm drain systems or watercourses. Liquid wastes include the following:

8. Drilling slurries or fluids
2. Grease-free or oil-free wastewater or rinse water
3. Dredgings, including liquid waste from drainage system cleaning
4. Liquid waste running off a surface including wash or rinse water
5. Other non-storm water liquids not covered by separate permits

Hold liquid waste in structurally sound, leak proof containers such as:

1. Roll-off bins
2. Portable tanks

Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills and leaks.

Store containers:

1. At least 50 feet from moving vehicles and equipment
2. If within the floodplain, at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, or storm drain inlets unless approved
3. If outside the floodplain, at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, or storm drain inlets unless approved

Remove and dispose of deposited solids from sediment traps under "Solid Waste" unless the Engineer authorizes another method.

Liquid waste may require testing to determine hazardous material content before disposal.

Drilling fluids and residue must be disposed of outside the MTS right of way.

If an approved location is available within the job site, fluids and residue exempt under California Code of Regulations, Title 23, Section 2511(g) may be dried by evaporation in a leak proof container.

Dispose of remaining solid waste under "Solid Waste" of these special provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for waste management shall be considered included in the contract prices paid for the various items of work requiring waste management and no additional compensation will be allowed therefor.

10-1.07 CONTRACTOR STORAGE AND LAYDOWN AREA

The Contractor shall be responsible for arranging for storage of materials and laydown area other than as described herein.

The Contractor may arrange with MTS for storage of materials in the Palm Avenue Station Parking Lot. The laydown area will generally be in the north portion of the lot and be approximately 100 by 200 feet (20,000 square feet), and will be made available to the Contractor without charge. The final location and shape of the area shall be determined by MTS and the Engineer. MTS and the Engineer will delineate the path of access to the laydown area that shall be used by all Contractor vehicles. No contractor equipment or vehicles shall be parked outside the fenced laydown area. The Contractor's employees may park their private vehicles outside the laydown area; however, MTS may require Contractor employees to park in specific areas or display special parking permits or stickers. The Contractor may arrange with MTS for storage of materials at other existing station parking lots (Alternate sites), however, no guarantee can be provided for any location other than Palm Avenue Station.

The use of these sites, other than Palm Avenue Station, is solely at the Contractor's option, and the Contractor shall be responsible for any permits, including updates to SWPPP and NOI required by the

RWQCB, security, lighting, fencing (with privacy slats or screens), utilities or other temporary measures required to properly utilize the site(s) as a construction staging and laydown area, including installation and maintenance of additional erosion BMP measures required to prevent sedimentation runoff from the site. All temporary improvements shall be removed at the completion of construction, and no permanent improvements at the site(s) will be allowed. The Contractor shall notify the Engineer in writing and accept full responsibility and liability for use of the site(s) during the construction period, including returning it to its original condition, and neither SANDAG nor MTS shall be liable for any claims resulting from Contractor's use of the site(s).

If the Contractor elects to use the Alternate site(s), the Contractor shall prepare a construction staging area site plan indicating exact location, dimensions, fencing, paving, ingress and egress routes and other temporary measures proposed for the site(s), however, MTS and the Engineer retain the rights to modify the location, shape, and access, to the site(s). The site plan shall be submitted to Engineer for review along with the Construction staging Plan, and no work shall take place at the site(s) until the site plan has been reviewed and approved by the Engineer.

The Contractor will be permitted to temporarily store track materials within the MTS right-of-way adjacent to the work, subject to the following:

1. Track material (except rail) shall be brought onto the site on a daily basis in sufficient quantity to complete construction operations on that day. Any excess materials shall be removed from the right-of-way daily.
2. Rail shall be brought onto the site and stored as indicated in Section 11, "Trackwork."
3. Track materials (i.e., rails and crossties) shall be bundled or stacked neatly and crosstie clips, pads, insulators, tie plates, rail anchors, and spikes shall be stored in suitable containers, etc.
4. Access must be maintained at all times to the entrance to the Trolley stations, and parking areas adjacent to the MTS right-of-way.
5. Track materials shall be located so as not to encroach within the CPUC required clearances from operating tracks.
6. Excess materials shall be removed from the right-of-way as soon as feasible after they are determined not required in the work.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.08 SITE CONDITIONS AND ACCESS

Contractor shall arrange a meeting on-site with the Engineer a minimum of 48 hours in advance of the start of construction at each station and examine the station area including any adjacent track and grade crossing work at and in the vicinity of that station and examine the job-site areas and conditions

under which work of this section will be performed. The Contractor shall notify the Engineer in writing, within 24 hours following the on-site meeting, of all discrepancies between the existing site conditions and those shown on the contract drawings. Contractor's failure to provide written notification to the Engineer will indicate that no discrepancies exist.

All project sites are accessible through public right of way.

Contractor is to maintain access to adjacent properties at all times. Disruption to these business activities shall be kept to a minimum. The contractor shall communicate in advance with each property owner/tenant affected by its operations prior to the start of work. In addition, the contractor shall maintain a proactive relationship with the area merchants and inform them weekly of the construction schedule to assure that impacts to their businesses are kept at a minimum throughout the contract period.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-1.09 PROTECTION OF EXISTING FACILITIES

1. Preservation of Property

Contractor shall maintain access to adjacent properties at all times. Disruption to these business activities shall be kept to a minimum.

Contractor shall construct painted white 4' x 6' plywood signs with black lettering indicating 'Open for Business' for each business affected by the traffic control. The signs shall be clearly visible and maintained for the duration of construction activities affecting each business. Each business affected shall receive an individual sign. For businesses at the 24th Street Station the contractor shall coordinate deliveries and vehicular and pedestrian access during construction of station, transit center and parking lot. Payment for signage and coordination with existing businesses shall be included in the lump sum price for Traffic Control.

The Contractor shall communicate in advance with each property owner/tenant affected by its operations prior to the start of work. In addition, the contractor shall maintain a proactive relationship with the area merchants and inform them weekly of the construction schedule to assure that impacts to their businesses are kept at a minimum throughout the contract period. Costs for this communication effort shall be considered included in the various items of work.

2. Protection

The Contractor shall protect existing work which is to remain in place, that is to be reused, or which is to remain the property of the owner by temporary covers, shoring, bracing, and supports. Items which are to remain or are to be salvaged which are damaged during performance of work shall be repaired to their original condition or replaced with new by the Contractor at no additional cost to the owner. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal work.

The Contractor shall protect all services and utilities which are to remain. Where removal of existing buildings, utilities, and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical utilities.

The Contractor shall use extra caution in the excavation adjacent to existing utilities. Existing high voltage electrical lines and communications lines are present in the area. Existing AC water mains shall remain in operation during construction and the contract shall utilize extreme caution in the protection in place of the main during excavation for the installation and compaction of structural soil. Prior to proceeding with the excavation and compaction of the structural soil adjacent to the AC water main, the contractor shall submit the work plan for approval by the inspector.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, therefore no additional compensation will be allowed.

10-1.10 SOUND CONTROL

Sound control shall conform to the provisions in Section 7-1.01J, "Sound Control Requirements," of these Special Provisions. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise levels. For any night work, the Contractor will be required to obtain a Noise Permit from the City of San Diego, Development Services (telephone 619-446-5000).

The Contractor will be required to limit construction noise according to the San Diego City Municipal Code. Details are available at the San Diego City website.

<http://www.sandiego.gov/nccd/noise>

Specifically, the Contractor shall limit noise during operations near residential buildings and during night and weekend construction. Permits may be required from the City of San Diego in order to be in compliance with local laws. The Contractor shall acquire all necessary permits and shall coordinate with all businesses and residences as needed to keep construction noise to a minimum.

The Contractor shall comply with all relevant portions of the Chula Vista Municipal Code (CVMC) as they pertain to Noise Control to include types of activities, noise/sound levels, and permissible hours of operation. Attention is specifically drawn to Chapters 17.24, "Noisy and Disorderly Conduct," and 19.68, "Performance Standards and Noise Control," of the CVMC. Permits from the City of Chula Vista may be required in order to be in compliance with the local municipal code. The Contractor shall comply with the permitting requirements of the City.

The Contractor shall comply with all relevant portions of the National City Ordinances as they pertain to Noise Control to include types of activities, noise/sound levels, and permissible hours of operation.

Attention is specifically drawn to Title 12, "Noise Control," of the National City Ordinances. Permits from National City may be required in order to be in compliance with the local municipal code. The Contractor shall comply with the permitting requirements of the City.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section, including obtaining any permits required, shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-1.11 CONSTRUCTION SURVEYING

All field construction surveying required for accurate location of the various items of work on the contract shall be furnished by the Contractor. For track rehabilitation, the elevation and alignment of the new track shall, generally, be based on the location of the existing tracks as indicated on the plans. The Contractor shall provide the Engineer with the location and elevation of the existing track extending 100 feet beyond the project limits.

Construction staking shall be in conformance with Chapter 12 of the Caltrans Surveys Manual, dated September 2006. Legible copies of all construction operations staking sheets shall be provided to the Engineer two days before construction work is started at each location.

All field construction surveying required for accurate location and the construction of the various items of work under the contract shall be performed and furnished by the Contractor.

Prior to beginning construction operations in the field, the Contractor shall tie out all such project control monuments for use in reconstructing project control monuments lost or disturbed during construction. Survey notes of control ties shall be submitted to the Engineer prior to starting construction operations in the field.

The Contractor shall notify the Engineer, in writing, 24 hours in advance of any construction staking.

The Contractor shall be responsible for preparing and filing with the San Diego County Surveyor a Corner Record of the references to existing monuments within the area of each street or highway to be reconstructed under this contract, prior to any reconstruction, as required by Section 8771 of the Business and Professions Code (January 1, 1995).

The Contractor shall also replace all disturbed existing property corner markers, monuments, and local agencies' well monuments disturbed during construction operations. These new markers, monuments, and well monuments shall be documented by a record of survey map or corner record prepared in accordance with Section 8771 of the Business and Professions Code and all applicable laws and regulations, and filed in the Office of the County Recorder of San Diego County at the Contractor's expense.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for furnishing all construction surveying, replacing all existing property corners, monuments and well monuments, filing and recording necessary record of survey maps and layout of the work shall be considered as included in the contract prices paid for the various items of work, and no additional compensation will be allowed therefore.

10-1.12 SUBMITTALS

Submittals and Shop Drawings shall be made in accordance with Section 5-1.02, "Plans, Working Drawings, and Submittals" of the Special Provisions.

Submit manufacturers' catalog data, cut sheets, and certifications as appropriate for all contractor furnished materials for approval by the Engineer.

The contractor shall submit a complete list of required submittals for approval by the Engineer. Attention is directed to Section 5-1.02, "Plans, Working Drawings, and Submittals" regarding additional requirements.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-1.13 COORDINATION

The Contractor shall coordinate and schedule the loading, hauling, unloading, and setting of the material and equipment with the Engineer. The Contractor shall be responsible for preparing plans for traffic detours and obtaining permits to move oversized material and equipment on roads and highways.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-1.14 QUALITY ASSURANCE

The Contractor shall work in accordance with the plan submitted and approved under Section 5-1.24, "Contractor's Quality Control (CQC) Plan."

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-1.15 PERMITS AND RIGHT-OF-WAY REQUIREMENTS

All permits and rights-of-way needed for performance of the Work shall be obtained by the Contractor.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-1.16 GROUND WATER AND DEWATERING

Work shall consist of dewatering as needed for the various items of work shown on the plans and as specified in these Special Provisions.

The Contractor shall note that a current environmental site assessment has not been performed and a potential for ground water contamination might exist.

The Contractor is advised of the potential for a high level of ground water in certain portions of the project area. Groundwater has previously been found to range from approximately 11 to 13 feet below ground surface. The ground water levels should be expected to fluctuate in response to tide, rainfall runoff, nearby irrigation, leaks in water, sewer, or storm drain pipes, and/or changes in nearby extraction patterns. The estimated high ground water level is approximately 6 to 11 feet below finished grade depending on location. The geotechnical reports prepared by Ninyo and Moore entitled, "Geotechnical Evaluation, Blue Line LRT Station Improvements, San Diego, National City, and Chula Vista, California" dated March 3, 2011 and "Geotechnical Evaluation, Harborside Station, Blue Line Station Improvements, San Diego, California" dated January 26, 2012, contain information about groundwater elevations encountered during drilling. These geotechnical reports are for information only and the Contractor may use the information contained within them at his/her own risk.

Groundwater may be discharged to the City of San Diego sanitary sewer system under the industrial Waste Discharge Program or to a storm drain under a National Pollution District Elimination System NPDES permit from RWQCB. For the stations within the jurisdictions of National City and Chula Vista, the Contractor shall confirm the acceptable way to dispose of ground water from de-watering.

Discharge to either the sewer or storm drain will require initial and periodic analysis by the Contractor as required by the permit and may require pretreatment and/or removal of contamination. Should the testing conducted by the Contractor identify hazardous material in the ground water, the Contractor shall immediately notify the Engineer in writing. The Contractor will be responsible for obtaining all required permits for disposal of ground water prior to discharging water.

Information regarding discharges to the City of San Diego sanitary sewer system can be obtained by contacting Chris Donaldson at (858) 654-4119.

NPDES discharge requirements are contained in RWQCB Order 95-25, NPDES NO. CAG919001, "General Waste Discharge Requirements for Groundwater Extraction and Similar Waste Discharges to

San Diego Bay and Storm Drains or Other Conveyance Systems Tributary Thereto." Both agencies require time to review the discharge authorization requests. The Contractor is responsible for obtaining permits, pumping and treating water and discharge monitoring. The Contractor shall discharge at all times in compliance with the discharge authorization. Treated water and discharge volumes shall be measured using a totalizing flow meter.

Measurement and Payment

Measurement of work performed under this section shall be per the provisions of Section 4-1.030, "Extra Work" of the Standard Specifications.

Payment for dewatering, including treatment of extracted groundwater prior to discharge, permits, analysis, pumping, and discharge fees will be made in accordance with the provisions of Section 4-1.030, "Extra Work," of the Standard Specifications.

10-2 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications and these Special Provisions. Staging and stockpiling of equipment and materials shall be within the limits of work as shown on the plans, unless said otherwise.

Measurement and Payment

Mobilization will be measured for payment as a lump sum.

The contract lump sum price paid for "Mobilization" shall be in accordance with Section 11-1.02, "Payment" of the Standard Specifications.

10-3 CONSTRUCTION STAGING PLANS

The Contractor shall prepare and submit to the Engineer a proposed plan for staging of construction ("Construction Staging Plans") for all work within a Station Work Group. The Construction Staging Plans for a Station Work Group are comprised of the "Construction Work Area Plan" and the "Traffic Control Plan."

1. The Construction Area Work Plan addresses all aspects of construction other than traffic control. The Construction Area Work Plan includes provisions for maintaining a minimum operating platform and station site, provisions for maintaining pedestrian traffic, provisions for temporary platforms and temporary grade crossings, and a single track work plan. (See Section 10-3.01.1, "Construction Area Work Plan").
2. The Traffic Control Plan addresses all aspects of construction related to vehicular traffic on public roads, including road and lane closures. (See Section 10-3.02, "Traffic Control Plan").

The Contractor shall prepare and submit to the Engineer the Construction Staging Plans for all work within a Station Work Group a minimum of 30 working days prior to commencing work in a Station Work Group. For Station Work Group E, the Contractor shall submit to the Engineer the Construction

Staging Plans within 20 working days of NTP. For all Station Work Groups, the Contractor shall allow up to three (3) weeks for the Engineer's review after the Staging Plans are submitted.

The submitted Construction Staging Plans prepared by the Contractor shall conform to the plans, standard specifications, these special provisions, and the Contractor's approved baseline schedule, and shall accommodate all required station area operations and the given time frames for work, and shall be approved by the Engineer prior to commencing work. Any proposed changes to an approved staging plan for a Station Work Group must be submitted to the Engineer for approval 5 business days before being enacted.

10-3.01 CONSTRUCTION AREA WORK PLAN

10-3.01.1 GENERAL

3. All phases of construction shall maintain minimum operational standards, see Section 10-3.01.2 "Minimum Operational Standards"
4. All phases of construction shall maintain pedestrian, vehicular and rail traffic. See Section 10-3.01.3 "Maintaining Pedestrian Traffic," Section 5-1.19 "Maintaining Vehicular Traffic," and Section 5-1.18 "Maintaining Rail Traffic."
5. The Construction Area Work Plan shall include an individual plan sheet (minimum of 11"x17") for each of the Contractor's proposed stages in the construction as well as notes describing the work activities proposed for each stage. Each stage plan sheet shall also include the following information:
 1. The overall site construction limits
 2. Property and easement lines
 3. Proposed work areas
 4. The stage limits of construction
 5. Track centerlines
 6. The limits and features of the operational platform for each stage (using the existing platform, temporary platform, or permanent platform as permitted)
 7. Existing and/or proposed linework of defining elements including curbs, striping, and buildings. Grade contours or landscaping shall not be shown unless necessary to depict critical elements of a particular stage.
 8. Temporary striping, if applicable, to demonstrate minimum required parking per the phasing plans provided
 9. Temporary access modifications, if applicable
 10. Applicable improvements for construction operations such as daily laydown areas, trailer and boxcar locations, haul routes, work platforms (including flooding track bed with temporary ballast and temporary asphalt track pavement), and track crossings dedicated to construction traffic
 11. Temporary bus routing and bus facilities, if applicable
 12. Temporary ADA accessible routes specific to the stage connecting the locations identified in the phasing plans
 13. Temporary drainage improvements, as applicable
 14. Temporary erosion and sedimentation control measures
 15. Estimated duration of stage

16. General list of concurrent construction activities at other stations or outside of the stage limits within the applicable Station Work Group
17. Provisions for temporary grade crossings, if applicable
18. Provisions for temporary platforms, if applicable
19. Public signage to inform pedestrians and the motoring public of continued trolley and bus service. This signage shall be provided according to Caltrans Standards Plans RS1-RS4, Sections 12, Section 56 and shall include not less than one portable changeable message sign per station.

10-3.01.2 MINIMUM OPERATIONAL STANDARDS

The Contractor shall maintain a “Minimum Operational Platform” and a “Minimum Operational Site” at each station as indicated in these Special Provisions and the plans. The Minimum Operational Platform standards shall apply to the revenue operations use of temporary platforms, existing platforms, or permanent platforms. The Construction Area Work Plan for each station in a Station Work Group shall identify compliance with each minimum requirement.

MINIMUM OPERATIONAL PLATFORM

1. Minimum 8’ width x 245’ length or as shown in the plans.
2. A Minimum Operational Platform for the EB track and WB track as shown in the plans.
3. Track side face of platform shall be offset 4.83’ from track centerlines.
4. For the existing or temporary platforms, the entire platform front edge shall be set at the adjacent top of rail elevation.
5. For the new permanent platform, the entire platform front edge shall be operational up to 8” above the adjacent rail elevation.
6. Two (2) 20’ wide temporary pedestrian grade crossings at each end of the minimum operating platform per plan.
7. Platform and grade crossings shall meet the requirements of California Access Requirements Manual and provide a maximum 1.8% grade in all directions.
8. Wheelchair lift landing zones sized, marked, and located relative to platform as shown in the plans.
9. Directional bar mat placed relative to ADA marking as shown in the plans.
10. 8 inch black warning stripe with “Stand Behind Line” wording (spaced at 25’ centers) in white 4” letters on black background provided for full length of platform and grade crossings
11. 2’ temporary detectable warning provided full length of platform and grade crossings. Temporary detectable warning shall be a surface applied detectable warning tile, Surface Mount Composite Tiles, by ADA Solutions, Inc., or approved equal. The specified tile shall be salvaged to MTS following removal. The specific tile shall be applied in accordance with the manufacturers’ recommendations, including anchors designed for installation in asphalt concrete.
12. Minimum 4’ wide ADA clearance provided around utility pole, guy wire, and other conflicts located within the platform limits

13. A temporary passenger shelter shall be provided in each track direction and centrally located, unless otherwise shown in the phasing plans
14. Benches (2 per platform), information kiosks (1 per platform), trash receptacles (2 per platform), and shelters as shown in the phasing plans.
15. Minimum illumination of 1.8 ft-candles provided for entire platform. Fixtures within salvaged shelters shall be powered.
16. Temporary power feeds and 12 strand fiber optic cable for relocated Ticket Vending Machines (TVMs) and Passenger Card Interface Devices (PCIDs). The Contractor shall coordinate with MTS for the installation of TVMs and PCIDs on each minimum operating platform. The 12 strand fiber optic cable and power source shall be run through new or existing conduit or overhead on existing catenary poles from the communications room or enclosure to each proposed TVM or PCID location. An alternate power source may be proposed for approval by the Engineer.
17. The Contractor shall submit to the Engineer the plan for maintaining a minimum operational platform on the existing platform. After written approval is received from the Engineer the Contractor may commence construction/demolition activities on the existing platform
18. The Contractor shall receive written approval from the Engineer prior to moving revenue operations to the temporary platform.
19. The Contractor shall submit to the Engineer the plan for a minimum operational platform on the proposed platform. The Contractor shall receive written approval from the Engineer prior to moving revenue operations to the permanent platform.

MINIMUM OPERATIONAL SITE

1. Includes a Minimum Operational Platform
2. Bus service and access for busses to the site shall be maintained for duration of construction unless otherwise indicated in phasing plans. Contractor shall submit temporary bus routes for approval to MTS minimum 4 weeks in advance of need.
3. Contractor shall provide pedestrian routes in accordance with Section 10-3.01.4 "Maintaining Pedestrian Traffic," Section 7-1.08 "Public Convenience," and Section 7-1.09 "Public Safety."
4. Contractor shall provide minimum illumination of 1.8 ft-candles for all temporary access routes, parking areas, and bus platforms. Existing site fixtures shall be powered.
5. Contractor shall provide portable bicycle racks with capacity for a minimum of ten bicycles at H Street, Palm Avenue, and Iris Avenue stations. Contractor shall provide portable bicycle racks with capacity for a minimum of five bicycles at all other stations (except San Ysidro). Location of the bicycle racks shall be identified in the Contractor's Construction Staging Plans. The location shall be within the limits of the station site and adjacent to a maintained sidewalk or walkway with access to both the minimum operational platform and the adjacent public right-of-way.
6. Contractor shall provide minimum of one vehicular access point between the public right-of-way and the parking lot for the duration of construction unless otherwise indicated on the phasing plans.

7. Contractor shall provide, as a minimum, the amount of parking spaces identified in the phasing plans for each stage of parking lot construction.
8. Contractor shall provide a quantity of accessible parking stalls and loading zones reserved for persons with disabilities. These spaces shall at all times be located nearest to the operational platform. The minimum amount required is dependent on the total amount of parking spaces provided in each parking lot stage, as shown in the table below:

Total Spaces	Accessible Spaces
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7

9. Interim drainage improvements may be required depending on the final approved Construction Staging Plans.
10. Contractor shall provide water pollution control as approved in the Construction Staging Plans and in accordance with specification Section 10-15 "Storm Water Pollution Prevention Program"

10-3.01.3 MAINTAINING PEDESTRIAN TRAFFIC

Pedestrian access facilities shall be provided from the public street right of way through construction areas to the trolley station operational platform as shown in the plans. In addition, if public sidewalks along adjacent streets within the limits of construction are disturbed, an alternate nearby path shall be provided by the Contractor for use by the general public. Pedestrian access facilities shall not be permitted through neighboring properties except by written approval from MTS and SANDAG and written agreement with the owner of the potentially impacted property. The Contractor is responsible for maintaining pedestrian access to local businesses, residences, parking facilities, and transit facilities, including egress to and from existing, temporary, or proposed bus stops. The Contractor is required to meet with existing businesses and residences in the area in order to keep the public fully informed as to the impact to their property and/or business.

The Contractor shall contact Tom Tupta of MTS at (619) 595-4907, Tom Gray of MTS at (619) 595-4978, and the Engineer during the Construction Area Work Plan development and arrange meetings to discuss pedestrian circulation methods and temporary relocation methods of fare collection and other equipment.

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and Sections 7-5.03 "Public Convenience and Safety," and Section 5-1.18 "Maintaining Rail Traffic," of these Special Provisions. Nothing in these Special Provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

Pedestrian access facilities shall be according to the following requirements:

1. Temporary walkways and temporary station facilities shall conform to California Building Code, Chapter A, Section 414A (Fixed Guideway Transit Systems), Federal Americans with Disabilities Act (ADA) Accessibility Guidelines (28 CFR Part 36, Appendix A 10.3), and California Building Code (Title 24) requirements.
2. Pedestrian routes shall be clearly marked and a minimum of 60 inches wide.
3. A temporary wheelchair loading area and signs directing passengers to this area shall be provided when the existing, temporary, or permanent wheelchair loading area is not accessible.
4. Temporary walkways shall be delineated with 6-foot high chain-link fence barricades with orange mesh attached for increased visibility. Yellow caution tape shall not be used. Construction signs indicating the ADA accessible path(s) shall be placed at 75-foot intervals on both sides of the temporary walkways. Signs shall consist of 3-inch minimum uppercase black lettering on white background and the bottom of signs shall be 80 inches above the walkway surface. Signs shall have a black arrow with the following lettering: ' ACCESSIBLE ROUTE' and shall include the international wheelchair symbol.
5. The Construction Area Work Plan shall include a construction sign submittal to be approved by the Engineer indicating the specifications of the signs including: materials, base support, graphics, and fastening details. The signs may be attached the temporary chain-link fence. The signs shall be according to Caltrans Standards Plans RS1-RS4, Section 12, and Section 56.
6. Bridging over construction areas shall be minimum 3/4-inch exterior grade plywood fixed in place to prevent vertical or lateral movement when in place. The bridging shall not deflect more than 1/2 inch at mid-span when loaded with a concentrated load of 700 pounds.

The Contractor shall maintain all temporary pedestrian access facilities in a safe and neat condition from time of installation to time of removal.

10-3.01.4 PROVISIONS FOR TEMPORARY PLATFORMS AND TEMPORARY GRADE CROSSINGS

Temporary platforms shall be constructed at the locations shown in the phasing plans and shall be according to Section 10-3.01.2 “Minimum Operational Standards.”

Temporary station amenities shall be salvaged from the existing stations or shall be provided by MTS for the Contractor’s use. The amenities provided by MTS will be available for pick-up at the Wright Street Yard. The Contractor shall coordinate with the Engineer to identify the acceptable source of all temporary station amenities. Installation shall include all work necessary to transport, store, properly anchor, and support amenities at the temporary platform, including temporary concrete pads.

Upon removal of the temporary platform, the site shall be restored to its original condition. This includes but is not limited to, grading, removal of temporary storm drainage and conduits, pavement restoration, and restoration of pavement striping and markings. Disposal or delivery of all temporary station amenities shall be according to Section 10-4, “Abandonment, Demolition, Removal, Disposal, and Reconstruction of Existing Facilities.”

Portions of temporary platforms and temporary grade crossings shall be removable and restorable as identified in the plans. The Contractor shall provide shop drawings, designs, and procedures to implement the provisions for removable and restorable elements so that track construction or other work can proceed without interfering with LRT, bus, or freight train operations. Any requests that deviate from the plans shall be submitted for approval in writing to the Engineer. Any approval of the requests shall be at the sole discretion of the Engineer and will be provided in writing. The Engineer reserves the right to deny any and all requests.

10-3.01.5 MEASUREMENT AND PAYMENT

The Contractor’s Construction Area Work Plan shall comply with the restrictions and parameters of the phasing plans and details. Complying with the requirements of Section 10-3.01, “Construction Area Work Plan,” will be measured by lump sum for each Station Work Group.

Station Work Group	Lump Sum (Maximum Value)
E	\$205,000
D	\$194,000
C	\$146,000
B	\$154,000
A	\$74,000
San Ysidro	\$10,000

The lump sum amount set forth for the “Construction Area Work Plan (*Station Work Group Name*)” in the table above shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing, implementing, and updating an acceptable Construction Area Work Plan and as follows:

- A. For preparing the Construction Area Work Plan for each Station Work Group, updating the plan, as required, and for approval of the Engineer.

- B. For all of costs associated with the implementation of the Construction Area Work Plan for each Station Work Group and coordination with the Engineer, including the installation, maintenance, and removal of temporary improvements required for the Contractor to maintain an operational site during construction, as specified in the Standard Specifications and these special provisions and as directed by the Engineer. The price provided for "Construction Area Work Plan (*Station Work Group Name*)" shall include all temporary construction activities and improvements to include protection, salvage, adjustment or demolition of existing conditions and additional erosion control, earthwork, paving, and miscellaneous improvements that may otherwise not be shown in the Construction Drawings or included in another contract bid item. The Contractor shall be responsible for properly addressing discrepancies between their proposed Construction Area Work Plan and the Construction Drawings. All existing improvements demolished, adjusted or modified as a result of the Contractor's Construction Area Work Plan shall be restored to existing conditions or approved equal (as determined by the Engineer) and included in the price paid for "Construction Area Work Plan (*Station Work Group Name*)."
- C. For all costs associated with doing all the work involved in placing, temporarily removing, reinstalling, and restoring, and finishing the temporary platforms and temporary grade crossings, complete in place, including surface preparation and removals, providing temporary power, temporary communication (fiber optic cable), temporary drainage, detectable warning tiles, temporary pedestrian grade crossings, surface restoration, coordination, and removing the temporary platforms and temporary grade crossings and restoring the site to its original condition, as shown on the plans, as directed by the Engineer, and as specified in the standard specifications and Special Provisions.
- D. Full compensation for complying with the requirements of this section shall be considered as included in the contract lump sum price listed in the table above and any additional costs shall be considered incidental to the other items of work for the project, and no additional compensation will be allowed.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for "Construction Area Work Plan (*Station Work Group Name*)," listed in the table above, shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes. After acceptance of the contract pursuant to the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes herein above listed for the item, will be included for payment in the first estimate made after acceptance of the contract. Progress payments for a "Construction Area Work Plan (*Station Work Group Name*)" will be made as follows:

Fifteen percent payment for each "Construction Area Work Plan (*Station Work Group Name*)" will be made when an accepted Construction Area Work Plan has been approved by the Engineer prior to commencing work in the Station Work Group.

Fifty percent payment for each "Construction Area Work Plan (*Station Work Group Name*)" will be made when the Contractor receives written approval from the Engineer prior to moving revenue operations to the temporary platforms in the Station Work Group.

Seventy-five percent payment for each “Construction Area Work Plan (*Station Work Group Name*)” will be made when the Contractor receives written approval from the Engineer prior to moving revenue operations to the permanent platforms in the Station Work Group.

One hundred percent payment for each “Construction Area Work Plan (*Station Work Group Name*)” will be made, when Station Substantial Completion is achieved for the entire Station Work Group.

10-3.02 TRAFFIC CONTROL PLAN

The Contractor’s attention is directed to Section 5-1.19, “Maintaining Vehicular Traffic.”

The Contractor shall prepare Traffic Control Plans with elements and zone devices in accordance with Part 6 of the California MUTCD, 2010 edition and these Special Provisions. Traffic Control for striping within the city rights of way shall be in accordance with the California MUTCD, 2010 edition and the requirements of the appropriate jurisdiction.

The work shall consist of the Contractor preparing and obtaining approval of Traffic Control Plans as required by the governing agency or agencies, before doing any work within any city street right-of-way, placing and removing of traffic and pedestrian control devices, placing any temporary striping required, placing any permanent striping or markings damaged or removed during construction and working within the MTS right-of-way. The Traffic Control Plans shall comply with requirements set forth by the governing agency or agencies regarding types of plan submittals, information shown about sign types, sign placement, traffic phasing, detours, street closings, removals, etc.

The Contractor shall submit the draft Traffic Control Plan to the Engineer for review ten calendar days prior to submittal to the appropriate permitting agency. The Contractor shall circulate copies of the traffic control plans to the permitting agency and any third parties as required by the permitting agency. Some jurisdictions, including but not limited to the City of Chula Vista, require the Contractor to obtain City Council approval of road closures; the Contractor shall plan accordingly. Contractor shall be responsible for contacting governing public agency or agencies to determine required processing time. Contractor shall submit traffic control plans to avoid project delays. Upon receipt, a copy of the approved traffic control plan shall be submitted to the Engineer.

Construction Phasing Detour Routes have been provided in the Construction Plan Set for bidding purposes but final sign layout, type, and quantity shall be the responsibility of the Contractor and as approved through the jurisdictions. The Construction Phasing Detour Route plans address only road closures due to track grade crossing construction. Lane closures and other traffic control measures per MUTCD and jurisdictional standards that are also required due to other construction activities are not depicted but shall be included in the Contractor’s bid.

The Contractor shall maintain all temporary access facilities in a safe and neat condition from the time of installation to the time of removal. 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, the Contractor shall immediately repair said component to its original condition or replace said component and restore the component to its original location.

The Contractor shall notify the Engineer in writing and receive written permission at least 5 working days in advance of implementing any construction detour or street closure.

The Contractor shall notify all emergency services, transportation companies, or others identified on the plans at least five (5) working days in advance of implementing any construction detour or lane closure.

The Contractor shall prepare a contingency plan for reopening closures to public traffic. The Contractor shall submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request.

When traffic cones or delineators are used to delineate a temporary edge of the traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the jurisdiction or permitting agency. The lane closure provisions of this Section 5-1.19 shall not apply if the work area is protected by the permanent or temporary railing or barrier.

Any existing permanent striping that is damaged during construction shall be restored to its original state and layout. Until the permanent striping is replaced, the Contractor shall install temporary construction area traffic control that conforms to Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications. The work performed in connection with replacing the striping shall conform to the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specification and to Drawing A20B of the Standard Plans.

If parking is to be restricted during construction, the Contractor shall post "tow-away/no parking" signs 48 hours in advance after receiving approval from the City of San Diego, City of Chula Vista, or City of National City Police Department(s), depending on jurisdiction. The sign shall contain "days/hours" information and be posted so as to be reasonably seen by the public.

Personal vehicles of the Contractor's employees shall not be parked within the railway right of way including any section closed to public traffic, except personal vehicles used in lieu of the Contractor's equipment. Said vehicles shall be included in the equipment list required in the provisions in Section 5-1.10, "Equipment and Plants," of these Special Provisions and shall be marked with permanent or temporary name plates identifying contracting firm engaged in the work.

The Contractor's equipment or personal vehicles used in lieu of the Contractor's equipment, and marked with permanent or temporary name plates identifying contracting firm, may park in the area of construction but only during construction operation hours.

When leaving a work area and entering a roadway or railway carrying public traffic or rail traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic or rail traffic.

Equipment, material, or debris shall not be stored or remain in the public right of way without prior acceptance by the Engineer.

When work is in progress in a trench or other excavation adjacent to the traveled way, portable delineators, conforming to Section 12-3.04, "Portable Delineators," of the Caltrans Standard Specifications, shall be placed on the edge of pavement. At other times, the portable delineators shall be placed off and adjacent to the edge of pavement. The portable delineators shall be placed as necessary for proper delineation. The spacing between delineators shall not exceed 50 feet on tangents or 25 feet on curves.

Whenever traffic is permitted over or adjacent to trenches or other depressions, the Contractor shall furnish and maintain temporary steel plate bridging with a non-skid surface unless other means of protecting the public and the work are expressly approved by the Engineer.

Steel plates used for bridging shall extend 12 in. beyond the edges of trenches.

Steel plates (A-36 grade steel, designed for HL-93 truck loading per the AASHTO LRFD Bridge Design Specifications with California Amendments) shall conform to the following minimum thickness.

<u>Trench Width</u>	<u>Minimum Plate Thickness</u>
10 in.	1/2 in.
23 in.	3/4 in.
2 ft- 7 in.	7/8 in.
3 ft- 5 in.	1 in.
5 ft- 3 in.	1 3/4 in.

Note: For spans greater than 5 ft- 3 in., The Contractor shall have a California Registered Civil Engineer prepare and submit a structural design as specified under Section 5-1.4, "Submittals" of these Special Provisions.

Trenches shall be adequately shored, per Section 629 of the California Department of Transportation's Encroachment Permits Manual, to support bridging the traffic loads.

Where steel plates are used for bridging, the contractor shall provide asphalt concrete tapers, utilizing cold planing to provide adequate depth to adequately feather the asphalt to the edges of the plates. A "Rough Road" sign (W33), with black lettering on an orange background shall be used in advance of steel plate bridging in addition with any other required construction signing.

Minor deviations from the requirements of this section which do not significantly change the cost of the Work may be permitted upon the written request of the Contractor if, in the opinion of the Engineer, public traffic or rail traffic will be better served and the Work expedited. Such deviations shall not be adopted until the Engineer has indicated his approval in writing. All other modifications will be made by contract change order.

Measurement and Payment

Complying with the requirements of this section will be measured by lump sum for each station.

The contract lump sum price paid for "Road Closure Traffic Control (*Station Work Group Name*)" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, erecting, installing, maintaining, and removing traffic control devices, including barricades, portable flashing beacons, construction area signs, portable changeable message signs, delineators or cones, flashing arrow signs, special detour signs, temporary railing, steel plate bridging, including asphalt concrete tapers and cold planing where required for steel plate bridging, temporary pedestrian fencing, obtaining required City permit(s) within the appropriate jurisdiction, and temporary traffic striping, as shown on the Plans and as specified in these Special Provisions and the Standard Specifications. Progress payments for a "Road Closure Traffic Control (*Station Work Group Name*)" will be made as follows:

Seventy-five percent of the lump sum price for "Closure Traffic Control (*Station Work Group Name*)" will be paid over the duration of construction at each station as shown on the approved baseline schedule.

The final twenty-five percent of the lump sum price for "Closure Traffic Control (*Station Work Group Name*)" will be paid when Station Substantial Completion is achieved for the entire Station Work Group.

Per Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, Full Compensation for furnishing, erecting, maintaining, and removing any additional construction area signs the Contractor may deem necessary will be considered as included in the lump sum price paid for "Road Closure Traffic Control (*Station Work Group Name*)," and no additional compensation will be allowed.

Full compensation for compliance with lane and road closure requirements and conditions, not otherwise provided for in this section, shall be considered as included in the Contract lump sum price paid for "Road Closure Traffic Control (*Station Work Group Name*)" and therefore, no separate payment will be allowed.

10-3.03 FLAGGING

Flaggers to provide traffic control of public traffic through the work areas shall conform to the provisions in Section 12-2, "Flagging," of the Standard Specifications and these Special Provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for traffic control flagging, shall be considered as included in the Contract lump sum price paid for "Road Closure Traffic Control (*Station Work Group Name*)" and therefore, no separate payment will be made.

10-4 ABANDONMENT, DEMOLITION, REMOVAL, DISPOSAL, AND RECONSTRUCTION OF EXISTING FACILITIES

10-4.01 DESCRIPTION OF WORK

Certain existing improvements shall be abandoned, demolished, removed, disposed, stored, salvaged, reconstructed, and/or relocated as shown on the plans. Removal of existing facilities at the construction site shall conform to the provisions of Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions. See Section 11-3, "Track and Ballast Removal and/or Salvage" of these Special Provisions for track and ballast removal.

The Contractor shall be responsible for obtaining all necessary permits and approvals for accomplishing all removal and disposal operations. Unless otherwise stipulated, all materials resulting from the removal of obstructions shall become the property of the Contractor at the place of origin and shall be disposed of by the Contractor in conformance with all laws, regulations and rules legally imposed on such activities. All existing facilities removed or demolished shall be immediately loaded into trucks and removed from the site in accordance with Section 7-1.13, "Disposal of Material Outside the Railway or Highway Right of Way," of the Standard Specifications. No stockpiling of said materials shall occur on site without the express approval of the Engineer.

The Contractor shall not dispose of the improvements or materials there from by sale, gift, or in any manner whatsoever to the general public at the site, provided however that this provision shall not be construed as limiting or prohibiting the sale or disposal of such improvements or materials at the site to duly licensed contractors, and provided that the Contractor verifies that all such materials have been removed from the site.

The Contractor is encouraged to separate asphalt pavement and provide to sites for use in recycled asphalt pavement preparation. The Contractor is encouraged to use recycling as a method of disposal whenever possible.

The demolition and construction work shall be performed in accordance with Section 10-1.01, "Sequencing Restrictions and Parameters" of these special provisions.

10-4.02 EXISTING HIGHWAY FACILITIES

All references to "Roadway" or "Highway" shall be considered applicable to transit and railway facilities and the work performed in connection with various existing facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications.

Measurement and Payment

No separate measurement or payment will be made for the requirements of this section.

10-4.03 PROTECTION OF TREES

Trees within the project site shall not be damaged during demolition. Only trees that are identified to be removed shall be removed, all others shall be protected in place, unless otherwise directed by the Engineer.

All trees that are to remain that are damaged during the work under this contract shall be replaced in kind unless otherwise approved by the Engineer.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for protection of existing trees shall be considered included in the contract price paid for various items of demolition work and no additional compensation will be allowed therefore.

10-4.04 REMOVAL AND DISPOSAL OF EXISTING FACILITIES

Disposal of existing facilities includes demolition, removal, and disposal of various existing facilities as shown on the plans, all as required for construction of new facilities.

Items to remain that are damaged during demolition shall be repaired or replaced as directed by the Engineer at no cost to the Owner.

- A. Remove Existing Sidewalk and Subgrade

Removal of existing concrete sidewalk, base and subgrade as shown on the Plans, shall conform to the provisions in Section 15-3, "Removing Concrete," of the Standard Specifications and these Special Provisions. Concrete shall be removed without damaging portions of existing concrete to remain in place by sawcutting the concrete at the limits of removal shown on the Plans or ordered by the Engineer. Removal shall be to a depth to allow for the installation of the proposed sidewalk as indicated in the drawings.

Existing manhole frames and covers, valve boxes and vaults, and other facilities to remain in place shall be protected and preserved.

Portions of existing sidewalk, base and subgrade identified to be removed as part of track removal shall be performed in accordance with Section 11-3, "Track and Ballast Removal" of these special provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing sidewalk and subgrade shall be included in the contract unit price for "Roadway Excavation" in these Special Provisions.

B. Remove Existing Concrete Pavement

Removal of existing concrete pavement shall conform to Section 15-3, "Removing Concrete," of the Standard Specifications and these Special Provisions. Concrete shall be removed without damaging portions of existing concrete to remain in place by sawcutting the concrete at the limits of removal shown on the Plans or ordered by the Engineer.

Demolition shall consist of performing all work necessary to demolish, remove and dispose of existing concrete pavement, all as shown on the plans and specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and for doing all the work that may be required to construct and maintain the facilities within the limits of work.

The joint between any surfacing to be removed and surfacing which is to remain in place shall be cut to a neat line with a power-driven saw to full depth prior to removal operations. Residue from saw cutting operations shall be removed from the pavement surface by vacuuming or other approved method and shall not be allowed to flow across the pavement nor be left on the surface of the pavement. Residue from saw cutting operations shall be disposed of outside the project right-of-way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Portions of existing concrete pavement identified to be removed as part of track removal shall be performed in accordance with Section 11-3, "Track and Ballast Removal" of these special provisions.

Existing manhole frames and covers, valve boxes and vaults, and other facilities to remain in place shall be protected and preserved.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing concrete pavement shall be included in the contract unit price for "Roadway Excavation" in these Special Provisions.

C. Remove Existing Asphalt Concrete (AC) Pavement

Existing AC pavement shown on the plans to be removed shall be sawcut and removed to a depth of at least 12 inches below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

The joint between any surfacing to be removed and surfacing which is to remain in place shall be cut to a neat line with a power-driven saw to full depth prior to removal operations. Residue from saw cutting operations shall be removed from the pavement surface by vacuuming or other approved method and shall not be allowed to flow across the pavement nor be left on the surface of the pavement. Residue from saw cutting operations shall be disposed of outside the project right-of-way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Existing manhole frames and covers, valve boxes and vaults, and other facilities to remain in place shall be protected and preserved.

Portions of existing AC pavement identified to be removed as part of track removal shall be performed in accordance with Section 11-3, "Track and Ballast Removal" of these special provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing asphalt concrete (AC) pavement shall be included in the contract unit price for "Roadway Excavation" in these Special Provisions.

D. Cold Plane (Grind) Asphalt Concrete (AC) Pavement

Existing asphalt concrete pavement shall be cold planed at the locations and to the dimensions shown on the plans and shall conform to the provisions in Section 42-02, "Grinding," of the Standard Specifications. Refer to Section 10-11.13, "Asphalt Concrete (AC) Overlay," of these Special Provisions for surface preparation in preparation for asphalt overlay.

Planing asphalt concrete pavement shall be performed by the cold planing method. Planing of the asphalt concrete pavement shall not be done by the heater planing method.

The depth, width, and shape of the cut shall be as shown in the plans, on the typical cross sections or as designated by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections. The outside lines of the planed area shall be neat and uniform. Planing asphalt concrete pavement operations shall be performed without damage to the surfacing to remain in place.

The Contractor shall schedule paving operations so that cold planed areas are paved with asphalt concrete within the same work shift.

The material planed from the roadway surface, including material deposited in existing gutters or on the adjacent traveled way, shall be removed and disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. Removal operations of

cold planed material shall be concurrent with planing operations and follow within 50 feet of the planer, unless otherwise directed by the Engineer.

Existing manhole frames and covers, valve boxes and vaults, and other facilities to remain in place shall be protected and preserved.

Measurement and Payment

“Cold Plane (Grind) Asphalt Concrete (AC) Pavement” will be measured by the square yard. The quantity to be paid for will be the actual area of surface cold planed irrespective of the number of passes required to obtain the depth shown on the plans.

The contract price paid per square yard for “Cold Plane (Grind) Asphalt Concrete (AC) Pavement” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in cold planing asphalt concrete surfacing and disposing of planed material, including furnishing the asphalt concrete for and constructing, maintaining, removing, and disposing of temporary asphalt concrete tapers, as specified in the Standard Specifications and these special provisions and as directed by the Engineer.

E. Remove Existing Curb and Gutter

Removal of existing curb and gutter as shown on the Plans, shall conform to Section 15-3, “Removing Concrete,” of the Standard Specifications and these Special Provisions.

Portions of existing curb and gutter identified to be removed as part of track removal shall be performed in accordance with Section 11-3, “Track and Ballast Removal” of these special provisions

Measurement and Payment

“Remove Existing Curb and Gutter” will be measured for payment by the linear foot for removing all curb and gutter to the limits shown on the Plans to be removed or directed by the Engineer.

The contract unit price paid per linear foot for “Remove Existing Curb and Gutter” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing curb and gutter including sawcutting at the edge of curb and gutter to remain in place and disposal of the material removed.

F. Remove Existing Curb

Removal of existing curb as shown on the Plans shall conform to Section 15-3, “Removing Concrete,” of the Standard Specifications and these Special Provisions.

Measurement and Payment

“Remove Existing Curb” will be measured for payment by the linear foot for removing all curb to the limits shown on the Plans to be removed or directed by the Engineer.

The contract unit price paid per linear foot for "Remove Existing Curb" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing curb including sawcutting at the edge of curb to remain in place and disposal of the material removed.

G. Remove Existing Pavers

Existing brick (including sand bedding), concrete interlocking pavers and tile, including mortar, where shown on the plans to be removed, shall be removed in conformance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

Removing brick, concrete interlocking pavers and tile will be measured and paid for by the square foot as "Remove Existing Pavers."

Pavers removed in excess of the shown on the plans or ordered by the Engineer will not be measured nor paid for.

The contract unit price paid per square foot for "Remove Existing Pavers" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing pavers, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

H. Remove Existing Shelter

Existing passenger shelters, where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. Passenger shelter removal shall consist of removing posts, frames, foundations, sign panels, and lighting electrical equipment.

The Contractor shall notify the Engineer 7 days prior to removing any LRT passenger shelter.

Existing concrete foundations of passenger shelters shall be removed at all locations. The resulting holes shall be backfilled and compacted in accordance with Section 10-10.02, "Aggregate Subbases" of these Special Provisions.

At those locations exposed to public traffic where shelter foundations are removed, the Contractor shall schedule operations so that at the end of each working day there shall be no open holes.

Electrical wiring shall be removed to the nearest pull box outside the limits of new improvements or as directed by the Engineer.

Measurement and Payment

"Remove Existing Shelter" will be measured and paid for by the unit determined from actual count of passenger shelters removed.

The contract unit price paid for each "Remove Existing Shelter" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing the existing shelter and disposal of the material removed, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

I. Remove Existing Wall

Existing concrete retaining walls where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. Removal of retaining walls shall include removal of the retaining wall stem wall and retaining wall footing in its entirety unless specifically noted otherwise on the plans.

Attention is directed to Section 16, "Clearing and Grubbing," and Section 19-1.04, "Removal and Disposal of Buried Man-Made Objects," of the Standard Specifications and these Special Provisions.

Measurement and Payment

Removing concrete retaining wall will be measured and paid for by the linear foot as "Remove Existing Wall." The linear foot length for payment will be based on the length of each wall section as shown on the plans.

The contract price paid per linear foot for "Remove Existing Wall" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of concrete retaining wall, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

J. Remove Existing Chain Link Fence

Existing chain link fence where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications, unless indicated to be salvaged or relocated.

The Contractor shall notify the Engineer 48 hours prior to removing any fence. Access control shall be maintained at all times. Before leaving any work area, all fencing necessary to ensure the integrity of the original fenced areas shall be provided such that there are no gaps left between the existing fence and the fence being installed. Whether permanent or temporary fencing is used, shall be the Contractor's option.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing chain link fence shall be included in the contract lump sum price for "Clearing and Grubbing" in these Special Provisions.

K. Remove Existing Trash Receptacle

Existing station trash receptacles, where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Prior to off-site disposal the contractor shall remove and relocate existing trash receptacles to the temporary platform as identified in Section 10-1.05 "Provisions for Temporary Platforms and Temporary Grade Crossings." Contractor shall coordinate relocation and permanent off-site disposal with the Engineer.

Measurement and Payment

"Remove Existing Trash Receptacle" will be measured and paid for by the unit determined from actual count of trash receptacles removed.

The contract unit price paid for each "Remove Existing Trash Receptacle," shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing, relocating and disposing of existing trash receptacles, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

L. Remove Existing Tree Planter Pot

Existing station tree planter pots, where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. Any existing irrigation facilities connected to the existing tree planter pots to be removed shall be removed and existing irrigation pipes shall be capped and cut flush with the existing pavement.

Measurement and Payment

"Remove Existing Tree Planter Pot" will be measured and paid for by the unit determined from actual count of tree planter pots removed.

The contract unit price paid for each "Remove Existing Tree Planter Pot," shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of existing tree planter pots, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

M. Remove Existing Bench

Existing station metal and cast-in-place concrete benches, where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Existing metal anchors on platform-mounted benches or reinforcing steel on cast-in-place concrete benches shall be completely removed.

Prior to off-site disposal the contractor shall remove and relocate existing bench to the temporary platform as identified in Section 10-1.05 "Provisions for Temporary Platforms and Temporary Grade Crossings." Contractor shall coordinate relocation and permanent off-site disposal with the Engineer.

Measurement and Payment

"Remove Existing Bench" will be measured and paid for by the unit determined from actual count of benches removed.

The contract unit price paid for each "Remove Existing Bench," shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing, relocating the bench to the temporary platform and final disposal of the existing bench outside of the right of way, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. Fifty percent of the unit price for "Remove Existing Bench" will be paid when the bench is relocated to the temporary platform and the remaining fifty percent will be paid when the bench is removed and disposed by the contractor.

N. Remove Existing Paper Vending Machines

Contractor shall coordinate with SDTI to notify newspaper vendors four weeks in advance of construction for the removal of existing paper vending machines that are bolted, chained or freestanding within the limits of work at LRT stations. If the existing paper vending machines are not removed by the vendors following three documented contacts by the Contractor, the Contractor shall remove and securely store the existing paper vending machine for the duration of the construction period. At the completion of the project, if the paper vending machine remain unclaimed by the newspaper vendors, such vending machines shall become the property of the Contractor and disposed of according to the requirements of Section 7-1.13 "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

Measurement and Payment

"Remove Existing Paper Vending Machines" will be measured and paid for by the unit determined from actual count of paper vending machines removed.

The contract unit price paid for "Remove Existing Paper Vending Machines," shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing, storing the paper vending machines during construction and final disposal of the unclaimed paper vending machines outside of the right of way, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

O. Remove Existing Landscaping Material

Removing existing plants shall consist of removing ground cover and shrubs where shown on the plans and disposing of removed ground cover and shrubs. Removing existing landscaping material shall conform to the provisions in Section 16, "Clearing and Grubbing" of the Standard Specifications and Section 10-5.01, "Clearing and Grubbing" of these special provisions.

Removed ground cover and shrub materials shall properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. At the Contractor's option, removed ground cover and prunings may be reduced to chips. Chipped materials

shall not be spread within the project right of way.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of landscaping material shall be included in the contract lump sum price for "Clearing and Grubbing" in these Special Provisions.

P. Remove Existing Bollard

Bollard removal shall include the demolition of the bollard above and below existing grade, including the removal of all reinforcement and anchor bolts. The Contractor shall backfill all open holes and excavations in accordance with the Standard Specifications, and all demolished bollard material to be removed shall be properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing bollard shall be included in the contract unit price for "Clearing and Grubbing" in these Special Provisions.

Q. Remove Existing Sign

Existing signs and sign panels, at those locations shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Existing signs and sign panels shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

Measurement and Payment

"Remove Existing Sign" will be measured and paid for by the unit determined from actual count of signs removed.

The contract unit price paid for "Remove Existing Sign" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of existing signs, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

R. Remove Existing Track

Remove existing track shall include the removal of existing rail materials that are located outside of the track demolition area, as identified in the plans. Materials that are removed and approved by the Engineer to be serviceable shall be salvaged, delivered, and unloaded at the MTS Storage Facility (Wright Street Yard).

All materials removed and approved to be disposed of by the Engineer shall be properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications, and with all applicable laws and regulations.

Removal of all other track materials within the track demolition area, as identified in the plans, shall comply with Section 11-3 "Track and Ballast Removal" of these Special Provisions.

Measurement and Payment

"Remove Existing Track" will be measured and paid for by the linear foot. The linear foot length for payment will be based on the length of each rail as shown on the plans.

The contract price paid per linear foot for "Remove Existing Track" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of the rail, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

S. Remove Existing Railing

Existing railing where shown on the plans to be removed, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications, unless indicated to be salvaged or relocated.

The Contractor shall notify the Engineer 48 hours prior to removing any railing. Access control shall be maintained at all times. Before leaving any work area, all railing necessary to ensure the integrity of the original fenced areas shall be provided such that there are no gaps left between the existing railing and the railing being installed. Whether permanent or temporary railing is used, shall be the Contractor's option.

Measurement and Payment

"Remove Existing Railing" will be measured for payment by the linear foot for removing all railing to the limits shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per linear foot for "Remove Existing Railing" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of existing railing, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

T. Remove Existing Concrete Stairs

Existing concrete stairs and steps, where shown on the plans to be removed, shall be removed in their entirety and disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Attention is directed to Section 16, "Clearing and Grubbing," and Section 19-1.04, "Removal and Disposal of Buried Man-Made Objects," of the Standard Specifications and these Special Provisions.

Where no joint exists between concrete to be removed and concrete to remain in place or the locations shown on the plans where saw cutting of existing concrete structure is required, the concrete shall be cut on a neat line to a minimum depth of 6.0 inches with a power driven saw before the concrete is removed.

Measurement and Payment

Removing concrete stairs will be measured and paid for by the cubic yard as "Remove Concrete Stairs," determined in the same manner specified for roadway excavation in conformance with the provisions in Section 19, "Earthwork," of the Standard Specifications.

The contract price paid per cubic yard for "Remove Concrete Stairs" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing and disposing of concrete, complete in place, including importing and placing backfill material as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

U. Remove Existing Tree

All tree removal shall be conducted under direct supervision of the Engineer. Trees noted to be removed shall be removed completely including the root crown, root mass and roots over 2 inches in diameter where practicable. Stump shall be removed by grinding or other mechanical method to a depth of 30 inches below proposed finish grade. The contractor shall verify the specific trees to be removed with the Engineer prior to removal. Caution shall be exercised to avoid damage to adjacent property and barricades shall be erected to protect pedestrians.

Removed trees shall be properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of trees shall be included in the contract lump sum price for "Clearing and Grubbing" in these Special Provisions.

V. Remove Existing Tree Stump

Existing tree stumps shall be removed by grinding or other mechanical method to a depth of 30 inches below proposed finish grade and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications. Caution shall be exercised to avoid damage to adjacent property and barricades shall be erected to protect pedestrians.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing tree stumps shall be included in the contract lump sum price for "Clearing and Grubbing" of these special provisions.

W. Remove Existing Traffic Signal Loop

Existing traffic signal loop to be removed, as shown on the plans and as directed by the Engineer, shall be disconnected from any existing power sources before removal. Any existing conduit and/or wiring connected to the traffic loop to be disconnected shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications, at no extra cost to the Owner.

Measurement and Payment

"Remove Existing Traffic Loop" will be measured and paid for by the unit determined from actual count of traffic loops removed.

The contract unit price paid for "Remove Existing Traffic Loop" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing the existing traffic loops, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

X. Remove Existing Railroad Tie Curb

Existing railroad tie curb at the Palm Avenue Station to be removed, as shown on the plans and as directed by the Engineer, shall be removed and properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing railroad tie curb shall be included in the contract lump sum price for "Clearing and Grubbing" in these Special Provisions.

Y. Remove Existing Light Pole

Existing light standards to be removed, as shown on the plans and as directed by the Engineer, shall be disconnected from any existing power sources before removal. Any existing conduit and/or wiring connected to the light standards to be removed shall be removed and disposed of in accordance with the standard specifications and these specifications. Existing foundation materials associated with light standards to be removed shall be properly disposed of in accordance with the standard specifications and these special provisions, at no extra cost to the Owner. The contractor shall deliver the existing poles and luminaires to the Wright Street yard, or another MTS yard as designated by the Engineer.

Removed conduits and foundations shall be properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

“Remove Existing Light Pole” will be measured and paid for by the unit determined from actual count of light standards removed.

The contract unit price paid for “Remove Existing Light Pole” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing the existing light standards, transporting the luminaries and poles to the designated MTS storage yard and disposal of the conduits and foundations as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Z. Remove Existing Post

Post removal shall include the demolition of the post above and below existing grade, including the removal of all reinforcement and anchor bolts. The Contractor shall backfill all open holes and excavations in accordance with the Standard Specifications, and all demolished post material to be removed shall be properly disposed of outside the right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full Compensation for removing and disposing of existing post shall be included in the contract lump sum price for “Clearing and Grubbing” in these Special Provisions.

AA. Remove and Reinstall Existing Driver Facility

Remove and Reinstall Existing Driver Facility shall include the removal, relocation, temporary reinstallation, and final relocation and reinstallation of the MTS Bus driver facility at Iris Avenue station as shown in the plans. The Construction Phasing Plans indicate a temporary location for the Driver Facility at the station site. The Contractor’s approved Construction Staging Plans for the Iris Station shall indicate the Contractor’s proposed Driver Facility site for each proposed stage of construction. The Contractor shall contact MTS a minimum of 14 days in advance of the need for removal and relocation of the driver facility. Upon written approval from the Engineer, the Contractor shall remove and relocate the driver facility as indicated on the plans, and as directed by the Engineer. The driver facility shall be available for use by MTS at all times or as directed by the Engineer. All relocations and reinstallations of the driver facility shall include providing connections for all existing utility services for the driver facility.

Measurement and Payment

“Remove and Reinstall Existing Driver Facility” will be measured and paid for by each facility removed, relocated and reinstalled.

The contract unit price paid for “Remove and Reinstall Existing Driver Facility” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing, relocating, temporary reinstalling, and final relocating and reinstalling the existing driver facility, including providing all utility connections, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-4.05 EXISTING UTILITIES

A. Adjust Existing Surface Utilities

All existing surface utilities such as manhole covers, grates, cleanout covers, valve covers, pull boxes, utility vaults and other miscellaneous appurtenances to remain shall be adjusted to proposed grade as indicated. All existing damaged surface utilities shall be removed and replaced with new facilities in kind and in accordance with the current standards for the respective utility owner and to the satisfaction of the Resident Engineer.

Measurement and Payment

The contract unit price paid per each utility by type adjusted to grade shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in adjusting existing utilities to grade including replacing damaged facilities.

B. Remove Existing Storm Drain

The Contractor shall remove existing pipe as shown on the plans regardless of type, material, or size. Removal of pipe appurtenances such as bends, elbows, fittings, collars and lugs shall be considered incidental to the project. Voids resulting from the removed storm drain not otherwise replaced with new storm drain shall be filled with engineered fill up to the bottom of sub-grade and be compacted to a relative compaction of 95%.

Existing storm drain pipe beyond the limits of removal not otherwise called out for removal shall be abandoned in place from the limit of removal up to the nearest structure. Abandonment shall consist of bulk-heading with brick or concrete block masonry eight inches (8") thick at the upstream end, at downstream end that connect to catch basins, manholes and at locations directed by the Resident Engineer. Bulk-heading shall be considered incidental to the removal of storm drain and shall not be measured or paid separately.

Measurement and Payment

"Remove Existing Storm Drain" and "Abandon Existing Storm Drain" will be measured for payment by the linear foot for removing all storm drain pipe to the limits shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per linear foot for "Remove Existing Storm Drain" and "Abandon Existing Storm Drain" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing and disposing of existing storm drain pipe, including backfill and bulk-heading, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

C. Remove Existing Underdrain Pipe

The Contractor shall remove existing underdrain pipe as shown on the plans regardless of type, material, or size. Removal of pipe appurtenances such as bends, elbows, fittings, collars and lugs shall be considered incidental to the project. Voids resulting from the removed underdrain not otherwise replaced with new underdrain shall be filled with engineered fill up to the bottom of sub-grade and be compacted to a relative compaction of 95%.

Measurement and Payment

“Remove Existing Underdrain Pipe” will be measured for payment by the linear foot for removing all underdrain drain pipe to the limits shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per linear foot for “Remove Existing Underdrain Pipe” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing and disposing of existing underdrain pipe, including backfill, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

D. Remove Existing Drainage Structure

The Contractor shall remove existing drainage structure as shown on plans. Removal of drainage structure shall include removal and disposal of the existing structure and removal of existing structure lid frame and grate, regardless of structure depth, structure type, and material, and shall include removal of appurtenances such as steps, adjusting rings, and manhole base. Voids resulting from the removed structure not otherwise replaced with a new structure shall be filled with engineered fill up to the bottom of sub-grade and be compacted to a relative compaction of 95%.

Measurement and Payment

“Remove Existing Drainage Structure” will be measured for payment by each drainage structure removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Drainage Structure” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing and disposing of existing drainage structure, including backfill, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

E. Remove Existing Grate Inlet

The Contractor shall remove existing grate inlet as shown on plans. Removal of grate inlet shall include removal and disposal of the existing grate inlet and removal of existing structure lid frame and grate, regardless of structure depth, structure type, and material, and shall include removal of appurtenances such as steps, adjusting rings, and manhole base. Voids resulting from the removed structure not otherwise replaced with a new structure shall be filled with engineered fill up to the bottom of sub-grade and be compacted to a relative compaction of 95%.

Measurement and Payment

“Remove Existing Grate Inlet” will be measured for payment by each grate inlet removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Grate Inlet” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing and disposing of existing grate inlet, including backfill, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

F. Remove Existing Flared End Section

The Contractor shall remove the existing flared end section as shown on plans. Removal of flared end section shall include removal and disposal of the existing structure regardless of type, material, or size. Removal of flared end section appurtenances such as fittings, and riprap shall be considered incidental to the project.

Measurement and Payment

“Remove Existing Flared End Section” will be measured for payment by each flared end section removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Flared End Section” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing and disposing of existing flared end section, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

G. Remove Existing Trench Drain

The Contractor shall remove existing trench drain as shown on the plans regardless of type, material, or size. Any existing storm drain pipe connection to the trench drain to be removed shall be removed and disposed of in accordance with these specifications. Removal of trench drain appurtenances such as concrete around trench drain, covers and fittings shall be considered incidental to removing the trench drain. Voids resulting from the removed trench drain shall be filled with engineered fill up to the bottom of sub-grade and be compacted to a relative compaction of 95%.

Measurement and Payment

“Remove Existing Trench Drain” will be measured for payment by the linear foot from beginning of grate to end of grate for removing all trench drain to the limits shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per linear foot for “Remove Existing Trench Drain” and shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing the trench drain and disposal of the material removed.

H. Remove Existing Utility Line

The Contractor shall remove existing electrical, telephone and communication lines as shown on the plans regardless of type, material, or size and shall include the removal of conduit and wires located within the conduit. Removal of appurtenances such as sweeps, bends, elbows, ties and fittings shall be considered incidental to the project.

Where removal of existing utility line is not feasible, the Contractor shall abandon existing utility lines in place.

Measurement and Payment

“Remove Existing Electrical Line,” “Remove Existing Telephone Line” and “Remove Existing Communication Line” will be measured for payment by the linear foot for removing all utility lines to the limits shown on the Plans or directed by the Engineer to be removed.

“Abandon Existing Electrical Line” and “Abandon Existing Telephone Line” will be measured for payment by the linear foot for abandoning all utility lines to the limits shown on the Plans or directed by the Engineer to be abandoned.

The contract unit price paid per linear foot for “Remove Existing Electrical Line,” “Abandon Existing Electrical Line,” “Remove Existing Telephone Line,” “Abandon Existing Telephone Line” and “Remove Existing Communication Line” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing the electrical and telephone lines and disposal of the material removed.

I. Remove Existing Utility Box

The Contractor shall remove existing utility boxes as shown on the plans. Utility boxes include traffic signal boxes, telephone pull boxes, electrical pull boxes, pull boxes and utility pull boxes, as indicated in the plans. Removal of utility box shall include removal and disposal of the existing structure and removal of existing structure lid frame and grate, regardless of structure depth, structure type, and material, and shall include removal of appurtenances such as the manhole base.

Measurement and Payment

“Remove Existing Utility Box” will be measured for payment by each utility box removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Utility Box” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing each utility box and disposal of the material removed.

J. Remove Existing Electrical Cabinet

Existing electrical cabinets to be removed, as shown on the plans and as directed by the Engineer, shall be disconnected from any existing power sources before removal. Any existing conduit and/or wiring connected to the electrical cabinet to be removed shall be removed and disposed of in accordance with the standard specifications and these specifications. Existing foundation materials associated with electrical cabinet to be removed shall be properly disposed of in accordance with the standard specifications and these special provisions, at no extra cost to the Owner.

Measurement and Payment

“Remove Existing Electrical Cabinet” will be measured for payment by each electrical cabinet removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Electrical Cabinet” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing the electrical cabinet and disposal of the material removed.

K. Remove Existing Telephone Pedestal

Existing telephone pedestals to be removed, as shown on the plans and as directed by the Engineer, shall be disconnected from any existing power sources before removal. Any existing conduit and/or wiring connected to the telephone pedestal to be removed shall be removed and disposed of in accordance with the standard specifications and these specifications. Existing foundation materials associated with telephone pedestal to be removed shall be properly disposed of in accordance with the

standard specifications and these special provisions, at no extra cost to the Owner.

Measurement and Payment

“Remove Existing Telephone Pedestal” will be measured for payment by each telephone pedestal removed as shown on the Plans or directed by the Engineer to be removed.

The contract unit price paid per each “Remove Existing Telephone Pedestal” shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in removing the telephone pedestal and disposal of the material removed.

10-4.06 SALVAGE EXISTING FACILITIES

10-4.06.1 GENERAL

All material scheduled for removal shall be subject to return to MTS for storage and reuse, as directed by the Engineer, unless otherwise specified herein. The Contractor shall not damage or destroy this material and shall protect all salvaged material during the demolition and removal work. The Contractor shall not reuse any removed material without the Engineer’s written approval. The Contractor shall return and transport all material designated for salvage, together with a bill of material, to the Wright Street yard or another approved MTS storage location as directed by the Engineer. In the case of items to be salvaged to another entity, the Contractor shall make arrangements for the removal of those items to a location and in a manner acceptable to that entity prior to removal.

Existing facilities to be salvaged shall be immediately loaded onto trucks and removed to their predetermined salvage location. No stockpiling of said materials shall occur on MTS property without the expressed approval of the Engineer.

Items to remain that are damaged during demolition shall be repaired or replaced as directed by the Engineer at no cost to the Owner. Items to be salvaged that are damaged during removal shall be repaired or replaced as directed by the Engineer at no cost to the Owner.

10-4.06.2 SALVAGE EXISTING BIKE LOCKER

The Contractor shall contact the SANDAG Commute office (Maria Filippelli at 619-515-1177) a minimum of four weeks in advance of the need for removal of the bike lockers and request that SANDAG commute coordinates with bike owners for removal of bike locker contents. Upon written approval from the Engineer, the Contractor shall remove existing bike lockers as indicated on the plans, and as directed by the Engineer. The Contractor shall be responsible for storage of the Bike Lockers removed and upon completion of the permanent platform construction, reinstall the Bike Lockers as indicated in Section 10-13.21. Excess Bike Lockers shall be returned to SANDAG and transported to an approved SANDAG/MTS storage location as directed by the Engineer and as coordinated with the SANDAG Commute office (Maria Filippelli at 619-515-1177).

Measurement and Payment

“Salvage Existing Bike Locker” shall be measured by each existing bike lockers unit removed, salvaged and stored.

The contract price per each paid for “Salvage Existing Bike Locker” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in removing and storing existing bike lockers as shown in the plans and specified in these special provisions, and as directed by the Engineer. All costs associated with installation of the bike locker on the permanent platform, shall be included in “Install Bike Locker as indicated in Section 10-13.21 and no additional compensation will be allowed therefore.

10-4.06.3 SALVAGE EXISTING SHELTER

Existing shelters that are located on the existing platform and are identified to be salvaged on the “Demolition Plan” shall be salvaged and installed on the temporary platform as indicated in 10-3.01-2 “Minimum Operational Standards.” At the time when the temporary platform is no longer being utilized for revenue operations, the Contractor shall return and transport shelters to the Wright Street yard or another approved MTS storage location as directed by the Engineer.

Measurement and Payment

“Salvage Existing Shelter” shall be measured by each existing shelter unit removed and salvaged to MTS.

The contract price per each paid for “Salvage Existing Shelter” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in removing and salvaging existing shelters as shown in the plans and specified in these special provisions, and as directed by the Engineer. All costs associated with installation and removal of the shelter on the temporary platform, shall be included in “Construction Area Work Plan (*Station Name*)” as indicated in Section 10-3.01 and no additional compensation will be allowed there for.

10-4.06.4 SALVAGE EXISTING SIGN, POLE AND BASE

Contractor shall salvage existing sign, pole and base units as identified to be salvaged on the “Demolition Plan.”

Measurement and Payment

“Salvage Existing Sign, Pole and Base” shall be measured by each existing sign, pole and base unit removed and salvaged.

The contract price per each paid for “Salvage Existing Sign, Pole and Base” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in removing and salvaging existing sign, pole and base units as shown in the plans and specified in these special provisions, and as directed by the Engineer.

10-4.06.5 SALVAGE EXISTING FACILITIES – BY OTHERS

The salvaging of ticket vending machines, personal card interface devices (PCID), pay phones and vending machines shall conform to the provisions of Section 10-13.15, “Vending Machines and Public Telephones” and Section 10-13.16, “Ticket Vending Machines and PCID” of these Special Provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-4.07 REMOVE FOUNDATIONS

Foundation removal typically shall include the demolition of the foundation below existing grade, including the removal of all reinforcement and anchor bolts. The Contractor shall backfill all open foundation holes and excavations in accordance with the Standard Specifications, and all demolished foundation material shall be removed from the work site and disposed of at no additional cost the SANDAG.

Contractor will be permitted to remove the concrete in one or more pieces, but broken pieces must be completely removed from the job site and shall not be mixed with ballast or fill. The Contractor shall do all digging, removing, replacing, and tamping of ballast or fill, including the furnishing of necessary ballast for backfilling all holes caused by removal of the concrete foundations. The removal of concrete foundations and pads shall be as approved by the Engineer.

Concrete being removed from the job site shall not be stored in emergency exits, passageways, or adjacent to operating tracks at any time. Such concrete shall be removed from the right-of-way at the end of each day's work. Storage for short periods of time at locations remote from the operating portions of the railroad may be used with written approval of the Engineer.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-4.08 REMOVE EQUIPMENT

The Contractor shall submit a list of equipment and material, which will be delivered to SANDAG/MTS for storage.

All material scheduled for removal shall be subject to return to SANDAG/MTS for storage and reuse, suitably packed for warehouse storage and clearly marked with a unique identification, as directed by the Engineer.

Existing retired material and equipment shall be packaged in an approved manner. The Contractor shall package removed material or equipment on pallets for ease of handling wherever possible and suitable. Any damaged material or equipment shall be repaired or replaced unless otherwise approved by the Engineer.

The Contractor shall store any material removed and which will not immediately be reinstalled away from damage and in a secure area.

Removed wire and cable shall be disposed of by the Contractor. Any copper conductor size larger than 9 AWG shall be returned to MTS at an approved site and time.

The Contractor shall plug all holes left in the structures and rail ties by removal of equipment, and shall paint all steel exposed by removal of equipment. Concrete foundations and pads no longer required in the final layout shall be completely removed by the Contractor as specified in Section 10-4.07, "Remove Foundations," of these special provisions.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefore.

10-4.09 REMOVE EXISTING IRRIGATION FACILITIES

Removal of existing irrigation facilities shall include the removal and disposal of valves, valve boxes, main valve, meter, controller and back flow preventer, as shown in the plans. The contractor shall remove existing below ground irrigation pipe as shown on the plans regardless of type, material, or size and shall include the removal of conduit and wires located within the conduit. Removal of pipe appurtenances such as bends, elbows, ties and fittings shall be considered incidental to the project.

Where removal of existing below ground irrigation pipes is not feasible, the Contractor shall abandon existing irrigation pipes. Abandonment of existing pipes shall occur in areas that extend beyond our construction limits and/or in areas inside our construction limits where removal may compromise the health and safety of existing trees or palms unless otherwise noted on the plans.

Water shall be maintained in conformance with the provisions in Section 20-5.025, "Maintain Existing Water Supply," of the Standard Specifications.

The Contractor shall refer to Section 10-7 "Irrigation" of these Special Provisions for additional requirements associated with existing irrigation facilities.

Measurement and Payment

Removal of existing irrigation facilities shall be measured as a lump sum by station.

The contract lump sum price paid for "Remove Existing Irrigation Facilities (*Station Name*)" for each station location shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in removing existing irrigation facilities as shown in the plans and specified in these special provisions, and disposal of the material removed.

10-4.10 EXISTING SURVEY MONUMENTS

There are survey monuments that will be impacted by the proposed construction activities. Several of these monuments are brass disks that are a part of the Record of Survey Map No. 15487 as prepared by Philip J. Gurbino (LS 4424) of Berggren and Associates on April 17, 1997 and recorded in San

Diego County on April 18, 1997, file no. 97.180859. There may be other existing monuments. The Contractor shall be responsible for any monuments and benchmarks which will be disturbed or destroyed by construction activities associated with this project. The Contractor shall have a licensed Land Surveyor or Registered Civil Engineer authorized to practice Land Surveying, reference and replace such points with appropriate survey monuments. A corner record or record of survey, as appropriate, shall be filed by the licensed Land Surveyor or Registered Civil Engineer as required by the Land Surveyors Act.

Measurement and Payment

No separate measurement shall be made for the requirements of this section.

The labor, materials, tools, equipment, and costs associated with identifying impacted monuments, removing existing monuments, referencing, replacing monuments complete in place and filing a corner record or record of survey shall be considered incidental to the proposed construction associated with this project and no additional compensation shall be provided therefore.

10-5 GRADING

A complete soil and groundwater management plan (SGMP) shall be prepared prior to beginning earth disturbing activities onsite. Work performed shall be in compliance with the Standard Specifications, these Special Provisions, the SGMP, the contractor prepared site-specific health and safety plan (HSP) and community health and safety plan (CHSP), and applicable state and federal statutes and regulations. The Contractor shall be responsible for notifying the Engineer of plans for excavation.

10-5.01 CLEARING AND GRUBBING

Clearing and Grubbing shall generally include the protection of existing project features to remain and the removal of all trees, shrubs, landscaping, landscape irrigation, vegetation, existing top soil, miscellaneous concrete in landscape areas, pipes, hardware, timber, rubble, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the Engineer is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations or any other objectionable material encountered beneath the ground surface as a result of grading and/or trenching operations within the prescribed areas, and those items not specifically covered under the provisions in Section 10-4, "Abandonment, Demolition, Removal and Disposal of Existing Facilities" or Section 10-5.02.B "Roadway Excavation" of these Special Provisions. Clearing and grubbing shall remove the top 6" of material at existing grade except where tap roots and other projections over 1-1/2 inches in diameter exist. At these locations site shall be grubbed out to a depth of at least 18 inches below the finished subgrade or slope elevation.

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these Special Provisions. Clearing and grubbing shall also include the removal, relocation, adjusting, or salvaging of all facilities so indicated on the plans including walls or other structures which are not designated as separate bid items or which are not included in other bid items.

Items not scheduled for re-use, relocation or re-installation within the project limits shall become the property of the Contractor and shall be legally disposed of off-site. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor and approved by the Engineer

prior to the start of construction. The Contractor shall be responsible for obtaining all necessary permits and approvals for all removal operations.

In addition to the above items, clearing and grubbing shall include, but not limited to the following items as shown on the plans or specified in these Special Provisions:

- A. Soil and other material excavated to depth of 6 inches under the proposed parkway area to accommodate new landscaping, soil and planting materials except where existing tap roots and other projections over 1-1/2 inches in diameter exist.
- B. Removal of trees, shrubs, stumps, trash, debris barricade, and vegetation in the pavement cracks or curb lines whether or not specifically indicated on the plans or otherwise shown to be protected or relocated.
- C. Deleterious materials resulting from clearing and grubbing operations shall be hauled away and legally disposed of at a site obtained by the Contractor.
- D. Removal and disposal of any additional items not specifically mentioned which may be found within the work limits.
- E. Applying water.
- F. Dust Control.
- G. Maintenance of project appearance.
- H. Clean-up of project upon completion of work.
- I. Clear tree roots for 6" below sidewalk, where tree roots are the cause of damages.

Excavated material not designated for re-use within the project or determined to contain aerially deposited lead shall become the property of the Contractor and shall be disposed of offsite in conformance with the provisions in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications. Surplus material shall not be disposed of in any MTS or public street right of way.

Excavated materials determined to contain aerially deposited lead or other hazardous materials, which have special requirements for disposal, shall be disposed of in accordance with Section 10-5.04, "Hazardous Waste in Excavation," of these special provisions.

Measurement and Payment

Clearing and grubbing shall be measured as a lump sum per station for all the areas requiring clearing in order to construct planned work.

The contract lump sum price paid for "Clearing and Grubbing – (*Station*)" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in clearing and grubbing as shown in the plans and specified in these special provisions, and legally disposing of all surplus excavated material. No additional compensation shall be provided there for.

10-5.02 EARTHWORK

10-5.02.A GENERAL

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these Special Provisions. Earthwork beneath the track section shall be in accordance with Section 11, "Trackwork," of these Special Provisions.

Three geotechnical reports have been prepared for this project by Ninyo and Moore Geotechnical Consultants.

- The first is entitled "Geotechnical Evaluation Blue Line LRT Station Improvements, San Diego, National City and Chula Vista, California" and dated March 3, 2011;
- the second is entitled, "Geotechnical Pavement Evaluation, Palm and Palomar Street Stations, Blue Line LRT Station Improvements, San Diego and Chula Vista, California," dated December 6, 2011;
- and the third is entitled "Geotechnical Evaluation Harborside Station, Blue Line LRT Station Improvements, San Diego, California."

These geotechnical reports are for information only and the Contractor may use them at their own risk.

Permanent cut and fill slopes shall not be steeper than 2:1 (horizontal to vertical). Slopes in excess of 20 feet high are not anticipated but should be evaluated by the Engineer on an individual basis should they be needed. Remove topsoil and other materials deemed by the Engineer to be unsuitable, when placing fill on slopes steeper than 5:1 (horizontal to vertical). Near-horizontal keys and near-vertical benches should be excavated into firm fill material. Compacted fill slopes shall be overbuilt and cut back to grade, exposing firm compacted fill. The actual amount of overbuilding may vary as field conditions dictate. The Contractor to provide mechanical compaction as close to the outer edge of the overbuilt slope surface as practical. Positive drainage shall be established away from the top of slope as shown in the construction plans.

Within parking lot, platforms and transit center locations, the Contractor shall proof-roll the exposed subgrade with heavy equipment as directed by the Engineer. Where, in the opinion of the Engineer, the existing subgrade material is not suitable or yields, the subgrade shall be over-excavated and replaced with Class 2 aggregate over an approved subgrade enhancement geotextile to a minimum depth of 1 foot and a maximum depth of 2 feet or as determined by the Engineer.

Valve boxes, manhole covers, and drainage structures within the limits of any grading operation shall be adjusted to proposed finish grade.

Surplus excavated material shall not be used to widen embankments or to flatten slopes and shall not otherwise be deposited within the project limits. Surplus excavated material shall become the property of the Contractor and shall be disposed of outside the right-of-way in conformance with the provisions in Section 7-5.01, "Disposal of Material Outside the Railway or Highway Right of Way," of these Special Provisions.

10-5.02.B ROADWAY EXCAVATION

Roadway excavation shall be in conformance with Section 19-2, "Roadway Excavation," of the Standard Specifications. Roadway excavation shall include the removal of existing material to the elevations required for the proposed pavement sections as shown in the plans; removal, disposal or stockpiling of material excavated as required, including existing pavements; subgrade preparation; re-

use of excavated material; placement and compaction of re-used material or aggregate subbase to the required elevations shown in the plans and in accordance with the Standard Specifications and these Special Provisions.

Structure Excavation and Backfill shall comply with the Standard Specifications and Section 10-5.03 of these Special Provisions.

Roadway Excavation-Platform (F)

In areas directly under the platform, the Contractor shall excavate the existing soils to a depth of 2.83 feet below the proposed finished grade elevation of the platform as shown in the platform sections in the construction plans.

Roadway Excavation-Site (F)

In parking lot and transit center areas, the Contractor shall excavate the existing soils to the following depths:

- 2.67 feet below the proposed finished grade elevations in areas to receive Asphalt Concrete Pavement as shown in the pavement sections in the construction plans.
- 3.25 feet below the proposed finished grade elevations in areas to receive Portland Cement Concrete Pavement as shown in the pavement sections in the construction plans.

In sidewalk areas, the Contractor shall excavate the existing soils to a depth of 1 foot below the proposed finished elevations as shown in the plans, details and platform sections in the construction plans. Sidewalk areas are any concrete sidewalk or bus platform areas as indicated in the plans.

Roadway Excavation-Access Road (F)

In the access road areas, the Contractor shall excavate the existing soils to a depth of 2.67 feet below the proposed finished grade of the access roads. In vegetated areas, the Contractor shall excavate to the depth below finished grade required for the installation of planting soil.

Roadway Excavation (Track)

In the areas of track construction, the Contractor shall excavate beyond the limits of existing ballast which is required to achieve the new track section shown in the plans. In the areas of vehicular grade crossings, the Contractor shall excavate to the depth required to achieve the new pavement section shown in the plans. In the area of Anita Street vehicular crossing, the contractor shall excavate as shown on the plans.

Some site soils have little cohesion. These materials may be prone to caving in drilled holes and the Contractor should anticipate the need to mitigate caving during construction. Over-excavation called out in the plans shall be considered roadway excavation.

Excavated soils may be re-used as compacted subgrade material provided they are suitable per the requirements of these Special Provisions. Excavated materials may be re-used as compacted subgrade provided they are free from organic material, contaminated material, clay lumps and rocks or debris greater than 4 inches in diameter. Excavation into cobble soils may generate oversized materials that may not be suitable for use as backfill. These may be broken into pieces that are 4 inches or smaller in diameter or disposed of offsite. Fill materials shall be free from organic and

otherwise deleterious materials and as provided in Section 19 of the Standard Specifications. Fill materials shall be free from environmental contamination. Unsuitable material shall become the property of the Contractor and shall be legally disposed of, offsite.

See Section 10-5.02 C for subgrade preparation.

Compacted subgrade material may consist of re-used excavated material and/or aggregate subbase and shall be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to placing compacted subgrade material, the Contractor shall have it field tested to determine the laboratory optimum moisture content. Prior to compaction, each lift shall be watered or dried as needed to achieve a moisture content generally near the laboratory optimum, mixed, and then compacted by mechanical methods to 95 percent of its modified Proctor density as evaluated by ASTM D 1557. Successive lifts shall be treated in a like manner until the desired compacted sub-grade elevations are achieved.

In parking lot and transit areas, the Contractor shall place compacted sub-grade fill to the elevation of the underside of the compacted granular subgrade elevation as shown in the pavement sections in the construction plans. In platform areas, the Contractor shall place compacted sub-grade fill to the elevation of the underside of the compacted base material as shown in the platform sections in the construction plans. In sidewalk areas, the Contractor shall place compacted sub-grade to the elevation of the underside of the crushed aggregate base as shown in the plans, details and cross-sections.

Measurement and Payment

“Roadway Excavation-Platform (F),” “Roadway Excavation-Site (F)” and “Roadway Excavation-Access Road (F)” shall be a Final Pay items per Section 9-1.02, “Final Pay Items” of these Special Provisions. Roadway excavation quantities are estimated in cubic yard for all the areas requiring excavation in order to construct the planned work.

“Roadway Excavation (Track)” shall be measured by cubic yard in conformance with Section 19-2.08, “Measurement,” of the Standard Specifications.

The contract prices paid for “Roadway Excavation-Platform (F),” “Roadway Excavation-Site (F)” “Roadway Excavation-Access Road (F),” and “Roadway Excavation (Track)” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in excavating existing surface and sub-grade material to the lines and grades indicated in the plans and specified in these special provisions; removal, disposal or stockpiling of material as required, including existing pavements; re-use of excavated material as compacted subgrade; subgrade preparation; placement and compaction of re-used material or aggregate subbase to the required elevations shown in the plans and in accordance with the Standard Specifications and these Special Provisions and legally disposing of all surplus excavated material. No additional compensation shall be provided there for.

“Roadway Excavation (Track)” shall be paid in conformance with Section 19-2.09, “Payment,” of the Standard Specifications.

Where Excavation or backfill is required for the construction of retaining wall and other structure foundations, drainage and utility structures (including pipes, vaults, cleanouts, etc.), full compensation for complying with the requirements of this section shall be considered as included in the contract

prices paid for the various items of work involved, and no additional compensation will be allowed there for.

10-5.02.C SUBGRADE PREPARATION

After demolition, clearing and grubbing, removal of existing paved areas, over-excavation of the native material to the depth specified as described above but prior to the placement of subgrade enhancement geotextile and compacted fill, the exposed ground surface shall be scarified to a depth of approximately 8 inches and watered or dried, as needed, to achieve moisture contents near the laboratory optimum. The scarified materials shall then be compacted to a minimum 90 percent of their modified Proctor density as evaluated in accordance with American Society for Testing and Materials (ASTM) test method D 1557. Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture conditioning, and re-compaction.

Where the grade is too low as a result of the removal of excavated materials that are unsuitable for reuse as fill or as a result of buried manmade structures discovered during excavation and needing removal as determined by the Engineer, Class 2 Aggregate Base shall be added until the appropriate grade is met. Class 2 aggregate base shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications. The Engineer will direct corrective work and such ordered work will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Should the R-Value of the upper 6 inches of the exposed subgrade (upon which base and sub-base materials are to be placed) be less than 10, as determined by the Engineer, the Engineer will review and determine the necessary modifications to subgrade and/or structural section. If a structural section change is necessary, then the Engineer will direct corrective work and such ordered work will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Where the platform improvements extend into the existing landscaped areas, the Contractor shall remove all mulch, leaves, roots, and organics to a depth of 3 feet below finished grade in accordance with the Section 16, "Clearing and Grubbing" of the Standard Specifications. Aggregate subbase shall be placed where needed, and compacted to 90 percent relative compaction.

Measurement and Payment

Full compensation for scarifying and compacting existing sub-grade material, furnishing labor, materials, equipment, tools, and incidentals for doing all work involved in subgrade preparation shall be included in the contract price paid for "Roadway Excavation" and no separate payment shall be made there for.

Buried manmade structures encountered during excavation and needing removal as determined by the Engineer, shall be measured and paid in accordance with Section 10-04.05.D of these Special Provisions.

10-5.02.D SUBGRADE ENHANCEMENT GEOTEXTILE

Subgrade Enhancement geotextile shall be in accordance with Section 19-8, "Subgrade Enhancement Geotextile" of the Standard Specifications. It shall be installed at the bottom of the excavation section

as shown in the pavement sections in the construction plans and in accordance with manufacturer's recommendations.

Measurement and Payment

"Subgrade Enhancement Geotextile" shall be measured by the square yard as shown in the plans. Overlaps as required for installation shall be considered as incidental to the installation.

The contract unit price paid for "Subgrade Enhancement Geotextile" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved placing geotextile material as shown in the plans and specified in these special provisions.

10-5.02.E SURPLUS MATERIAL

Surplus excavated material not designated or determined to contain aurally deposited lead shall become the property of the Contractor and shall be disposed of offsite in conformance with the provisions in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications. Surplus material shall not be disposed of in any MTS or public street right of way.

Surplus excavated materials determined to contain aurally deposited lead or other hazardous materials, which have special requirements for disposal, shall be disposed of in accordance with

Section 10-5.04, "Hazardous Waste in Excavation," of these special provisions.

Measurement and Payment

Disposal of surplus excavated material, not re-used for fill shall be included in the price paid item for Roadway Excavation. No separate payment shall be made therefor.

10-5.02.F ADDITIONAL WORK

Measurement and payment for additional required excavation above and beyond what is depicted in the construction plans as directed by the Engineer shall be in accordance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-5.03 STRUCTURE EXCAVATION AND BACKFILL

Structure excavation and backfill shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications and as specified in these special provisions.

Blasting will not be allowed.

Shoring, lagging, or other bracing shall be furnished and placed to adequately support the excavation.

Steel shoring, steel and timber lagging, and other steel bracing may remain in place, subject to the following requirements:

1. The amount of bracing remaining in place shall not exceed the practical minimum that is necessary to safely support the sides of the excavation.
2. Bracing shall be placed in an open type arrangement with ample clearance between adjacent braces to permit the ready flow of concrete around the bracing and provide proper clearance to the reinforcement.

At the footings where material is removed and replaced, as described herein, a relative compaction of not less than 95 percent shall be obtained below the bottom of the excavation to the depth shown in the plans. If no depth is shown in the plans then 95 percent compaction shall be obtained for a minimum depth of 6 inches below the bottom of excavation.

In Platform areas, the Contractor shall place compacted sub-grade fill to the elevation of the underside of base material in the platform pavement section as shown in the construction plans and described in Section 10-5.02.C of these Special Provisions.

Measurement and Payment

Structure Excavation and Structure Backfill shall be included in various items of work involved and no additional measurement shall be made for Structure Excavation and Structure Backfill.

Structure Excavation and Structure Backfill shall be included in various items of work involved and no additional compensation will be allowed therefor. Structure Excavation and Structure Backfill shall include furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Structure Excavation and Structure Backfill, and for doing all work involved in the removal and disposal of existing retaining walls associated with Structure Excavation, complete in place, including excavation support systems as required for excavation as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-5.04 HAZARDOUS WASTE IN EXCAVATION

General

A supplemental geotechnical report has been prepared for this project by Ninyo and Moore Geotechnical Consultants entitled, "Geotechnical evaluation, Harborside Station, Blue Line LRT Station Improvements, San Diego, National City and Chula Vista, California" and dated January 26, 2012. This geotechnical report is for information only and the Contractor may use it at his/her own risk.

It is anticipated that the Contractor will encounter contaminated soils or hazardous waste in excavations. Therefore, the contractor shall provide employees with the herein designated safety and remediation training within 24 hours of the Contractor, SANDAG or third party determining a hazardous or contaminated soils condition exists in an excavation. The contractor shall have the trained employees available prior to the start of any excavation and at the direction of the Engineer, the Contractor shall include a hazmat training as a scheduled task in the Contract Schedule. No additional working days shall be granted for the contractor's inability to provide and mobilize trained workers within the 24 hour time limit.

If the Contractor encounters hazardous waste in excavation, as defined by Section 25117 of the Health and Safety Code, the Contractor shall immediately so notify the Engineer in writing. The Engineer shall notify the City of San Diego Solid Waste Local Enforcement Agency (LEA) and SANDAG during earthwork. Excavation in the immediate area of the suspected hazardous material shall be suspended

until the Engineer authorizes it to be resumed. If such suspension delays the current controlling operation, the Contractor will be granted an extension of time as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications.

If such suspension delays the current controlling operation more than 2 working days, the delay will be considered a right-of-way delay and the Contractor will be compensated for each such delay as provided in Section 8-1.08, "Right of Way Delays," of the Standard Specifications.

The SANDAG reserves the right to use other forces for exploratory work to identify and determine the extent of such material and for removing hazardous material from such area.

Existing preservative-treated timber crossties that are removed during trackwork demolition and are not to be salvaged shall be disposed of in a safe manner in accordance with the relevant Health and Safety Codes of Practice.

Health and Safety Plans

Prior to site mobilization, the Contractor's Site Health and Safety Manager (SHSM) shall prepare the Health and Safety Plan (HSP). The plan shall provide policies, information, requirements, and guidelines to be followed while conducting excavation activities, temporary stockpiling/storage, reuse, handling, and disposal of waste from the site. The HSP should be prepared in accordance with the Federal and State Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response (HAZWOPER) Standards: 29 CFR 1910.120 and 8 CCR Section 5192.

The HSP shall provide for contingencies and be structured to handle a variety of situations that may arise, but be concise enough so that site workers understand the hazards and are able to follow the procedures to reduce the level of risk. The employees within the exclusion zone shall be trained through an OSHA approved Hazwopper 40 Hour Training class or have a Hazwopper refresher course within one year prior to the date the work is to be performed; and possess a certificate showing successful completion of the Hazwopper training. OSHA accepted Hazwopper training shall conform to all Federal, State, and Local requirements (including those specified in 29 CFR 1910.120. In addition, workers shall have additional hands-on training in use of the Personal Protective Equipment required for their jobsite(s) in accordance with 29 CFR 1910.120. Appropriate management personnel should have eight-hour supervisor training. Additional training should be required for personnel engaged in specialized tasks, as appropriate.

Contractor field personnel and sub-contractors should be required to review the HSP and provide written acknowledgement of their review and understanding of the plan and willingness to abide by its requirements. In addition, the Contractor's SHSM, or designee, should perform a daily tailgate safety meeting held at the beginning of each workday to discuss relevant task-specific safety issues.

Soil Excavation

The Contractor shall be responsible for excavation, handling, possible reuse and/or off-site disposal, and temporary stockpiling of materials in accordance with project specifications, the HSP, the CHSP, the SGMP, and the applicable local, state, and federal statutes, regulations, and guidelines.

Excavation and handling of wastes and/or soil impacted with wastes shall be done in a manner that prevents the release of contamination to other on-site and off-site areas. The Engineer or designee, shall

observe excavation activities, and use field observations and appropriate field screening procedures and indicators to identify and guide the Contractor in segregating the wastes, should they be encountered.

Segregation and Stockpiling

Should potentially contaminated soil and/or groundwater be encountered during earthwork, the Contractor shall notify the Engineer in writing, as noted above, for assistance with segregation prior to continuing further excavation activities in that area. The Contractor shall coordinate with the Engineer to identify and segregate “potentially contaminated,” “contaminated” and “clean” soils/materials into separate stockpiles as follows:

“Potentially Contaminated” Soils/Materials Stockpile: These are soils and/or materials that may not be obviously contaminated based on field observations or may only be minimally contaminated. Analytical testing to evaluate the stockpile for on-site/off-site reuse or off-site disposal will be required as directed by the Engineer.

“Contaminated” Soils/Materials Stockpile: These are soils and/or materials that, based on field observations such as content and other factors such as odors and discoloration, are likely contaminated. Analytical testing to evaluate the stockpile for possible off-site disposal options will be required as directed by the Engineer.

“Clean” Soil Stockpile: These are soil and/or materials that are not suspected to be contaminated based on the type of material encountered and lack of visual or field screening indicators of contamination. Analytical testing to evaluate the stockpile for potential reuse or disposal options may be required as directed by the Engineer.

Should contamination be encountered in the construction area, the excavated soils/materials will be considered a contaminated substance unless determined otherwise by analytical testing. The Contractor should excavate, load, and transport potentially contaminated and contaminated soils to pre-determined, on-site stockpile staging area.

Soil Reuse or Disposal

Should potentially contaminated or contaminated soil and/or waste be encountered, it shall be segregated, stockpiled, sampled, and analyzed as described in the SGMP and directed by the Engineer. The analytical results should be utilized to make one of the following determinations for on-site reuse, off-site reuse, or disposal:

- The soils/materials are suitable for on-site reuse. However if there is excess material or on-site reuse is not an option, these may be considered for unrestricted off-site disposal,
- The soil/materials are suitable for unrestricted off-site disposal based on regulatory requirements, e.g., the Regional Water Quality Control Board’s (RWQCB) Resolution No. R9-2007-0104 Conditional Waiver No. 8, specifically Section 8.II.F., or
- The soils/materials are not suitable for on-site reuse and shall be disposed of off-site at an appropriate facility. The analytical results should be utilized to classify the soil as a nonhazardous, California hazardous, or RCRA hazardous waste.

Approval should be obtained from the Engineer prior to the onsite reuse of potentially contaminated or contaminated soil and/or waste.

Stockpile Management

The staging area and the stockpiles shall be managed by the Contractor in accordance with Standard Specifications, these Special Provisions, this SGMP, the HSP, the CHSP, and the Contractor's Storm Water Pollution Prevention Plan (SWPPP) as directed by the Engineer. The "potentially contaminated" soils/materials and "contaminated" soils/materials stockpiles shall be constructed and managed to minimize the threat of release of contaminants or soil from the stockpile. The stockpiling shall be performed in accordance with current County of San Diego Department of Environmental Health Site Assessment and Mitigation (SAM) manual guidelines and Regional Water Quality Control Board (RWQCB) regulations regarding the management of temporarily stockpiled soil. Contaminated substance, hazardous substance, and/or hazardous waste stockpiles shall be removed from the site in less than 90 days from the date of starting the stockpile.

The stockpiled soil/materials shall be:

- Placed onto a relatively impervious surface, such as asphaltic concrete, concrete, or on a 30-mil or thicker high density polyethylene (HDPE) liner,
- Moistened to minimize dust emissions during stockpiling, as necessary,
- Securely covered with an 8-mil or thicker HDPE liner to minimize vapor emissions and prevent runoff from rain, and,
- Configured in such a manner that surface water runoff from the stockpile does not carry stockpile material and/or leachate beyond the stockpile perimeter berm.

Best Management Practices (BMPs)

The Contractor shall implement BMPs to protect the temporary stockpiles from erosion and storm water run-on and runoff. The BMPs include, but are not limited to, the following:

- Erosion control,
- Storm water drainage control,
- Secondary containment (as applicable),
- Fugitive emission control of dust and/or vapors,
- Wind dispersion control,
- Spill prevention, and,
- Additional BMPs specified in the Contractor's SWPPP.

The Contractor shall ensure that water draining from excavated soils/materials not be allowed to flow into any existing drainage systems or onto the ground surface unless the surface is protected with a HDPE liner. If contaminated and/or potentially contaminated soils/materials are encountered, then the water draining from excavated soils/materials, and water generated from spraying for dust suppression, shall be controlled in a manner consistent with the Contractor's SWPPP. Surface water runoff shall be handled according to the Contractor's SWPPP, National Pollution Discharge Elimination System requirements,

and other pertinent state and federal statutes and regulations. The Contractor shall be responsible for implementing BMPs specified in the SWPPP.

Odor and Vapor Control

During construction activities (e.g., excavating, maintaining stockpiles, loading, and transportation), if there is a potential to generate odors, the Contractor shall employ odor suppression techniques to mitigate impacts to nearby sensitive receptors (e.g., businesses, residential communities, general public). The Contractor shall implement appropriate means and methods, including application of odor suppression techniques and covering stockpiles and open excavations or trenches prior to leaving the site at the end of each workday or as directed by the Engineer.

Waste Characterization

Waste stockpile sampling shall be performed in general conformance with the United States Environmental Protection Agency SW-846 requirements. Only discrete soil samples shall be collected. Each waste stream should be considered as one stockpile.

Samples shall be collected from random locations in a stockpile. Random sample points shall be selected from locations on a three-dimensional grid. The number of samples shall be collected based on the guidance provided below:

- A minimum of four samples per 100 cubic yards (cy), or part thereof, for the first 500 cy.
- In addition to the samples for the first 500 cy indicated above, one sample for every additional 500 cy, or part thereof, for the first 5,000 cy.
- For volumes over 5,000 cy, the number of samples should be as directed by the Engineer

Additional samples and analyses may be required for waste profiling to meet the requirements of the individual receiving facility; therefore, archiving of samples may be appropriate. Archived samples shall be appropriately preserved and analyzed within the maximum holding time specified in SW-846. Samples should be analyzed in accordance with the requirements of the receiving facility.

Transport and Disposal

Transporters and disposal facilities used must be appropriately licensed and/or permitted and properly insured. The management of the transportation and disposal of wastes to the appropriate treatment and disposal or recycling facilities shall be the responsibility of the Contractor. The Contractor or Environmental Professional shall prepare waste profiles and manifests for review and signature by SANDAG, and then forward them to the appropriate disposal/recycling facility for acceptance. The Contractor should schedule shipments of wastes after notice of acceptance and at the direction of SANDAG.

Vehicles and vessels entering the site for loading of wastes slated for disposal shall be tracked by the Contractor as directed by the Engineer, as necessary, and decontaminated prior to their departure from the site. The Contractor shall take measures to avoid materials being tracked off-site.

Hazardous wastes transported off-site for disposal shall be performed in accordance with Department of Transportation (DOT) Hazardous Material Transportation regulations 49 CFR Parts 171 and 180, 40 CFR

Part 262, Subpart B, and Title 22 CCR Section 66262, which involve packaging, placarding, labeling, and manifesting requirements. Hazardous wastes transported should also have appropriate certification notices per 40 CFR Par 268 and Title 22 CCR Section 66268. Personnel having the required DOT-training should perform DOT-related functions, if required. Wastes that have been characterized as non-hazardous and do not exhibit the DOT hazard class characteristics (i.e., explosives, gases, flammable/combustible liquids, flammable solids/spontaneously combustible materials/dangerous when wet materials, oxidizers and organic peroxides, toxic materials and infectious substances, radioactive materials, and corrosive materials) are not regulated under DOT rules for hazardous materials transportation.

Unknown Contamination in Excavation

In the event of encountering unknown contamination which causes a sudden hazard to life or the environment, the Contractor should immediately secure the area, notify the Contractor's SHSM, Community Health and Safety manager (CHSM), and the Engineer of the health and/or environmental risk, and call "911" to summon the emergency services, as necessary. The CHSM has the knowledge and authority to cease any activity contributing to the hazard.

The SHSM should be responsible for notifying the appropriate emergency response agencies, the Engineer and SANDAG. The SHSM shall be identified prior to commencement of construction activities, and the applicable contact names and numbers to report any hazards should be posted at the project site.

If previously unknown hazardous substances or conditions are encountered that do not present an immediate threat to human health or water quality, the Contractor shall immediately notify the Engineer, SHSM, CHSM, and the City. As necessary, the area surrounding the discovery of unknown contamination should be isolated and secured by the Contractor with markings, fencing, or a suitable barrier so that construction activities can be excluded from the zone of impact. SANDAG and the City, with guidance from the Engineer, shall then decide whether immediate excavation, segregation, stockpiling, containerization, or other activities are warranted.

Documentation

If potentially contaminated soil and/or waste are encountered, the Engineer or designee shall prepare a report summarizing monitoring activities, site observations, locations and extents/volumes of materials excavated, volumes of materials reused on-site or disposed off-site, placement locations of reused materials, and information regarding the discovery, location, characterization, handling, and disposition of waste/impacted soils. The report should be signed by the project Environmental Professional's registered professional (e.g., Professional Geologist, Professional Engineer).

In addition, the report shall include the following information:

- An estimate of the volume of material in each stockpile,
- A description of the sampling methodology and sample location/selection process,
- A plot plan detailing the stockpile and sample locations,
- A copy of the sample results, chain-of-custody documents, and quality assurance/quality control supporting data,

- A summary of the laboratory results of the stockpile sampling,
- Statistical calculations for all stockpiles greater than 20 cy,
- Placement location, if the materials were reused on site,
- An accounting of the materials transported and disposed of off-site, including weight tickets and waste manifests, and,
- Health and safety monitoring records, including air monitoring analytical data and procedures used to mitigate odors and dust.

Measurement and Payment

No separate measurement will be made for the removal of existing preservative-treated timber crossties.

“Hazardous Waste in Excavation” shall be measured by the cubic yard. SANDAG and the Engineer shall make a determination on the extent of the hazardous material to be excavated. Excavation determined to contain hazardous material shall be isolated and not be comingled with other uncontaminated material as described above and directed by the Engineer.

Full compensation for workers to attend OSHA accepted Hazwopper 40 Hour Training and possess a certificate showing proof of acceptable training as described in this section shall be included in various items of work involved and no additional compensation will be allowed therefore.

Payment for removal and disposal of “Hazardous Waste in Excavation” shall be per the contract unit price paid per cubic yard and shall, include obtaining any necessary permits, required state, federal, municipality or disposal facility testing and analysis, stockpiling, handling, sample storage, hazardous material transportation and disposal at a legal facility, reuse, documentation, and relevant disposal fees.

Payment for removal and disposal of unknown contamination found in excavation will be made in accordance with the provisions of Section 4-1.03D, “Extra Work,” of the Standard Specifications.

No additional payment will be allowed for the removal and legal disposal of preservative-treated timber ties.

10-5.05 TRENCH EXCAVATION AND BACKFILL

Excavating and backfilling for trenches shall conform to the provisions in Section 86-2.01, "Excavating and Backfilling," of the Standard Specifications.

Open trenches and excavations shall be covered or barricaded to protect the general public and workers in accordance with Section 10-2, “Traffic Control Plan,” of these Special Provisions. Open trenches in traffic areas shall be covered with traffic rated trench plates or otherwise be adequately barricaded. After excavation, trenches shall promptly have conduits installed and then be backfilled.

Trench excavation and shoring requirements adjacent to the existing rail shall comply with Section 7.0, "Railroads," of the Caltrans' California Trenching and Shoring manual to determine railroad live loading lateral pressure for shoring design (Chart 3.6, LATERAL PRESSURE FOR COOPER RAILROAD LIVE LOAD). The shoring in areas where freight trains do not operate over or alongside trolley tracks shall be designed to accommodate LRV loads as shown in the LRV Loading Diagram of MTDB's LRT Design Criteria. All shoring within a 1 to 1 influence line from the end of the railroad ties shall be designed for a minimum Cooper E-80 load per bogie/axel.

All surplus excavation, from whatever source, shall be disposed of in accordance with Section 7-1.13, "Disposal of Material Outside the Railway or Highway Right of Way," of the Standard Specifications.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for excavating and backfilling shall be considered included in the contract prices paid for the various related items of work and no separate payment will be made therefore.

10-5.06 FINISHING ROADWAY

The work performed in connection with finishing roadway shall conform to the provisions of Section 22-1.01, "Finishing Roadway," and of Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions.

All references to "Roadway" or "Highway" shall be considered applicable to transit and railway facilities.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for complying with the requirements of this section shall be considered as included in the contract prices paid for various items of work involved and no additional compensation will be allowed therefore.

10-6 PLANTING

10-6.01 GENERAL

The work performed in connection with planting shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these Special Provisions.

10-6.02 WATERING OF PLANTS

The Contractor shall notify the Engineer not less than 72 hours prior to requiring initial access to the existing irrigation controllers. When the Engineer determines that access to the controllers is required at other times, arrangements will be made to provide this access.

When fluctuations of water pressure and water supply are encountered during normal working hours, plants shall be watered outside of normal working hours, as often and in sufficient amounts as conditions may require keeping the soil and plant roots moist during the life of the contract.

10-6.03 PROGRESS INSPECTIONS

Progress inspections will be performed by the Engineer for completed planting work at designated stages during the life of the contract.

Progress inspections will not relieve the Contractor of responsibility for installation in conformance with the Special Provisions, plans and Standard Specifications. Work within an area shall not progress beyond each stage until the inspection has been completed, corrective work has been performed, and the work is approved, unless otherwise permitted by the Engineer.

The requirements for progress inspections will not preclude additional inspections of work by the Engineer at other times during the life of the contract.

The Contractor shall notify the Engineer, in writing, at least 4 working days prior to completion of the work for each stage of an area and shall allow a minimum of 3 working days for the inspection.

Progress inspections will be performed by the Engineer at the following stages of work:

- A. Before planting begins and after completion of the work specified for planting in Section 20-4.03, "Preparing Planting Areas," of the Standard Specifications.
- B. Before plant establishment work begins and after completion of the work specified for planting in Section 20-4.05, "Planting," of the Standard Specifications.
- C. At intervals of one month during the plant establishment period.
- D. A final walkthrough shall be conducted at the site a minimum of one week prior to turn-over of the maintenance to the Owner's Maintenance Contractor. The walkthrough shall include the Contractor, the Landscape Contractor, SANDAG, MTS, the Landscape Architect, and the Owner's Maintenance Contractor.

10-6.04 COST BREAKDOWN

The Contractor shall furnish the Engineer cost breakdowns for each of the contract lump sum items of planting.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost breakdowns submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost breakdowns submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for planting due to differences between the quantities shown in the cost breakdowns furnished by the Contractor and the quantities required to complete the work as shown on the plans.

The sum of the amounts for the units of work listed in each cost breakdown for planting work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in each cost breakdown. Cost breakdowns shall be submitted to the Engineer for approval within thirty (30) working days after the contract has been approved. Cost breakdowns shall

be approved, in writing, by the Engineer before a partial payment for the items of planting will be made.

Approved cost breakdowns will be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the items of planting due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost breakdown, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

10-6.05 EXISTING PLANTING

In addition to the provisions in Section 20 of the Standard Specifications, work performed in connection with existing planting shall be in conformance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions.

Replacement planting shall conform to the requirements in Section 7-1.11, "Preservation of Property," of the Standard Specifications.

10-6.06 MAINTAIN EXISTING PLANTED AREAS

Existing planted areas, designated on the plans to be maintained or existing to remain, shall be maintained throughout the life of the contract in conformance with these Special Provisions.

Existing plants shall be watered in conformance with the provisions in Section 20-4.06, "Watering," of the Standard Specifications.

Existing planted areas to be maintained shall be inspected for deficiencies by the Contractor in the presence of the Engineer. Deficiencies requiring corrective action shall include weeds; dead, diseased, or unhealthy plants; missing plant stakes and tree ties; inadequate plant basins; and any other deficiencies needing corrective action to promote healthy plant life, as determined by the Engineer. The inspection shall be completed within 10 working days after the start of work.

When directed by the Engineer, deficiencies found during the inspection shall be corrected within 10 working days after the inspection. Correction of deficiencies, as directed by the Engineer, will be paid for as extra work in conformance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

When directed by the Engineer, existing plants shall be pruned and the work will be paid for as extra work in conformance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

After initial deficiencies have been corrected as directed by the Engineer, the Contractor shall continue to maintain existing planted areas as often as necessary to maintain the area in a neat appearance. The work shall include the following and any other work needed to promote healthy plant growth and maintain the area in a neat appearance, as determined by the Engineer.

- A. Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 150 mm (6 inches) in length.

- B. Trash, debris and weeds shall be removed from existing planted areas. Weeds shall be killed prior to removal. Trash, debris and weed removal in ground cover areas shall extend beyond the outer limits of ground cover areas to the adjacent edges of paving, fences and proposed plants and planting areas, and a 2-m (80 inches) diameter area centered at each existing tree and shrub outside of existing ground cover areas.
- C. Existing plant basins shall be kept well-formed and free of silt. If existing plant basins require repairs, and the plant basins contain mulch, the mulch shall be replaced after the plant basins have been repaired.
- D. When a portion of a new automatic irrigation system is completed, the existing plants to be watered by that portion of the irrigation system shall be watered automatically.
- E. Pesticides for maintaining existing planted areas shall conform to the provisions in "Pesticides" of these Special Provisions.

If, after completion of the initial inspection and correction of deficiencies, the Engineer determines that existing plants show signs of failure to grow, or are so injured or damaged as to render the plants unsuitable for the purpose intended, the existing plants shall be replaced. Removal, disposal and replacement of the existing plants shall be in conformance with the provisions in "Preservation of Property" of these Special Provisions.

10-6.07 REMOVE EXISTING PLANTS FOR TRENCHING

Removing existing plants for trenching shall conform to the provisions in Section 20-5.026, "Remove Existing Plants for Trenching," of the Standard Specifications and these special provisions.

Removing existing plants for trenching work shall consist of removing and replacing ground cover, pruning trees and shrubs within trench locations, applying pre-emergents and disposing of removed ground cover and pruning.

Replacement of removed ground cover within the maximum 6 feet width, as specified in Section 20-5.026, "Remove Existing Plants for Trenching," of the Standard Specifications, will be required, except for trenches within 6 feet of fences, curbs, dikes or shoulders.

Trees and shrubs adjacent to dikes, walks, fences, guard railing, and pavement edges may be pruned back 10 feet from these facilities to facilitate trenching work. When trenching is to be performed adjacent to other trees and shrubs that cannot be avoided, the trees and shrubs may be pruned upon receipt of prior written approval of the Engineer.

All tree removal shall be conducted under direct supervision of the Engineer. Trees noted to be removed shall be removed completely including the root crown, root mass and roots over 2 inches in diameter where practicable. Stump shall be removed by grinding or other mechanical method to a depth of 30 inches below proposed finish grade. The contractor shall verify the specific trees to be removed with the Engineer prior to removal. Caution shall be exercised to avoid damage to adjacent property. Barricades shall be erected to protect pedestrians.

Existing tree grates and frames shall be removed as shown on the demolition drawings.

Pruning shall include removal of deadwood, suckers, and broken or bruised branches 1 inch or larger in

diameter. Pruning shall conform to the provisions in Section 20-4.055, "Pruning," of the Standard Specifications.

Removed ground cover and pruned materials shall be disposed of outside the limit of work in conformance with the provisions in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications. At the Contractor's option, removed ground cover and prunings may be reduced to chips. Chipped materials shall not be spread within the project right of way. Shrubs adjacent to dikes, fences, guard railing, and the edge of pavement within the 10 feet pruned area designated above, that in the opinion of the Engineer should be removed after pruning, shall be removed and disposed of. Removing and disposing of the shrubs not otherwise provided for will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

One application of a pre-emergent pesticide shall be applied to trenched areas in existing ground cover areas and to trenched areas adjacent to fences, curbs, dikes and shoulders. The Engineer will determine when the pre-emergent pesticide shall be applied.

10-6.08 PROTECTION AND STORAGE OF PLANTS

The Contractor's on-site plant storage area shall be approved by the Engineer prior to the delivery of any plant materials. Any plants determined by the Engineer to be wilted, broken, or otherwise damaged shall be rejected at any time during the project, whether in the ground or not. All plants shall be handled by their containers. Any plant that has been handled by its trunk or stem shall be rejected. All rejected plants shall be removed from the site immediately.

10-6.09 MULCH

Mulch shall be decomposed granite. Install mulch in all tree wells, shrub and ground cover planting areas as designated on the plans. Install mulch to the depth indicated on the plans and details.

The salvage and reuse of existing granite material from the project area will not be allowed. All granite material shall be new.

The color of the granite shall be a blend of tan, brown, reddish-brown mix. Contractor to submit samples for approval by Engineer.

Gradation for the granite material is as follows:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/4"	100%
1/2"	45-65%
No. 40	5-20%

At the pre-construction conference, written acknowledgement from each supplier that they can provide the quantity of granite material required to complete the project shall be provided to the Engineer for all granite material proposed to be used on the project.

10-6.10 COMMERCIAL FERTILIZER

Commercial fertilizer (granular) shall be a pelleted or granular form and shall fall within the following guaranteed chemical analysis range:

Ingredient	Percentage Range
Nitrogen	15
Phosphoric Acid	15
Water Soluble Potash	15

Commercial fertilizer (slow release) shall be a pelleted or granular form, shall be slow release, and shall fall within the following guaranteed chemical analysis range:

Ingredient	Percentage Range
Nitrogen	16
Phosphoric Acid	6
Water Soluble Potash	8

Commercial fertilizer (packet) shall be slow release and shall be in a biodegradable packet form. The packet shall gradually release nutrients throughout a 12-month period. Each packet, shall have a mass of 10-g \pm 1-g, and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	20
Phosphoric Acid	10
Water Soluble Potash	5

Install the amount of fertilizer packets per each plant as recommended by the manufacturer.

At the option of the Contractor, two 10.5-g tablets may be used in place of each 21-g tablet designated on the plans or specified in these special provisions. Regardless of the tablet size used, each tablet shall be the slow release type and shall have the same guaranteed chemical analysis as specified for the 21-g tablets. Each 10.5-g tablet shall have a mass of 10.5-g \pm 0.5-g.

10-6.11 GYPSUM

Agricultural grade gypsum shall be a (CA SO₄ H₂O) calcium sulfate product – minus ninety-four point three percent (-94.3%). Ninety percent (90%) shall pass a fifty (50) mesh screen. Control of dust during application is mandatory. (Shall be similar or equal to: U.S. Gypsum, Domtar or Bandini)

10-6.12 SOIL TESTING

Soil Testing - Prior to the incorporation of soil amendments or fertilizers, soil testing by a certified agronomic soil testing laboratory and 24-hour percolation test shall be conducted to determine the

optimum amounts of each amendment to ensure proper plant establishment as well as proper sub-surface soil drainage. The Contractor shall obtain soil tests from (1) one general location at each area requiring planting as determined by the Engineer, and submit test results to Engineer for interpretation and recommendation. Soil test results may require change in soil amendment or fertilizers quantities. If soil in planting areas is found to be not suitable for plant survival, the unsuitable soil shall be removed and an approved import soil shall be furnished and installed as approved by the Engineer. Corrective work ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-6.13 CLEARING

Prior to preparing planting areas, trash and debris shall be removed from the entire project area within the project limits, excluding paved areas, medians and existing planted areas where existing plants are to remain.

In addition to removing trash and debris, the project area shall be cleared as specified herein:

- A. Existing ground cover, where different from proposed ground cover, shall be removed.
- B. At the option of the Contractor, removed trees and shrubs may be reduced to chips. Chipped material shall not be substituted for mulch, nor shall the chipped material be placed within areas to receive mulch.
- C. Weeds shall be killed and removed within the project limits, except for existing plants and planting areas to be maintained, and including new and existing pavement, curb, sidewalk and other surfaced areas.
- D. Weeds killed during the initial clearing shall be disposed of outside of the project limits.

After the initial clearing is complete, additional clearing work shall be performed as necessary to maintain the areas, as specified above, in a neat appearance until the start of the plant establishment period. This work shall include the following:

- A. Trash and debris shall be removed.
- B. Rodents shall be controlled.
- C. Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 150 mm (6 inches) in length.
- D. Existing ground cover shall be killed and removed from within the 2-m (80 inch) diameter areas specified for each proposed plant location within the existing ground cover areas.
- E. Weeds in plant basins, including basin walls, shall be removed by hand pulling, after the plants have been planted.

Weed Control

Weed control shall also conform to the following:

- A. Stolon type weeds shall be killed with glyphosate.
- B. Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 6 inches.
- C. Removed weeds and ground cover shall be disposed of outside the project area in conformance with the provisions in Section 7-1.13, "Disposal of Material outside the Highway Right of Way," of the Standard Specifications.

Clearing work shall not include work required to be performed as clearing and grubbing as specified in Section 16, "Clearing and Grubbing," of the Standard Specifications.

10-6.14 PESTICIDES

Pesticides used to control weeds shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications. Except as otherwise provided in these special provisions, pesticide use shall be limited to the following materials:

- Glyphosate
- Oxadiazon – 50 percent WP (Preemergent)
- Trifluralin (Pre-emergent)

Oxadiazon (Pre-emergent)

Granular pre-emergent shall be applied prior to the application of mulch. Mulch applications shall be completed in these areas on the same working day. Photosensitive dye will not be required.

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type, except when Oxadiazon is used under mulch in conformance with these special provisions.

Prior to the application of pre-emergent, ground cover plants shall have been planted a minimum of three (3) days and shall have been thoroughly watered.

A minimum of one hundred (100) days shall elapse between applications of pre-emergent.

Except for ground cover plants, pre-emergent shall not be applied within 18 inches of plants or erosion control areas.

If the Contractor elects to request the use of other pesticides on this project, the request shall be submitted, in writing, to the Engineer not less than fifteen (15) days prior to the intended use of the other pesticides. Written approval from Engineer must be obtained prior to application of other pesticides. Except for the pesticides listed in these special provisions, no pesticides shall be used or applied without prior written approval of the Engineer.

Pesticides shall not be applied within the limits of the plant basins. Pesticides shall not be applied in a manner that allows the pesticides to come in contact with the foliage and woody parts of the plants.

10-6.15 PREPARE HOLES

Holes for plants shall be excavated to the minimum dimensions shown on the plans.

Backfill material for plant holes shall be a mixture of 6 parts on-site native soil, 4 parts soil amendment, and 10 pounds gypsum per cubic yard (or other mixture as indicated in soil tests). Backfill material shall be thoroughly mixed and uniformly distributed throughout the entire depth of the plant hole without clods and lumps.

Root barriers shall be installed in plant holes in conformance with the details shown on the plans and the provisions in "Root Barriers" of these special provisions.

Tree drain assemblies shall be installed in plant holes requiring tree drains in accordance with the details shown on the plans.

10-6.16 STRUCTURAL FRAME AND SOIL SYSTEMS

General

Section includes furnishing and installing Structural Frame and Soil System, geotextile, geogrids, sub base material, backfill, drainage system, root barrier, and mulch, and the installation of planting soil.

Definitions

- A. Aggregate Sub Base (below Cell frame): Aggregate material between the bottom of the Structural Frame and Soil System frame and the compacted sub-grade below, designed to distribute loads from the frame to the sub-grade.
- B. Aggregate Base Course (above Cell deck): Aggregate material between the paving and the top of the Structural Frame and Soil System deck below designed to distribute loads across the top of the deck.
- C. Backfill: The earth used to replace or the act of replacing earth in an excavation beside the Structural Frame and Soil System frames to the excavation extents.
- D. Finish Grade: Elevation of finished surface of planting soil or paving.
- E. Geogrid: Net-shaped synthetic polymer-coated fibers that provide a stabilizing force within soil structure as the fill interlocks with the grid.
- F. Geotextile: A geosynthetic fabric, applied to either the soil surface or between materials, providing filtration, separation, or stabilization properties.
- G. Planting Soil: Soil as defined in Standard Specification intended to fill the frames and other planting spaces.
- H. Root package: The earthen package containing the root system of the tree as shipped from the nursery.
- I. Structural Frame and Soil Systems: Plastic structural cellular system with posts, beams and

decks designed to be filled with planting soil for tree rooting and support of vehicle loaded pavements. The soil within the cells may also be used as part of rainwater filtering, retention and detention systems.

- J. Sub-grade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill.
- K. Strongback: Modified Structural Frame and Soil System frame designed to be attached to top of Structural Frame and Soil Systems for stability while installing planting soil and backfill.
- L. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- M. Tree: A perennial woody plant with one or several trunks and a distinct crown and intended to become large enough to shade people and or vehicles.

Submittals

- A. Upon forty-five (45) days prior to start of installation of items in this section, the Contractor shall provide submittals required in this section to the project engineer for review and approval.
- B. Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these specifications.
- C. Samples for Verification: For each product where noted in the specification, submit samples as described.
- D. Soil Installation Mock Up and Compaction Evaluation:
 - a. Prior to the installation of Structural Frame and Soil Systems, construct a mockup of the complete installation at the site. The installation of the mock up shall be in the presence of the project engineer. The mock up shall be a minimum of 100 square feet in area and include the complete Structural Frame and Soil System installation with sub base compaction, drainage installation, Base course aggregate and geotextile as required, geogrids, backfill, planting soil with compaction, decks, and top geotextile.
 - b. The mock up area may remain as part of the installed work at the end of the project provided that it remains in good condition and meets all the conditions of the specifications.
- E. Compaction testing results: Submit results of all compaction testing required by the specifications including the bulk density test of the mock up and installed soil, and the compaction testing log of penetrometer and moisture meter readings to the project engineer for approval.
- F. Qualification Data: Submit documentation of the qualifications of the Structural Frame and Soil System installer sufficient to demonstrate that the installer meets the requirements of paragraph "Quality Assurance."
- G. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - a. Manufacturer's certified analysis for standard products.

- b. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- c. Structural Frame and Soil System manufacturer's letter of review and approval of the project, plans, details and specifications for compliance with product installation requirements.

Sequencing and Scheduling

- A. General: Prior to the start of Work, prepare a detailed schedule of the work for coordination with other trades.
- B. Schedule all utility installations prior to beginning work in this section.
- C. Where possible, schedule the installation of Structural Frame and Soil Systems after the area is no longer required for use by other trades and work. Protect installed Structural Frame and Soil Systems from damage in the event that work must occur over or adjacent to the completed Structural Frame and Soil Systems.

Quality Assurance

- A. Installer Qualifications: Structural Frame and Soil Systems and related products shall be installed by a qualified installer whose work has resulted in successful installation of planting soils and planter drainage systems, underground piping, chambers and vault structures.
- B. Submit list of completed projects of similar scope and scale to the Owner, demonstrating capabilities and experience.
- C. The installer and the field supervisor shall have a minimum of five years successful experience with construction of similar scope in dense urban areas.
- D. Installer's Field Supervision: Installer is required to maintain an experienced full-time supervisor on Project site when work is in progress. This person shall be identified during the Pre-installation Conference, with appropriate contact information provided, as necessary. The same supervisor shall be utilized throughout the Project, unless a substitution is submitted to and approved in writing by the Engineer.

Layout and Elevation Control

Provide layout and elevation control during installation of Structural Frame and Soil Systems. Utilize grade stakes, benchmarks, surveying equipment and other means and methods to assure that layout and elevations conform to the layout and elevations indicated on the plans.

Permits and Code Compliance

Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary permits/approvals from all such authorities.

Delivery, Storage and Handling

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, if applicable. Protect materials from deterioration during delivery and while on the project site.
- B. Bulk Materials:
 - a. Do not deliver or place backfill, soils and soil amendments in frozen, wet, or muddy conditions.
 - b. Do not dump or store bulk materials near structures, utilities, sidewalks, pavements, and other facilities, or on existing trees, turf areas or plants.
 - c. Provide protection including tarps, plastic and or matting between all bulk materials and any finished surfaces sufficient to protect the finish material.
- C. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated material, backfill, soil amendments and planting mix within the project limits as needed.
- D. Structural Frame and Soil Systems: Protect Structural Frame and Soil Systems from damage during delivery, storage and handling.
- E. Store under tarp to protect from sunlight when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
- F. Handling is to be performed with equipment appropriate to the size (height) of Cells and site conditions, and may include, hand, handcart, forklifts, extension lifts, small cranes, etc., with care given to minimize damage to Structural Frame and Soil System frames, decks and adjacent Structural Frame and Soil Systems. Backhoes, front-end loaders and skid steers are considered inappropriate for Structural Frame and Soil System transport and placement.

Project Conditions

- A. Verification of Existing Conditions and Protection of New or Existing Improvements: Before proceeding with work in this section, the Installer shall carefully check and verify all dimensions, quantities, and grade elevations, and inform the project engineer immediately of any discrepancies.
 - a. Carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging. Verify the location of all above ground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system, and take proper precautions as necessary to avoid damage to such improvements and plants.
 - b. In the event of conflict between existing and new improvements notify the project engineer in writing and obtain written confirmation of any changes to the work prior to proceeding.
 - c. When new or previously existing utility lines are encountered during the course of excavation, notify the project engineer in writing and make recommendations as to remedial action. Proceed with work in that area only upon approval of appropriate remedial action. Coordinate all work with the appropriate utility contractors, utility company or responsible public works agency.

- B. Weather Limitations: Do not proceed with work when sub-grades, soils and planting soils are in a wet, muddy or frozen condition.
- C. Protect partially completed Structural Frame and Soil System installation against damage from other construction traffic when work is in progress, and following completion with highly visible construction tape, fencing, or other means until construction is complete. Prevent all non-installation related construction traffic over the completed Structural Frame and Soil System installation; only allowing loads less than the design loads.

Protection

Protect open excavations and partially completed Structural Frame and Soil System installation from access and damage when work is in progress, and following completion with highly visible construction tape, fencing, or other means until all construction is complete.

Warranty

Structural Frame and Soil System manufacturer's product warranty shall apply. Submit manufacturer's product warranty.

Project Work

Coordinate installation with all other work that may impact the completion of the work.

Preconstruction Meeting

Prior to the start of the installation of Structural Frame and Soil Systems, meet at the site with the project engineer, general contractor and the Structural Frame and Soil Systems installer to review installation layout, procedures, means and methods.

Structural Soil and Framing System

- A. Polyethylene and fiberglass structures including frames and decks designed to support sidewalk loads and designed to be filled with soil for the purpose of growing tree roots.
- B. Structural Frame and Soil System Frames: 16 inches x 24 inches x 48 inches.
- C. Structural Frame and Soil System Deck: 2 inches x 24 inches x 48 inches. Deck to include manufactured installed galvanized steel tubes.
- D. Structural Frame and Soil System Strongback: 24 inches x 48 inches x 6 inches modified Structural Frame and Soil System Frame units designed to stiffen and align the frames as planting soil and backfill material is placed. Strongbacks are to be removed prior to placing decks. They are to be reused as the work progresses.
- E. Structural Frame and Soil System Deck Screws: Manufacturer's supplied stainless steel screws to attach decks to frames.
- F. Basis of Design: Silva Cells (or approved equal)

- a. Manufacturer: DeepRoot Partners, L.P. (Deep Root);
- b. 530 Washington Street, San Francisco, CA 94111;
- c. Phone 415.781.9700; 800.458.7668
- d. fax 415.781.0191
- e. www.deeproot.com.

Anchoring Spikes

10" long X 19/64" diameter, spiral, galvanized timber spikes. Utilize 4 nails in each frame on the first layer of Structural Frame and Soil Systems to anchor the frames to the aggregate sub-base.

Solid and Perforated Drain Lines

- A. PVC double wall perforated pipe. Pipe, manufactured from virgin, low filler cell class PVC resin (12454 per ASTM D1784).
 - a. Basis of design: Contech A-2000 (or approved equal)
 - i. Manufacturer: Contech construction Products, Inc.
 - ii. Chicago IL
 - iii. Phone 630 573 1110
 - iv. www.contech-cpi.com
- B. Perforated pipe shall have slots on the bottom quadrant of the pipe of 1-1/16" long by 0.031" wide at 0.413 on center.
- C. All fittings, "T," "Y," end caps, and splices shall be compatible fittings by the same manufacturer. Size - 4" diameter.
- D. Pipe and fitting joints shall be glued using glue and techniques recommended by the pipe manufacturer.

Inspection Riser and Cap

- A. Inspection riser shall consist of a rigid, schedule 40 non-perforated PVC pipe, 4 inches in diameter. Cut slots in the bottom to allow water access for inspection risers that extend to the sub base aggregate.
- B. Cap shall be PVC solid threaded cleanout or removable inlet grate designed to fit standard PVC schedule 40 pipe-fittings.

Geogrid

- A. Basis of Design:
 - a. Miragrid 2XT (or approved equal)
 - b. Manufacturer: Ten Cate Nicolon
 - c. Norcross, GA
 - d. www.tcmirafi.com

Geotextile Fabric

- A. Non-woven polypropylene fabric with the following properties:

Grab tensile strength	370 lb.
Grab tensile elongation	50%
Mullen burst strength	380 psi
Puncture strength	130 lb.
Apparent opening size	US sieve 80
Water flow rate	95 gpm/SF

- B. Geotextile shall be delivered in 12 feet wide rolls min.

- C. Basis of Design: non-woven polypropylene geotextile, Mirafi 180 N (or approved equal)
 - a. Manufacturer: Ten Cate Nicolon
 - b. Norcross, GA
 - c. www.tcmirafi.com

Aggregate sub-base (below cell frame)

Coarse aggregate meeting the requirements of AASHTO M 43 size 8 when tested in accordance with AASHTO T27 omitting AASHTO T11.

Aggregate base course (Above cell deck)

Coarse aggregate meeting the requirements of AASHTO M 43 size 8 when tested in accordance with AASHTO T27 omitting AASHTO T11.

Backfill material (Adjacent to Structural frame and Soil Systems)

Clean, compactable, coarse grained fill soil meeting the requirements of the Unified Soil Classification system for soil type GW, GP, GC with less than 30% fines, SW, and SC with less than 30% fines. Backfill material shall be free of organic material, trash and other debris, and shall be free of toxic material injurious to plant growth.

Planting soil

See Section 10-6.15 "Prepare Holes" of this Special Provision.

Mulch

See Section 10-6.09 "Mulch" of this Special Provision.

Layout approval

Prior to the start of work, layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the Structural Frame and Soil Systems and required drainage features in the correct locations.

Excavation

- A. Excavate to the depths and shapes indicated on the drawings. Base of excavation shall be

smooth soil, level and free of lumps or debris.

- B. Do not over-excavate existing soil beside or under the limits of excavation required for the installation. If soil is over-excavated, install compactable fill material in lifts not more than 8 inches deep and compact to the required density.
- C. Confirm that the depth of the excavation is accurate to accommodate the depths and thickness of materials required throughout the extent of the excavation.
- D. Confirm that the width and length of the excavation is a minimum of 6 inches, in all directions, beyond the edges of the Structural Frame and Soil Systems.

Sub-grade compaction

- A. Check compaction of the sub-grade below the Structural Frame and Soil Systems and confirm that the sub-grade soil is compacted to a minimum of 95% of maximum dry density at optimum moisture content in accordance with ASTM D 698 Standard Proctor Method. Proof compact the sub-grade with a minimum of three passes of a suitable vibrating compacting machine or apply other compaction forces as needed to achieve the required sub-grade compaction rate.
- B. Apply additional compaction forces at optimum water levels.

Installation of geotextile over sub-grade

- A. Where indicated on the drawings, install geotextile over the compacted sub-grade material.
- B. Install the geotextile with a minimum joint overlap of 18 inches between sections of material.

Installation of solid and perforate drain lines

- A. Layout the location of all drains lines. Adjust the alignments to conform to the final locations of sleeves and risers. Do not locate drain lines within 6 inches of the edge of any Structural Frame and Soil System post.
- B. Provide horizontal field engineering at all times when drain lines are being installed to assure that the slope on all drain lines is positive toward its intended outfall and also remains at the correct depth as shown on the plans.
- C. Excavate a trench a minimum of 12 inches wide to a depth required to provide positive drainage from the high points of the system to the outfall or connection point to storm sewer. Eliminate dips or rises that will trap water. Minimum slope shall be 1%.
- D. Install the perforated drain lines as indicated on the drawing. All connections and splices shall use the manufacturer's standard splice and fitting connections. Joints shall be secure. Place perforated pipe with drain slots on the bottom side of the pipe.

Installation of Inspection Risers

- A. Install 4" solid P.V.C. inspection risers to grade.
 - a. Install manufacturer's PVC solid "T's," elbows, and reducers. Use the proper sized "T's"

- and reducers
 - b. Extend risers into sub base aggregate and or make connections to drain lines where indicated on the plans.
 - c. Where inspection risers are indicated to be placed on top of the Structural Frame and Soil System Deck, assemble riser and fittings to dimensions requires such that the rim of the riser is flush with the paving. Set the rim top with a slope consistent with the slope of the pavement.
 - d. Adjust the location of the riser such that the center of the riser falls along the centerline of one of the ribbed sots in the deck. Cut the deck geotextile with an X cut and insert the riser through the geotextile.
 - e. Make a geotextile collar secured to the riser with zip ties that overlap the surrounding geotextile a minimum of 12-inches. Secure in place with tape.
 - f. Brace all risers while backfill and paving is being installed to secure its location and elevation.
- B. Install cleanout caps on top of each riser flush to grade.

Installation of aggregate sub-base below Structural Frame and Soil System

- A. Install aggregate sub base to the depths indicated on the plans, under the first layer of Structural Frame and Soil System frames.
- B. Compact aggregate sub base layer to a minimum of 95% of maximum dry density at optimum moisture content in accordance with ASTM D 698 Standard Proctor Method. Compact the sub-grade with a minimum of three passes of a suitable vibrating compacting machine or apply other compaction forces as needed to achieve the required sub-grade compaction rate.
- C. Grade surface in a plane parallel to the grades of the paving above.
 - a. The tolerance for dips and bumps in the aggregate under Structural Frame and Soil Systems shall be a 3/8-inch deviation from the plane in 10 feet and 1/8-inch in 4 feet.
 - b. The grade and elevations of the base under the Structural Frame and Soil Systems shall be approved by the Engineer prior to proceeding with the installation of the Structural Frame and Soil Systems.

Installation of Structural frame and Soil Systems, planting soil, geogrid, backfill, and mulch

- A. Identify the outline layout of the structure and the edges of paving around tree planting areas on the floor of the excavation, using spray paint or chalk line. The layout shall be calculated to include shift in layout locations due to depth and the slope of the Cells.
- B. Lay out the first layer of Structural Frame and Soil System frames on the sub base. Verify that the layout is consistent with the required locations and dimensions of paving edges to be constructed over the Structural Frame and Soil Systems. Check each Structural Frame and Soil System frame unit for damage prior to placing in the excavation. Any cracked or chipped unit shall be rejected.
- C. Place frames no less than 1 inch and no more than 3 inches apart.
- D. Assure that each frame sits solidly on the surface of the sub base. Frames shall not rock or

bend over any stone or other obstruction protruding above the surface of the sub base material. Frames shall not bend into dips in the sub base material. The maximum tolerance for deviations in the plane of the sub base material under the bottom of the horizontal beams of each Structural Frame and Soil System frame shall be 1/4 inch in 4 feet. Adjust sub base material including larger pieces of aggregate under each frame to provide a solid base of support.

- E. Anchor each Structural Frame and Soil System into sub base with four-10 inch spikes, driven through the molded holes in the Cell frame base. The purpose of the anchoring system is to maintain cell spacing and layout during the installation of planting soil and backfill.
- F. Install the second layer of Structural Frame and Soil System frames on top of the first layer. Comply with manufacturer's requirements to correctly register and connect the Cell frames together.
 - a. Register each frame on top of the lower frame post. Rotate each frame registration arrow in the opposite direction from the frame below to assure that connector tabs firmly connect. Each frame shall be solidly seated on the one below.
 - b. Build layers as stacks of frames set one directly over the other. Do not set any frame half on one Cell frame below and half on an adjacent frame.
- G. Install Strongbacks on top of the Structural Frame and Soil System frames prior to installing planting soil and backfill.
 - a. Strongbacks are required only during the installation and compaction of the planting soil and backfill.
 - b. Strongbacks should be moved as the work progresses across the installation.
 - c. Strongbacks shall be removed prior to the installation of Structural Frame and Soil System decks.
- H. Install planting soil, geogrid curtain and backfill as indicated on the plans. The process of installation requires that these three materials be installed and compacted together in several alternating operations to achieve correct compaction relationships within the system.
- I. Where required, place the geogrid curtain along the outside of the limit of the Structural Frame and Soil System frames.
 - a. Geogrid curtains are required between the edge of the Structural Frame and Soil Systems and any soils to be compacted to support paving beyond the area of Structural Frame and Soil Systems. Do not place geogrid curtains between the edge of the Cells and any planting area adjacent to the Cells.
 - b. Pre-cut the geogrid to allow for 6 inches minimum under lapping below backfill, and 12 inches minimum overlapping top of Structural Frame and Soil System stack.
 - c. Where cell layout causes a change direction in the plane of the geogrid, slice the top and bottom flaps of the material so that it lies flat on the top of the cell deck and aggregate base course along both planes.
 - d. Provide a minimum of 12 inch overlaps between different sheets of geogrid.
 - e. Place the geogrid in the space between the Structural Frame and Soil System frames and the sides of the excavation. Attach the geogrid to the Structural Frame and Soil System frames using 3/16 inch x 12-inch zip ties. Attach with zip ties at every cell and at Cell Deck.
- J. Install no more than two layers of Structural Frame and Soil System frames before beginning to

install planting soil and backfill. Compact the planting soil within the Structural Frame and Soil System frames and the backfill material outside the frames in alternating lifts until the desired elevations and density is achieved in both soils.

- K. Install and compact backfill material in the space between the Structural Frame and Soil Systems and the sides of the excavation in lifts that do not exceed 8 inches.
 - a. Compact backfill to 95% of maximum dry density using a powered mechanical compactor. Use a pneumatic compacting tool or narrow foot jumping jack compactor for spaces less than 12 inches wide and a 12-inch wide jumping jack compactor or larger equipment in wider spaces.
 - b. Maintain the geogrid curtain between the Structural Frame and Soil Systems frames and the backfill material.
 - c. Install backfill in alternating lifts with the planting soil inside the Structural Frame and Soil Systems.
- L. Fill the first layer or layers of frames with planting soil, specified Standard Specifications. Install in lifts that do not exceed 8 inches. Lightly compact the soil inside the frames at each lift to remove air pockets and settle the soil within the frames. Do not compact greater than 85% of maximum dry density. Check the soil compaction with a penetrometer or densiometer to achieve similar compaction levels provided in the mock up.
- M. If the planting soil becomes overly compacted, remove the soil and reinstall. Use hand tools or other equipment that does not damage the Structural Frame and Soil System frames.
- N. Do not walk directly on horizontal beams of the frames.
- O. Work soil under the horizontal frame beams of the second level of Cell frames and between columns eliminating air pockets and voids. Fill each frame such that there is a minimum of 10 inches of soil over the top of horizontal frame beams before beginning compaction.
- P. The top 1-2 inches of each frame post should remain exposed above the soil to allow the placement of the next frame or deck.
- Q. Continue to install and compact the planting soil within the Structural Frame and Soil System frames and the backfill material outside the frames in alternating lifts until the desired elevations and density is achieved in both soils.
- R. When using mulch, add a final layer of planting soil as required bringing the planting soil level to not more than 3 inches below the bottom of the Structural Frame and Soil System Deck when installed. When using air space rather than compost, the planting soil shall be brought to level not more than 1 inch below the bottom of the Structural Frame and Soil System Deck when installed.
- S. Obtain final approval by the project engineer of soil installation prior to installation of the Structural Frame and Soil System deck.
- T. Remove Strongbacks after planting soil and backfill has been compacted to the top of the entire set of Structural Frame and Soil Systems.
- U. Install 3 inches of mulch, or leave 1-inch air space, below Structural Frame and Soil System

Deck as indicated on the plans.

Structural frame and Soil System installation

- A. Install the Structural Frame and Soil System Decks over the top of each frame stack. Clean dirt from the tops of the Structural Frame and Soil System frame columns. Register the deck and make connections as recommended by the manufacturer to secure the deck to the top of the Structural Frame and Soil System Frame. Secure each deck at the four corners with screw fasteners as recommended by the manufacturer. Assure that each deck is seated firmly on the frame top with all connectors attached.
- B. Install and compact remaining backfill material such that the soil outside the limits of the Structural Frame and Soil Systems is flush with the top of the installed deck.

Installation of geotextile, geogrid, inspection riser, and aggregate over the deck

- A. Overlap geogrid over the top of the Structural Frame and Soil System Decks, with minimum of 12 inches overlap.
- B. Place geotextile over the top of the deck and where indicated on the drawings, extending beyond the outside edge of the excavation by at least 18 inches. Any joints must be overlapped by a minimum of 18 inches.
- C. Cut geotextile a minimum of 20 percent larger than the size of the deck area to be covered to accommodate for required conforming of the geotextile and stone to the deck contours.
- D. Install 4-inch diameter inspection risers above geotextile.
- E. Install the aggregate base course over the geotextile immediately after completing the installation of the fabrics and inspection risers. Work the aggregate from one side of the deck to the other to assure that the fabric and aggregate conforms to the cell deck contours. Do not apply aggregate in several positions at the same time.
 - a. Load the aggregate from equipment that is outside the limits of the excavated area. Use small, low impact material mover such as a concrete buggy to move aggregate over the cells. Work over material already in place. Never allow any motorized equipment of any size to operate directly on the Structural Frame and Soil System Deck.
 - b. For large or confined areas, where aggregate cannot easily be placed from the edges of the excavated area, obtain approval for the installation procedure and types of equipment to be used in the installation from the Structural Frame and Soil System manufacturer.
 - c. Compact aggregate base course, in lifts not to exceed 6" in depth, to 95% of maximum dry density. Utilize a roller or plate compactor with a maximum weight of 1000 pounds. Make sufficient passes with the compacting equipment to attain the required compaction.

Installation of paving above the Structural Frame and Soil System

- A. Place paving material over Structural Frame and Soil System as specified in plans.
- B. Take care when placing paving or other backfill on top of Structural Frame and Soil System not

to damage the system components.

Installation of planting soil and mulch within the tree planting area

- A. Prior to planting trees, install additional planting soil, to the depths indicated, within the tree opening adjacent to paving supported by Structural Frame and Soil Systems.
- B. Remove all rubble, debris, dust and silt from the top of the planting soil that may have accumulated after the initial installation of the planting soil within the Structural Frame and Soil Systems.
- C. Assure that the planting soil under the tree root ball is compacted to approximately 85-90% to prevent settlement of the root ball.
- D. The planting soil within the tree opening shall be the same soil as in the adjacent Structural Frame and Soil Systems.
- E. Cover the planting soil finished grade with 2 inches of mulch.

Repair of cut geotextile

In the event that any geotextile over sub-grades or the Structural Frame and Soil System decks must be cut during or after installation, repair the seam with a second piece of geotextile that overlaps the edges of the cut by a minimum of 12-inches in all directions prior to adding aggregate material.

Protection

- A. Ensure that all construction traffic is kept away from the limits of the Structural Frame and Soil Systems until the final surface materials are in place. No vehicles shall drive directly on the Structural Frame and Soil System deck or aggregate base course.
- B. Provide fencing and other barriers to keep vehicles from entering into the area with Structural Frame and Soil System supported pavement.
- C. Maintain a minimum of 4 inches of aggregate base course over the geotextile material during construction.
- D. When vehicle must cross Structural Frame and Soil Systems that does not have final paving surfaces installed, use construction mats designed to distribute vehicle loads to levels that would be expected at the deck surface once final paving has been installed. Use only low impact track vehicles with a maximum surface pressure under the vehicle of 4 pounds per square inch, on top of the mats over Structural Frame and Soil Systems prior to the installation of final paving.

Clean Up

Perform cleanup during the installation of work and upon completion of the work. Maintain the site free of soil and sediment, free of trash and debris. Remove from site all excess soil materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

10-6.17 PLANTING

Commercial fertilizer shall be applied or placed at the time of planting and at the rates recommended by the manufacturer and soil tests.

A granular pre-emergent shall be applied to areas to be covered with mulch outside of plant basins in conformance with the provisions in "Pesticides" of these special provisions. Mulch placed in areas outside of plant basins shall be spread to a depth of not less than 2 inches for decomposed granite mulch.

Mulch shall not be placed within 3 feet of the centerline of earthen drainage ditches, within one meter of the edge of paved ditches, and within 3 feet of the centerline of drainage flow lines.

Attention is directed to "Irrigation Systems Functional Test" of these Special Provisions regarding functional tests of the irrigation systems. Planting shall not be performed in an area until the functional test has been completed for the irrigation system serving that area.

Trees, Shrubs & Vines

- A. Immediately upon NTP for work in this section, Contractor shall locate and purchase or hold for purchase all trees required. If a single nursery cannot supply the quantity of trees needed for the project, the Contractor shall use multiple approved nurseries to contract-grow the necessary trees.
- B. Nomenclature: The scientific and common names of plants herein specified conform to the approved names given in "A Checklist of Woody Ornamental Plants of California," published by the University of California, College of Agriculture. See list of plant materials on plans.
- C. Plant material shall be per the California State Department of Agriculture Regulations for Nursery Inspections of Rules and Grading. Nursery tags must be submitted to the Engineer.
- D. All plants, including trees, shrubs, groundcover, and vines, shall have a growth habit normal to the species and shall be symmetrical, typical for variety and species, sound, healthy, vigorous and free from insect pests, plant diseases, sun scalds, fresh bark abrasions, excessive abrasions, other objectionable disfigurements, and meet the measurements specified. Trunks shall be straight and vertical.
- E. All trees shall have grown in containers for sufficient time to permit full rooting within the container to bind the soil but not so long as to create a root bound condition. No container plants that have cracked or broken balls of earth, when taken from the container, shall be planted. No plants with damaged roots, broken root balls, or root bound, when taken from container shall be planted. Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- F. Do not damage rootball and/or foliage of plants during transportation or plant installation.
- G. Pruning shall not be done prior to delivery except by approval of the Engineer.

- H. Inspection of plant materials required by City, County or State authorities shall be the responsibility of the Contractor, and where necessary, permits or certificates shall have been secured prior to delivery of trees to site.
- I. Plants shall be subject to inspection and approval or rejection at the project site at any time before or during progress of work, for size, variety, condition, latent defects, and injuries. Rejected plants shall be removed from the project site immediately.
- J. Substitutions will not be permitted except if proof is submitted that any tree specified is not obtainable. Then, a proposal will be considered for use of the nearest equivalent size or variety and cost. All substitutions are subject to Engineer's written approval.
- K. Quantities shall be furnished as needed to complete work shown on the plans.
- L. Identify plant species or varieties correctly on legible, weatherproof labels attached securely thereto before delivery to job site. There shall be a minimum of one labeled plant for each 5 plants in a lot.
- M. All plants shall be reviewed and approved for acceptable size and quality by Engineer prior to planting.
- N. Photos of all tree species shall be submitted to Engineer for approval a minimum of 15 days prior to delivery of the plants to the site. The Engineer reserves the right to reject any plant species upon conducting a physical inspection after delivery to the site. Photos shall illustrate the typical condition, form and size of the trees to be provided.
- O. The Engineer shall reserve the right to tag trees at the nursery as required for conformance with the plans and these specifications. Tagging of trees, however, does not cancel the right of the Engineer to reject plant material upon delivery to the project site.
- P. The Engineer reserves the right to reject any plant material found to be defective or not in conformance with plans and specifications.

Staking Materials

Stakes shall be lodgepole pine tree stakes. These shall be straight shafts, shaved and cut, cleaned and bare of branches and stubs, of uniform thickness with a minimum diameter of 3 inches, free of loose knots, splits or bends. Stakes shall be no less than 8 feet in length and shall be of sufficient length to penetrate the ground a minimum of 3 feet below the rootball.

Tree ties shall be flexible, non-deteriorating, self-fastening, black vinyl tree ties of sizes required to adequate support trees. (V.I.T. Cinch-Tie or equal).

Root Barrier

Root barrier panels must have factory installed independent joiner strips. Barriers must be a minimum of 0.90 inches thick and be made of 50% post-consumer High Impact Polypropylene (HIPP). Material must contain U.V. inhibitors to insure longevity. Barriers must have ½ inch raised vertical ribs running perpendicular to the panel and be 6 inches on center. Panels shall have a 3/8 inch wide "T" top edge and an external ground anchoring base flange 1/8 inch in width.

10-6.18 SEEDING

Seeding shall conform to the provisions in Section 20-3.04, "Seeding and Fertilizing," of the Standard Specifications. Seeding operations shall apply to areas indicated on the plans with the following seed mix:

Scientific Name	Common Name	Pounds Per Acre
<i>Cryptantha intermedia</i>	Nievitas Cryptantha	1
<i>Collinsia concolor</i>	Southern Chinese Houses	2
<i>Deinandra fasciculata</i>	Fascicled Tarweed	2
<i>Eschscholzia californica</i>	California Poppy	2
<i>Lasthenia californica</i>	California Goldfields	3
<i>Layia platyglossa</i>	Tidy Tips	2
<i>Lupinus bicolor</i>	Miniature Lupine	2
<i>Lupinus succulentus</i>	Arroyo Lupine	2
<i>Sisyrinchium bellum</i>	Blue-eyed Grass	2
<i>Vulpia microstachys</i>	Fescue	2
Shrubs		
<i>Artemisia californica</i>	California Sagebrush	2
<i>Encelia californica</i>	California Encelia	2
<i>Eriogonum fasciculatum</i> ssp. <i>fasciculatum</i>	California Buckwheat	2
<i>Isocoma menziesii</i> var. <i>menziesii</i>	Coastal Goldenbush	2
<i>Lotus scoparius</i> var. <i>scoparius</i>	Deerweed	2
Total		Approx 30

10-6.19 PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall be not less than ninety (90) calendar days after written approval of the installation from the Engineer.

Commercial fertilizer (slow release) shall be applied to trees, shrubs, vines and ground cover during the first week of March, June and September of each year. Commercial fertilizer (slow release) shall be applied at the rates recommended by the Manufacturer and shall be spread with a mechanical spreader wherever possible.

A seasonal watering schedule shall be submitted during the first week of April, July, and November, to the Engineer for use during the plant establishment period.

Weeds within plant basins, including basin walls and ground cover, shall be controlled by hand pulling.

Weeds within mulched and ground cover areas and outside of plant basins shall be controlled by killing.

Weeds within, pavement, curbs, sidewalk, and other surfaced areas shall be controlled by killing.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first forty-five (45) working days of the plant establishment period. The use of plants of a larger container size than those originally specified for replacement plants shall be at the Contractor's expense.

When ordered by the Engineer, one application of a pre-emergent pesticide conforming to the provisions in "Pesticides" of these Special Provisions shall be applied between forty (40) and fifty (50) working days prior to completion of the plant establishment period. This work will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The final inspection shall be performed in conformance with the provisions in Section 5-1.13, "Final Inspection," of the Standard Specifications and shall be completed a minimum of twenty (20) working days before the estimated completion of the contract.

All trees, shrubs and groundcovers which have been planted and which due to accident, disease, or other cause, fail to show a healthy growth within one year shall be replaced.

10-6.20 MEASUREMENT AND PAYMENT

Complying with the requirements of Section 10-6, "Planting," will be measured by lump sum for each station.

The contract lump sum price paid for "Planting - (*Station Name*)" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work all as shown on the construction plans and as specified in the Standard Specifications and these Special Provisions, including but not limited to the following:

- progress inspections,
- cost breakdowns,
- protection and maintenance of existing planted areas,
- removing plants and sod for trenching,
- protection and storage of plants
- mulching,
- Soil testing, planting and backfill soil material, fertilizers, and soil amendments,
- pesticides,
- clearing and preparing planting areas,
- structural frame and soil systems, anchoring spikes, drain lines, inspection risers, geogrids, geotextile fabrics, and aggregate base materials
- seeding,
- planting, staking, and root barriers
- plant establishment and cultivation of new plant material and seeded areas

10-7 IRRIGATION

10-7.01 GENERAL

Irrigation shall be furnished and installed in conformance with the provisions in Section 20-5, "Irrigation

Systems," of the Standard Specifications.

Excavation for proposed irrigation facilities shall not be started until the existing underground facilities have been located.

Contractor shall check and verify all site conditions, existing and proposed utilities and services prior to trenching. Verify point of connection locations prior to beginning of work.

Pipe main supply lines and pipe irrigation lateral lines shall be pressure tested in conformance with Method B as specified in Section 20-5.03H(2), "Method B," of the Standard Specifications.

10-7.02 EXISTING IRRIGATION FACILITIES

Existing irrigation facilities shall be located by the Contractor. Irrigation facilities that are identified to remain in place in the plans shall be protected throughout the duration of construction. Irrigation facilities that are damaged by the Contractor's operation shall be reported immediately to the Engineer and shall be repaired or replaced at the Contractor's expense. Contractor shall refer to Section 10-4.09 "Remove Existing Irrigation Facilities" for requirements related to removal of existing irrigation facilities.

The work performed in connection with the various existing irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions.

Water shall be maintained in conformance with the provisions in Section 20-5.025, "Maintain Existing Water Supply," of the Standard Specifications.

10-7.03 CHECK AND TEST EXISTING IRRIGATION FACILITIES

Existing irrigation facilities that are to remain or to be relocated, and that are within those areas where clearing and grubbing or earthwork operations are to be performed, shall be checked for missing or damaged components and proper operation prior to performing clearing and grubbing or earthwork operations. Existing irrigation facilities outside of work areas that are affected by the construction work shall also be checked for proper operation.

Functional tests for the irrigation controllers and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these Special Provisions.

Tests shall demonstrate to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode that the associated automatic components of the irrigation systems operate properly. If automatic components of the irrigation systems fail a functional test, these components shall be repaired. Corrective work will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Associated automatic components shall include, but not be limited to, remote control valves and rain sensors.

A written list of existing irrigation system deficiencies shall be submitted to the Engineer within twenty-four (24) hours after checking the existing facilities.

Deficiencies found during checking of the existing facilities shall be corrected as directed by the Engineer. Corrective work ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

When existing irrigation facilities are checked, existing backflow preventers to remain shall be tested for proper operation in conformance with the provisions in Section 20-5.03J, "Check and Test Backflow Preventers," of the Standard Specifications.

Existing backflow preventers shall be retested one year after the satisfactory completion of the previous test or 10 days prior to completion of the plant establishment period, whichever occurs first.

Length of watering cycles for use of potable water from water meters for checking or testing existing irrigation facilities shall be as determined by the Engineer.

Repairs to the existing irrigation facilities ordered by the Engineer after checking and testing the facilities, and further repairs required thereafter as ordered by the Engineer, except as otherwise provided for under "Maintain Existing Irrigation Facilities" of these Special Provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Repair operations shall be done by a licensed irrigation contractor.

10-7.04 COST BREAKDOWN

The Contractor shall furnish the Engineer cost breakdowns for each of the contract lump sum items of irrigation.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost breakdowns submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost breakdowns submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for irrigation due to differences between the quantities shown in the cost breakdowns furnished by the Contractor and the quantities required to complete the work as shown on the plans.

The sum of the amounts for the units of work listed in each cost breakdown for irrigation work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in each cost breakdown. Cost breakdowns shall be submitted to the Engineer for approval within thirty (30) working days after the contract has been approved. Cost breakdowns shall be approved, in writing, by the Engineer before a partial payment for the items of irrigation will be made.

Approved cost breakdowns will be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the items of irrigation due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost breakdown, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

10-7.05 MATERIALS

All materials and equipment used in irrigation work shall be new and without flaws or defects and of quality and performance as specified.

Prior to installation of any irrigation work, the Contractor shall submit for approval by the Engineer a list of all materials and equipment proposed to be used. Should the Contractor propose to use material(s) or equipment other than those listed as "approved," Contractor shall submit in writing, to the Engineer, a request to deviate from the approved list. Samples of the material(s) or equipment should accompany the request to assist in the evaluation of the proposed substitution. The burden of proof shall be borne by the Contractor.

10-7.06 IRRIGATION CONTROLLERS

Irrigation Controllers shall conform to the provisions in Section 20-2.31-A, "Irrigation Controllers," of the Standard Specifications and the following:

Irrigation Controllers shall be as shown in the plans.

10-7.07 ELECTRIC REMOTE CONTROL VALVES

Electric remote control valves shall conform to the provisions in Section 20-2.23, "Control Valves," of the Standard Specifications and the following:

Electric remote control valves shall be as shown in the plans.

Electric remote control valves shall be straight pattern (side inlet) as shown on the plans.

Electric remote control valve solenoids shall be DC latching as specified on the plans and operate on 3.5V. Latching solenoids shall be compatible with existing controller (if needed or necessary).

10-7.08 MANUAL CONTROL VALVES

Gate valves shall be constructed of brass with stainless steel shaft and brass handle, and both inlet and outlet threaded connections. Model shall be as designated on plans.

Quick coupling valves shall be of heavy duty, two-piece body design, of brass construction with replaceable washers, and shall have locking rubber covers as specified on plans. Furnish and deliver to the Engineer the following items, all corresponding to the quick coupling valves selected: Two valve keys and two swivel hose ells with globe valve controls.

10-7.09 VALVE BOXES

Valve boxes shall conform to the provisions in Section 20-2.24, "Valve Boxes," of the Standard Specifications, except as otherwise provided herein.

Valve boxes that fall within platform areas shall be precast Portland cement concrete. Valve boxes for in-line check valves and quick coupling valves shall be Brooks #3-HL (18 1/2"x12 1/4") or approved equal. Boxes for remote control valves, pressure regulating valves, gate valves, manual control valves, and low voltage control and neutral conductors shall be standard 12" x 17" rectangular. Covers for concrete valve boxes shall be locking cast iron.

Valve boxes in planting areas (excluding valve boxes in paved platform areas), shall be made of structural foam molding, and shall be identified on the top surface of the covers by painting the

appropriate abbreviations for the irrigation facilities contained in the valve boxes as shown on the plans. Valve boxes that contain remote control valves shall be identified per the plans and as directed by the engineer by using the appropriate letters and numbers (controller and station numbers). The letters and numbers shall be 2" in height. Identification shall be easily readable from pavement side.

In addition to painting the outside of the valve box lid, a yellow color vinyl tag with black embossed controller letter and station number such as is commercially available, shall be provided for all irrigation remote control valves and master control valves, and shall be permanently attached to valve with nylon tie. Tag shall be easily readable from pavement side.

The Contractor shall rework the locking toggles of the concrete valve boxes by replacing the existing clevis pin and sheet metal clip with a marine-type stainless steel machine bolt and self-locking nut. Apply oil to lubricate and to prevent rust.

Install valve boxes perpendicular to walk curb, walls, fences or landscape feature, and adjacent to valve boxes, at multiple valve box groups. Each box shall be an equal distance from curb/walk. Boxes shall be installed in the locations shown on plans. Short side of valve box shall be parallel to walk, curb, walls, fences, etc. Paint valve number on lid and box edge.

10-7.10 PIPE

Plastic pipe supply main lines shall be polyvinyl chloride (PVC) Schedule 40 pressure rated pipe with the minimum pressure rating (PR) shown on the plans.

Schedule 40 plastic pipe supply main lines shall conform to the requirements of ASTM designation: D-1785.

Plastic pipe supply lines (class 200-PVC non-pressure pipe) less than 4 inches in diameter shall have solvent cemented type joints. Primers shall be used on the solvent cemented type joints.

Plastic pipe supply lines (main) shall have a minimum cover of 18 inches.

Plastic pipe (lateral lines) shall be installed not less than 12 inches below the finished grade, measured to the top of the pipe.

Plastic pipe (for sleeves) shall be PVC, Schedule 40.

Sleeves shall be Schedule 40 PVC, 2 times the pipe size diameter and extend 12 inches beyond each side of pavement. The letters "E" for electrical or "W" for water shall be stamped or chiseled on the pavement directly above the sleeve.

PVC pipe shall be installed in accordance with the printed recommendations of the pipe and fittings manufacturers. A copy of such printed recommendations shall be furnished to the Engineer before any of the pipe is installed. All threaded PVC pipe shall be wrapped with two layers of 3/4 inch wide Teflon tape around the threads of each connection.

Fittings for plastic pipe supply lines with a pressure rating (PR) of 315 shall be Schedule 80.

Union fittings shall be Schedule 80 PVC, threaded inlet and outlet.

10-7.11 SPRINKLERS

Sprinklers shall be as specified on the construction plans, meeting the performance characteristics described in the legend.

10-7.12 INSTALLATION OF IRRIGATION SYSTEMS

Sand encasement for all irrigation pipe, direct burial control wire and electrical conduit shall be plaster or mortar sand as per Section 200 of the Standard Specifications for Public Works Construction, with a minimum sand equivalent of 50.

All connections to mainlines shall be made horizontally.

Cover over piping:

Plastic Laterals:	12 inches of cover 18 inches of cover under paving
Plastic Pressurized Mainline:	18 inches of cover 24 inches of cover under paving

All pressure pipe shall have a continuous blue colored trench marker metallic tape placed nine inches below finished grade directly above the buried pipe. Marker tape shall be "Alarmatape" or approved equal.

- A. Closing in Uninspected Work. Do not allow or cause any of the work of this section to be covered up or enclosed until it has been inspected, tested, and accepted by the Engineer.
- B. Flushing. Before backfilling the mainline, and with all control valves and remote control wiring in place, but before lateral pipes are connected, complete flush and test the mainline and repair all leaks; flush out each section of lateral pipe before sprinkler heads are attached.
- C. Testing. Make all necessary provisions for thoroughly bleeding the line of air and debris. Before testing, fill the line with water for a period of at least 24 hours. After valves have been installed, test all live waterlines for leaks at a pressure of 120 psi for a period of two hours, with all couplings exposed and with all pipe sections center loaded. All piping under paving shall be tested for leaks at a pressure of 120 psi for a period of two hours, with all fittings exposed. Furnish all necessary testing equipment and personnel. Correct all leaks and retest failed systems until acceptance by the Engineer.
- E. Final Inspection. Thoroughly clean, adjust, and balance all systems. Demonstrate the entire system to the Engineer, proving that all controllers and valves are operable, all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, that no low heads drain after shutoff, and that the installed system is workable, clean and efficient. Adjust all systems to provide full coverage of the planting areas, and to insure that no excess water is sprayed onto pavements or structures.

10-7.13 FINAL IRRIGATION SYSTEM CHECK

A final check of existing and new irrigation facilities shall be performed not more than twenty (20) working days prior to acceptance of each Station Work Group. Final system check to include:

- A. The length of watering cycles using potable water measured by water meters for the final check of irrigation facilities will be determined by the Engineer.
- B. Remote control valves connected to existing and new irrigation controllers shall be checked for automatic performance when the controllers are in automatic mode.
- C. Unsatisfactory performance of irrigation facilities installed or modified by the Contractor shall be repaired and rechecked at the Contractor's expense until satisfactory performance is obtained, as determined by the Engineer.
- D. Nothing in this section, "Final Irrigation System Check" shall relieve the Contractor of full responsibility for making good or repairing defective work or materials found before the formal written acceptance of the entire contract by the Engineer.

10-7.14 GUARANTEE

The entire irrigation system shall be guaranteed against defects in materials and workmanship for a period of one year from the date of acceptance of work at the final Station Work Group. Should the Contractor fail during the guarantee period to expeditiously correct a defect upon written notification by the Engineer, the Engineer shall cause the work to be corrected and bill the actual costs incurred to the Contractor. Defect corrections shall include the complete restoration of existing improvements that were damaged as a result of the defect.

Contractor shall supply "As-Built" drawings of the entire irrigation system, inclusive of all mains, valves, sources of electrical power for controllers, backflow preventers, control wires, sleeves and irrigation spray heads. Locate from dimensioning from two fixed points.

10-7.15 MEASUREMENT AND PAYMENT

Complying with the requirements of Section 10-7, "Irrigation," will be measured by lump sum for each station.

The contract lump sum price paid for "Irrigation – (*Station Name*)" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in checking, testing, removing, and relocating existing irrigation systems, and installing new irrigation systems, complete in place, all as shown on the plans and as specified in the Standard Specifications and these Special Provisions.

10-8 NOT USED

10-9 TRAFFIC STRIPES, PAVEMENT MARKINGS AND SIGNAGE

10-9.01 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

Thermoplastic traffic stripes (traffic lines) and pavement markings shall be applied in conformance with the provisions in Section 84-2, "Thermoplastic Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.1 inch.

Measurement and Payment

Thermoplastic Traffic Stripes and Pavement Markings shall be measured and paid for in accordance with Section 84-2.05, "Measurement," and Section 84-2.06, "Payment," of the Standard Specifications.

Removal of Thermoplastic Traffic Stripes and Pavement Markings shall be measured and paid in accordance with Section 15-2.06, "Measurement", and Section 15-2.07, "Payment," of the Standard Specifications.

10-9.02 PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS

Painted traffic stripes (traffic lines) and pavement markings shall be applied in conformance with the provisions in Section 84-3, "Painted Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

The color of the painted traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6628-01.

Retroreflectivity of the paint traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White painted traffic stripes and pavement markings shall have a minimum initial retroreflectivity of $250 \text{ mcd m}^{-2} \text{ lx}^{-1}$. Yellow painted traffic stripes and pavement markings shall have a minimum initial retroreflectivity of $150 \text{ mcd m}^{-2} \text{ lx}^{-1}$.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Measurement and Payment

Painted Traffic Stripes and Pavement Markings shall be measured and paid for in accordance with Section 84-3.06, "Measurement," and Section 84-3.07, "Payment," of the Standard Specifications.

Removal of Painted Traffic Stripes shall be measured and paid in accordance with Section 15-2.06, "Measurement", and Section 15-2.07, "Payment," of the Standard Specifications.

10-9.03 PAINT CURB

"Paint Curb" shall consist of painting concrete curbs and repainting existing curbs adjacent to sidewalks and at the concrete curbs at the edge of the platform, as shown on the plans, and shall conform to the

provisions in Section 59, "Painting," and Section 59-6, "Painting Concrete," of the Standard Specifications and these special provisions.

Paint for painting curbs shall be commercial quality paint.

Measurement and Payment

"Paint Curb" shall be measured by the linear foot for preparing and painting curb. Measurement shall be determined by actual measurements along the top of curb painted.

The contract unit price paid per linear foot for "Paint Curb" shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in preparing and painting curb and no additional compensation will be allowed therefore.

10-9.04 PAVEMENT MARKERS

Pavement markers shall conform to the provisions in Section 85 of the Standard Specifications and these special provisions.

Measurement and Payment

Pavement markers shall be measured and paid in accordance with Section 85-1.08, "Measurement", and Section 85-1.09, "Payment," of the Standard Specifications.

10-9.05 SIGNAGE

10-9.05.1 ROADSIDE SIGNS

This section includes requirements for manufacturing and supplying the signs for public roadways, and public railroad grade crossings. Roadside signs shall be installed at the locations shown on the plans or where designated by the Engineer and in conformance with the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications, current California MUTCD requirements, and these special provisions.

10-9.05.1.1 INSTALL ROADSIDE SIGN

Roadside sign panels shall be installed on new or existing posts at the locations shown on the plans or where designated by the Engineer and in conformance with the provisions in Section 56-2.04, "Sign Panel Installation," of the Standard Specifications and these special provisions.

For location requiring a new sign post, a new metal post conforming to Section 56-2.02A, "Metal Posts," of the Standard Specifications shall be provided.

Straps and saddle brackets for mounting sign panels on light poles where shown in the plans and as defined in Section 56-2.02D, "Sign Panel Fastening Hardware" of the Standard Specifications shall be provided.

Measurement and Payment

Installing roadside sign panels on new or existing posts will be paid for per each as determined from actual count installed in place.

The contract unit price paid per each "Roadside Sign – (*Type*)" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing roadside sign panels on existing posts, complete in place, as shown on the plans including removing and disposing of existing sign panels and drilling holes in existing posts, or providing and installing new posts and installing roadside sign panels to post, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions; and as directed by the Engineer.

10-9.05.2 SITE AND PLATFORM SIGNS

Work under this section includes furnishing and installing miscellaneous site and platform signs as indicated on the plans and these Special Provisions. Signs include post and panel information kiosk signs, post and panel site identification signs, post mounted ADA platform sign with Braille, and miscellaneous site and platform metal blade signs mounted to posts, light poles and structures.

Refer to Section 10-12.01 "Cast-In-Place Concrete" of these Special Provisions for the related work of concrete foundations and pavements.

Provide services, labor, necessary hardware, support and products to fabricate and install signs as indicated. Fabrication shall conform to plans and the section "Miscellaneous Metal Fabrication" of these Special Provisions.

Submit shop drawings in reproducible form for review prior to start of fabrication. Provide complete structural and shop drawings, to scale, of fabrication and installation showing details of construction and full size drawings of details affecting exterior appearance.

Lettering patterns and symbols included in the plans are provided for information only; the final version shall conform to approved shop drawings, the most current MTS San Diego Trolley Station Sign

Program Design Guidelines Manual, and the Americans with Disabilities Act (ADA).

A. QUALITY ASSURANCE

Workmanship under this contract shall be performed by skilled craftsmen under the supervision of trained foremen, experienced in the trade or trades required to accomplish the work.

Materials provided shall be new and of highest quality.

These requirements apply to items provided by the contractor and by his subcontractors. Contractor shall provide his subcontractors with necessary information including up-to-date Drawings, specifications, graphics schedules, and shall supervise their work.

Engineering and Code Requirements:

Using the contract drawings, signs shall be designed and fabricated to satisfy applicable codes and regulations, the most current MTS San Diego Trolley Station Sign Program Design Guidelines Manual, and ADA.

Location of Signs: The locations shown on the plan drawings are for general information only. The Contractor shall arrange a meeting with the Engineer at the site for final location of signs.

B. PROJECT CONDITIONS

Verification of Existing Conditions and Documents:

Contractor shall visit the site to inspect existing conditions and to verify dimensions, which are related to the installation of sign items. Contractor shall thoroughly review these documents, checking conditions and dimensions shown. Contractor shall notify the Engineer of any discrepancies in the documents, field dimensions or conditions, and changes required in the documents.

Written dimensions on the Drawings shall have precedence over scaled dimensions. Contractor shall confirm final wording and layout of sign plates with Engineer prior to fabrication.

C. PRODUCT DELIVERY, STORAGE, AND HANDLING

In the event phasing of installation is required, the Contractor and the Owner shall agree on a delivery and a secured (lockable) staging area.

D. PREPARATION

Examine site conditions, structures, substrates and other conditions under which the signs are to be installed, and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. The work shall not proceed until unsatisfactory conditions have been corrected. Final locations of signs shall be reviewed by the Engineer prior to installation.

E. INSTALLATION

Installed signs shall be clean, properly aligned, level and true to line and dimension, flush to surface or as detailed or specified. Damage to sign or surrounding surfaces, or other imperfections will not be approved, and shall be repaired or replaced to the satisfaction of the Engineer.

The final location of signs shall be approved by the Engineer and SDTI prior to installation.

Fastenings, structures and units shall be structurally sound and comply with applicable code requirements and restrictions. Protective coatings, identifying stickers, and paper shall be removed at the completion of the installation.

F. CLEANING AND PROTECTION

At completion of installation, clean surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner. Repair or replace damaged units as

directed by the Engineer. Remove crating and debris from project and leave premises in clean condition. Any signs damaged during delivery or installation shall be replaced by the Contractor at no cost.

10-9.05.2.1 TYPE 45 - INFORMATION KIOSK, FOUR PANEL

Work under this section includes furnishing and installing information kiosk signs as indicated on the plans and per the requirements above.

Measurement and Payment

Type 45 – Information Kiosk, Four Panel signs will be measured as each, according to the number of Type 45 – Information Kiosk, Four Panel signs furnished and installed according to the plans and as directed by the Engineer.

The contract unit price paid each for “Type 45 – Information Kiosk, Four Panel” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing Type 45 – Information Kiosk, Four Panel signs, complete in place, including concrete foundations and anchorage system and procurement and placement of the maps as required by MTS signage requirements, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-9.05.2.2 PRIMARY AND SECONDARY SITE IDENTIFICATION

Work under this section includes furnishing and installing site identification signs, by type, as indicated on plans and per the requirements above. Two (2) types of site identification signs are required, identified as Type 1 and Type 2.

Measurement and Payment

Primary and Secondary Site Identification signs will be measured as each, according to the number of Primary and Secondary Site Identification signs, by Type 1 or Type 2, furnished and installed according to the plans and as directed by the Engineer.

The contract unit price paid per each for “Type 1 - Primary Site Identification” and “Type 2- Secondary Site Identification” signs shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing Primary and Secondary Site Identification signs, by Type 1 or Type 2, complete in place, including concrete foundations and anchorage system and procurement and placement as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-9.05.2.3 ADA PLATFORM

Work under this section includes furnishing and installing ADA platform signs, as indicated on the plans and per the requirements above.

Braille sign post, backing plate and baseplate shall be fabricated of minimum 1/8 inch thick Type 304 welded, stainless steel according to the section "Miscellaneous Metal Fabrication" of these Special Provisions. The sign plate shall be securely affixed to the backing plate with tamper proof stainless steel screws.

Measurement and Payment

ADA Platform signs will be measured as each, according to the number of ADA Platform sign furnished and installed according to the plans and as directed by the Engineer.

The contract unit price paid per each for "Type 30 - ADA Platform" signs shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing ADA Platform sign complete in place, including concrete foundations and anchorage system, post, and procurement and placement of sign plates as required by MTS signage requirements, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-9.05.2.4 MISCELLANEOUS SITE AND PLATFORM BLADE SIGNS

Work under this section includes furnishing and installing miscellaneous metal blade signs mounted to posts, light poles and structures, by type, as indicated on plans and per the requirements above.

Measurement and Payment

Miscellaneous site and platform blade signs will be measured as each, according to the number of miscellaneous site and platform blade signs furnished and installed according to the plans and as directed by the Engineer, and by type per the following:

- Type 3 - Large Vehicular Restrictive Sign
- Type 4 - Small Vehicular Restrictive Sign
- Type 12 – Station Identification
- Type 15 – Destination
- Type 16 – Large Information Fare Paid Zone
- Type 17 – Small Information Accessible Route
- Type 51 – Do Not Sign

The contract unit price paid each for miscellaneous site and platform blade signs shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing miscellaneous site and platform blade signs, complete in place, including anchorage system and procurement and placement, as specified in the Standard Specifications and these Special Provisions and as directed by the Engineer, and by type per the following:

- Type 3 - Large Vehicular Restrictive Sign
- Type 4 - Small Vehicular Restrictive Sign
- Type 12 – Station Identification
- Type 15 – Destination
- Type 16 – Large Information Fare Paid Zone
- Type 17 – Small Information Accessible Route
- Type 51 – Do Not Sign

10-9.05.2.5 SIGN POST

Work under this section shall include furnishing and installing new sign post as shown in the plans.

Measurement and Payment

“Sign Post” will be measured as each, according to the number of sign posts furnished and installed according to the plans and as directed by the Engineer

The contract unit price paid each for “Sign Post” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing sign posts, complete in place, including anchorage system and procurement and placement, as specified in the Standard Specifications and these Special Provisions and as directed by the Engineer.

10-9.06 INDUCTIVE LOOP DETECTOR

The Contractor shall furnish and install inductive loop detectors per Section 86-5.01A of the Standard Specifications.

Measurement and Payment

Installation of inductive loop detectors will be measured by each according to the number of inductive loop detectors furnished and installed according to the plans and as directed by the Engineer.

Payment for any work related to the installation of inductive loop detectors, exclusive of the loop detectors to be installed as part of the new traffic signal installation at the 8th Street station and for the signal modification at the Anita Street and Industrial Boulevard, shall conform to the provisions in Section 86-8, "PAYMENT," of the Standard Specifications and these Special Provisions.

Payment for any work related to the installation of inductive loop detectors for the new traffic signal installation at the 8th Street station and for the signal modification at the Anita Street and Industrial Boulevard shall be in conformance with Section 10-9.07 of these Special Provisions.

The contract unit price per each “Install Traffic Signal Loop” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installation of the inductive loop detectors, complete in place, including all minor concrete and asphalt work required for the installation, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-9.07 TRAFFIC SIGNALS

Unless otherwise specified, new and modified traffic signals, street lighting, and electrical system materials and installation work related to the traffic signal installation at the 8th Street station and the traffic signal modification at the Anita Street and Industrial Boulevard intersection shall be done in accordance with Section 86 of the Standard Specifications and in accordance with the latest Standard Plans of the State of California, Department of Transportation, except as herein amended. References to other Sections 10 through 95 of the latest Standard Specifications of the State of California shall apply where shown in Section 86.

Traffic Signal System and Street Lighting System work shall include existing conduit and pull box relocations and adjustment, detection system installation, pedestrian barricades, repair or re-installation, interconnect cable installation, railroad preemption system installation, wireless communication systems and other work necessary to provide a complete and fully functional traffic signal system.

Measurement and Payment

Payment for any work related to the traffic signal installation at the 8th Street station shall be at the contract unit price "Traffic Signal – 8th Street Station" and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installation of the traffic signal including removal, modification, relocation, or installation of any street lighting and traffic signal equipment including wireless communication system and railroad preemption system as specified in the Standard Specifications, the City of National City's requirements, these Special Provisions, and as directed by the City of National City Engineer.

Payment for any work related to the traffic signal modification at the Anita Street and Industrial Boulevard intersection shall be at the contract unit price "Traffic Signal – Anita Street Grade Crossing" and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installation of the traffic signal modification, including removal, modification, relocation, or installation of any street lighting and traffic signal equipment including fiber optic system, wireless communication system and railroad preemption system installation as specified in the Standard Specifications, the City of Chula Vista's requirements, these Special Provisions, and as directed by the City of Chula Vista Engineer.

10-10 SUBBASES AND BASES

10-10.01 DESCRIPTION OF WORK

The work in this section includes aggregate subbase, aggregate base and EPS geof foam backfill materials.

10-10.02 AGGREGATE SUBBASES

This work shall consist of furnishing, spreading and compacting aggregate subbases as shown on the Plans and where determined necessary by the Engineer.

Six inches of Aggregate Subbase shall be placed above the Prepared Subgrade in accordance with Section 25-1.04, "Spreading," of the Standard Specifications and compacted to a minimum 95 percent relative compaction in accordance with Section 25-1.05, "Compacting," of the Standard Specification. Aggregate subbase shall be minimum Class 2 and shall conform to the provisions in Section 25, "Aggregate Subbases," of the Standard Specifications and these special provisions. Contractor shall allow time for Engineer to test compaction of the Prepared Subgrade and Aggregate Subbase prior to placing the base and paving.

Measurement and Payment

“Aggregate Subbase” will be measured and paid by the cubic yard in conformance with Sections 25-1.06, “Measurement,” and 25-1.07, “Payment,” of the Standard Specifications. Full compensation for furnishing labor, materials, equipment, tools, and incidentals, for doing all work involved in subgrade preparation, furnishing, placing, spreading, and compacting Aggregate Subbase as shown on the plans, specified in these Special Provisions, and as directed by the Engineer. No additional compensation will be allowed therefore.

10-10.03 AGGREGATE BASE

This work shall consist of furnishing and placing aggregate base as shown on the Plans and where determined necessary by the Engineer.

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions. Full compensation shall include furnishing labor, materials, equipment, tools, and incidentals, for doing all work involved in the spreading, compaction and installation of the aggregate base complete in place and to correct grade, as shown on the plans, specified in these Special Provisions, and as directed by the Engineer.

The use of recycled material is permitted on this project in accordance with the Section 26-1.02A, “Class 2 Aggregate Base” of the Standard Specifications.

Measurement and Payment

Measurement and payment for Aggregate Base shall be according to the contract unit cost for the item “Class 2 Aggregate Base,” measured per cubic yard in conformance with Sections 26-1.06, “Measurement,” and 26-1.07, “Payment,” of the Standard Specifications. Full compensation shall include furnishing labor, materials, equipment, tools, and incidentals, for doing all work involved in the spreading, compaction and installation of the aggregate base complete in place and to correct grade, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. No additional payment shall be allowed therefore.

10-10.04 LIGHTWEIGHT FILL (EPS BLOCK)

This Section includes the requirements for furnishing and installing lightweight fill (EPS Block). Lightweight fill (EPS Block) shall be expanded polystyrene (EPS) Geofom material as shown on the Plans.

A. GENERAL

The following references are incorporated into the requirements of the Work as described herein.

American Society of Testing and Materials (ASTM):

- ASTM D6817, *Standard Specification for Rigid, Cellular Polystyrene Geofom.*
- ASTM D-1621, *Test Method for Compressive Properties of Rigid Cellular Plastics.*
- ASTM D-1622, *Test Method for Apparent Density of Rigid Cellular Plastics.*

The Contractor shall submit the following prior to lightweight fill (EPS Block) installation as per the requirements of Section 10-1.12, Submittals.

- Lightweight fill (EPS Block) manufacturer’s product literature and technical data,

- including Physical properties in compliance with ASTM D6817 Type specified and a 10-year physical property warranty.
- Shop drawings showing lightweight fill (EPS Block) layout, profiles and product components.

The Contractor shall submit the following quality control documents during and after lightweight fill (EPS Block) installation, as per the requirements of Section 10-1.12, Submittals:

- A summary of test compliance with specified performance characteristics and physical properties.
- Manufacturer's Certificates showing evidence of Third Party Quality Control.

B. PRODUCTS

Lightweight fill (EPS Block): The material shall be Foam-Control EPS Geofoam and shall be compliant with ASTM D6817 and meet the requirements of ASTM D6817 Type EPS29. The material shall have the following minimum physical properties:

- | | |
|---|-------------------------|
| • Density, max | 1.8 lbs/ft ³ |
| • Compressive Strength (at 10% deformation), min. | 29 psi |
| • Flexural Strength, min. | 50 psi |
| • Modulus of Elasticity, min. | 1090 psi |

The material shall be Foam-Control EPS Geofoam and shall be treated by the manufacturer with a tested and proven termite treatment for below grade applications, 3 year minimum field exposure. The treatment shall be EPA registered, meet requirements of ICC ES EG239, and be recognized in an ICC ES report.

LIGHTWEIGHT FILL (EPS BLOCK) CONNECTOR PLATES: Connector plates shall be used to restrain lightweight fill (EPS Block) from moving laterally in layer over layer applications. The plate shall be made of galvanized or stainless steel with two-sided multi-barbed design capable of piercing lightweight fill (EPS Block). Each plate shall be capable of a lateral holding strength of 60 lbs. A minimum of two plates for each 4' x 8' section of lightweight fill (EPS Block) shall be used to minimize block to block movement during installation.

MATERIAL DELIVERY, STORAGE, AND HANDLING: The Contractor shall deliver lightweight fill (EPS Block) labeled with material Type. Materials shall be stored above ground, protected from moisture and sunlight prior to installation. Contractor shall ensure that the product is not exposed to open flame or other ignition sources.

C. EXECUTION

The Contractor shall comply with manufacturer's lightweight fill (EPS Block) product data, including technical bulletins.

PREPARATION AND INSTALLATION: The Contractor shall verify conditions of substrate, grade and other conditions which affect installation of lightweight fill (EPS Block). The Contractor shall prepare the subgrade by –

- Excavate existing soil as per Section 10-5, "Grading"
- Dewater site as required.
- Place a sand leveling course of 2" minimum thickness over the prepared surface. Level the course to $\pm\frac{1}{2}$ " per 10' (10 mm per 3 meters) horizontal. The leveling course surfaces must be above ground water level at time of lightweight fill (EPS Block) placement.

The Contractor shall place the lightweight fill (EPS Block)-

- At time of material delivery, verify identification marks on face of the product. Use material of proper Type only and as specified.
- Field sample at locations as directed by the Engineer, and test the samples. The materials shall meet the specified properties of density and compressive resistance.
- Place the material as required by the Engineer and as shown on the Plans.
- Place blocks of the lightweight fill (EPS Block) tightly on the prepared sand leveling course, first ensuring that the Sand is not frozen. If multiple layers of lightweight fill (EPS Block) are required, orient successive layers of blocks at 90° to previous layer and offset block joints between layers.
- Temporary ballast the lightweight fill (EPS Block) during all phases of construction to prevent displacement by wind or high water conditions.
- Commence with the placement of permanent overlying materials as quickly as practical.

PROTECTION: The Contractor shall protect the installed product and finished surfaces from damage during construction as required.

Measurement and Payment

"Lightweight Fill (EPS Block)" will be measured for payment by the cubic yard. Quantities shall be determined based on the limits shown on the plans or as directed by the Engineer. No allowance will be made for Lightweight Fill (EPS Block) placed outside the limits shown on the plans unless otherwise directed by the Engineer.

The contract price paid per cubic yard for "Lightweight Fill (EPS Block)" shall include full compensation for furnishing all labor, materials including but not limited to the required connector plates and joint fillers, tools, equipment and incidentals, and for doing all the work involved in constructing Lightweight Fill (EPS Block), complete in place, as shown on the plans, as these Special Provisions, and as directed by the Engineer.

10-10.05 SLURRY CEMENT BACKFILL

This work shall consist of furnishing and placing slurry cement backfill as shown on the Plans and where determined necessary by the Engineer.

Slurry cement backfill shall conform to the provisions in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications. Full compensation shall include furnishing labor, materials, equipment, tools, and incidentals, for doing all work involved in the placement of the slurry cement backfill, as shown on the plans, specified in these Special Provisions, and as directed by the Engineer.

Measurement and Payment

Measurement and payment for Slurry Cement Backfill shall be according to the contract unit cost for the item "Slurry Cement Backfill," measured per cubic yard in conformance with Sections 19-3.07, "Measurement," and 19-3.08, "Payment," of the Standard Specifications. Full compensation shall include furnishing labor, materials, equipment, tools, and incidentals, for doing all work involved in the placement of the slurry cement backfill, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-10.06 CEMENT TREATED BASE (CTB)

This work shall consist of furnishing and placing cement treated base as shown on the plans and where determined necessary by the Engineer.

Cement Treated Base (CTB) shall conform to the provisions in Section 27, "Cement Treated Bases" of the Standard Specifications. Cement Treated Base shall be Class A unless otherwise specifically directed by the Engineer.

Measurement and Payment

"Cement Treated Base" shall be measured per cubic yard and in accordance with Section 27-1.11, "Measurement" of the Standard Specifications. Cement Treated Base shall be paid by the contract unit cost per cubic yard and in accordance with the section 27-1.12, "Payment" of the Standard Specifications. Full compensation shall include furnishing all labor, materials, equipment, tools and incidentals for doing all the work involved in the mixing, placement, spreading and compaction of Class A Cement Treated Base complete in place, as shown in the plans, as specified in the Standard Specifications and these Special Provisions and as directed by the Engineer.

10-11 SURFACINGS AND PAVEMENTS

10-11.01 DESCRIPTION OF WORK

Surfacings and pavements shall include final surface preparation for the paving, providing and installing precast concrete pavers, concrete pavers, brick pavers, detectable warning pavers, directional bar mats, asphalt concrete paving, miscellaneous asphalt concrete, portland cement concrete paving and epoxy curb substitute.

10-11.02 PRECAST CONCRETE PAVERS ('STAND BEHIND LINE')

This work includes furnishing materials, labor, transportation, services, and equipment necessary to furnish and install precast concrete pavers with the recessed and painted 'Stand Behind Line' message, which are located on the platform immediately behind the detectable warning paver, including bituminous setting bed and joint filler, as indicated on drawings and as specified herein.

MATERIALS

Precast concrete pavers shall conform to the materials and fabrication requirements of Section 10-12 'Miscellaneous Concrete Construction'.

EXTRA MATERIALS

Deliver supply of maintenance materials to the owner. Furnish maintenance materials (including concrete pavers and colored joint filler) from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels. Furnish two percent (2%) of total of extra pavers of each type, color, pattern and size of paver product installed, securely packaged on a pallet and delivered to MTS yard. Furnish one 50 pound back of dry, colored joint filler material in a watertight container.

INSTALLATION

Installation of precast concrete pavers shall conform to the same requirements as 10-11.03 - Concrete Architectural Pavers.

Measurement and Payment

Precast concrete pavers will be measured for payment by the linear foot of precast concrete pavers installed, over the actual surfaces placed, within the limits shown on the Plans or as otherwise authorized by the Engineer. All five precast concrete paver types as shown on the Plans shall be measured together, with no separate measurement or payment made based on individual type.

The contract price paid per linear foot for "Pre-cast 'Stand Behind Line' Paver" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in constructing Precast Concrete Pavers ('Stand Behind Line'), painting of the recesses for each of the letters which make up the words 'Stand', 'Behind', and 'Line', complete in place, including mockups, furnishing and delivery of extra paver materials, bituminous setting bed systems, cutting, fitting, joint filling, and cleaning as shown on the plans and as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-11.03 CONCRETE ARCHITECTURAL PAVERS

This work includes furnishing materials, labor, transportation, services, and equipment necessary to furnish and install precast concrete architectural pavers, including bituminous setting bed and joint filler, as indicated on drawings and as specified herein.

Precast concrete architectural pavers shall conform to ANSI A137.1 and shall meet the following performance requirements:

Compressive Strength: Not less than 8,000 psi, averaging 9,000 psi minimum when tested in accordance with ASTM C-140.

Water Absorption: Not be greater than 7%, averaging 5%, when tested in accordance with ASTM C-293.

Flexural Strength: Not be less than 900 psi, averaging, 1,000 psi when tested in accordance with ASTM C-293.

Static Coefficient of Friction: Wet: 0.50 -0.60, Dry: 0.60 -0.70, when tested in accordance with ASTM C-1028.

The manufacturer shall be a company specializing in the manufacture of pre-cast concrete pavers for a

minimum of three (3) years. Installation shall be by a contractor and crew with at least (1) year of experience in placing concrete pavers on projects of similar nature and dollar cost, per these project requirements including bituminous setting bed system and special joint filling operations. Installation contractor shall conform to manufacturer's recommendations and all local, state licensing and bonding requirements.

Packaging and Shipping: Precast pavers to be stretch-wrapped in rows and banded on pallets, delivered in original unopened packaging with legible manufacturer identification, including size, quantity, manufacture date and inspector initials.

Manufacturer/Installer shall warrant installed system for a period of 5 years from date of substantial completion against failure of workmanship and materials.

EXTRA MATERIALS

Deliver supply of maintenance materials to the owner. Furnish maintenance materials (including concrete pavers and colored joint filler) from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels. Furnish two percent (2%) of total of extra pavers of each type, color, pattern and size of paver product installed, securely packaged on a pallet and delivered to MTS yard. Furnish one 50 pound bag of dry, colored joint filler material in a watertight container.

MOCKUPS

Before installing architectural concrete pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Engineer. Include patterns as directed by Engineer.
2. Notify Engineer 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Engineer's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

MATERIALS

Pavers shall be Angelus Paving Stones, Hanover Prest Paver, or approved equal. Materials used in the fabrication and installation of architectural concrete pavers shall conform to the following requirements:

Portland Cement: ASTM C-150 specifications for Portland Cement.

Aggregates: All aggregates to meet ASTM C-33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements. Aggregates to meet ASTM C241 HA 10 minimum.

Coloring: Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer's recommendations.

Color Blending: Factory-blend pre-cast paver that has a natural color range so products taken from one container will have the same range as products from a separate container.

Cleaner: Liquid neutral chemical cleaner with pH factor between 7 and 8, of formulation recommended by sealer manufacturer for type of precast paver used.

Sealer: Colorless, slip and stain resistant penetrating or acrylic sealer with pH factor between 7 and 8 that does not affect color or physical properties of precast paver surface.

Pavers shall conform to the following requirements:

Standard Paver Sizes: 12" x 12" x 2-1/4" thickness.

Edges: Beveled edge at all top/exposed surfaces.

Finish: Equivalent to Angelus Paving Stones standard finish, or Hanover Prest Paver tudor finish.

Aggregate: natural, sound, crushed marble chips without excessive flats or flakes.

Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalis and non-fading. Mix pigments with matrix to provide required colors.

Face layer: Minimum depth of 3/8" (nominal) and shall include 70% coverage of the paver face with aggregate.

Color: Color to be equivalent to Angelus Paving Stones - Mocha. Manufacturer to provide color samples based on Engineer provided color chips during review and approval process.

Pavers shall be fabricated by mechanically vibrated in molds, hydraulically pressed by a minimum of 400 tons of pressure, moisture cured with 100% humidity for 24 hours and factory finished by in-line grinding and shotblasting.

Bituminous Setting Bed: Bituminous setting bed shall be made from the following materials:

Asphalt Cement: Asphalt cement, conforming to ASTM D-3381. The viscosity grad. A.C. 10 or A.C. 20.

Sand for Bituminous Setting Bed: Fine aggregate shall be clean, hard sand with durable particles and shall be free from adherent coating, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from coarse to fine and all passing the No. 4 sieve, and it shall meet the gradation requirements when tested in accordance with the standard method of test or sieve or screen analysis of fine and coarse aggregates ASTM Designation C-136-81.

Bituminous Setting Bed Mix: The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be seven (7) percent asphalt cement and ninety-three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

Mastic and Base: Neoprene-modified asphalt adhesive under pavers, as manufactured by Hastings Pavement Co., Inc., or approved equal.

Mastic (asphalt adhesive)

Solids (base)	75%+/-1%
Lbs./Gal.	8-8.5 lbs.
Solvent, Mineral Spirits (over 100 degree F Flash)	

Base (2% neoprene, 10% asbestos-free fibers, 88% asphalt)

Melting point – ASTM D-36	150 degree F Min.
Penetration – 77 degree F 100 Gram Load 5 Sec (.1mm)	23-27
Ductility – ASTM D-113-44 @ 25 degree C	
5 cms/per minute	100-125 cm/Min.

Joint Filler:

Dry mixture of one part colored Portland Cement to match color of pavers, as approved by the Engineer, and three parts clean sand.

INSTALLATION

Contractor and Engineer shall jointly inspect areas to receive paver system for: defects in existing work that affect proper execution of paver installation, variances beyond allowable tolerances and maximum variation in paver bed not to exceed 1/8" in 10'-0" from required plane.

Before installation of each course of paving, the substrate shall be cleaned to remove any loose material. Dusty concrete or asphalt surfaces shall be washed and excess water removed and disposed of in accordance with local environmental requirements, to the satisfaction of the Engineer prior to application of the bituminous setting bed.

All electrical conduit, pull boxes, trench drains, foundations, and other surface penetrations shall be suitably protected prior to the application of the bituminous setting layer.

Installation of the Bituminous Setting Bed:

Tack Coat: Uniformly apply tack coat at a rate of 0.50 to 0.75 gallons per square yard to all surfaces to be in contact with the bituminous setting bed. Do not apply more asphalt emulsion than can be covered with the bituminous material during the same day. The surface shall be free of water, foreign material or dust when the tack coat is applied.

Bituminous Material: Set depth control depth rails on the existing concrete slab to proper line and level to achieve final surface profiles after installation of pavers. Maximum setting bed thickness to be one inch (1 in.). Minimum depth shall be one-half inch (1/2 in). Optimum depth is three-quarter inch (3/4 in.).

Spread hot bituminous material over the concrete substrate between the depth control rails. Screed material to level of setting bars. After each pass, low porous spots must be showered with fresh bituminous to produce a smooth, firm and even setting bed.

Fully compact bituminous materials with a 600 lb. power roller while still hot. The bed thickness shall be adjusted so that when the pavers are set on the adhesive layer, their top surface will be at the required grades.

Due to underslab imperfections, areas requiring a setting bed over 1 in. in depth, install material in separate, equal depth lifts.

Installation of Pavers:

Adhesive: Prepare neoprene modified asphalt adhesive in accordance with the manufacturers' instructions.

After the bed has cooled, a coating of two (2) percent neoprene-modified asphalt adhesive shall be applied by squeegeeing or troweling over the top surface of the setting bed, so as to provide a bond under the pavers.

Pavers: Place pavers on adhesive layer with sufficient pressure to achieve a full bond to the setting bed. Pavers shall be set hand tight in straight and square courses, and uniform top surface to the patterns and colors depicted on the drawings. Joint widths may vary to ensure good alignment to the proposed pattern and shall be 0 in. minimum to one-quarter inch (1/4 in.) maximum.

The pavers shall be laid away from the existing laying face as indicated on drawings in such a manner to ensure squareness of the pattern.

Fit pavers to surface penetrations, as indicated on the drawings. Cut pavers as required, using masonry saws or coring devices. All cut faces to be vertical and top edges shall be free from chips. No segment shall be smaller than one-fourth (1/4) paver.

On completion, surface tolerances shall be within 3/16 in. under a 10 foot straight edge and 1/8 in. +/- from finished elevations. There shall not be a difference in elevation between adjacent pavers of greater than 1/16 in., the alignment of pavers shall be 3/8 in. +/- in 50 feet.

If additional leveling of pavers is required, cover the surface with plywood and roll the surface with a light roller to compact the paver into place.

Newly laid pavers shall be protected at all times by panels of plywood or other non-staining rigid board on which the installer shall work.

Filling Joints:

Clean joints of all debris using power air blowers.

Sweep a dry mixture of the required cement and sand until joints are flush with the top surface. Fog lightly with water. Joints may recede up to 1/8 in. Cement stains that remain shall be cleaned immediately.

Expansion joints shall be located in alignment over all structural expansion joints, along the nearest paver pattern joint, at fixed obstructions, at perimeter contact with other paving surfaces and at other locations as indicated on plans. Expansion material shall be a Type A sealant, of a color to match the adjacent paver. Contractor to submit colors for all conditions to Engineer for approval.

Following installation the completed paver surface shall be cleaned and sealed. The cleaning agent shall have a pH factor between 7 and 10, be biodegradable phosphate free. Following cleaning, the pavers shall be rinsed with clean water and allow to dry thoroughly.

Measurement and Payment

Concrete architectural pavers will be measured for payment by the square foot of concrete architectural pavers, over the actual surfaces placed, within the limits shown on the Plans or as otherwise authorized by the Engineer.

The contract price paid per square foot for "Precast Concrete Architectural Pavers" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in constructing Concrete Architectural Paving, complete in place, including mockups, furnishing and delivery of extra paver materials, bituminous setting bed systems, cutting, fitting, joint filling, and cleaning as shown on the plans and as specified in the Standard Specifications and these

Special Provisions, and as directed by the Engineer.

10-11.04 CONCRETE DETECTABLE WARNING PAVERS

GENERAL

Precast concrete detectable warning pavers shall contain truncated dome patterned surface in accordance with requirements of Americans with Disabilities Act (ADA), PCI MNL 117, and as shown on plans.

Concrete Detectable Warning Pavers at LRT stations shall be a 30-1/2-inch x 24-inch x 2-inch thick unit with curb nosing and a central zone free of domes, as shown on the plans.

MOCKUPS

Before installing precast concrete detectable warning pavers, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Engineer. Include patterns as directed by Engineer.
2. Notify Engineer seven 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Engineer's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

MATERIALS

Use only precast concrete sources certified by National Precast Concrete Association (NCPA), following PCI MNL 117 specifications.

Face of casting shall not be thinner than one inch or less than 1 and a half times maximum aggregate size, whichever is larger, unless otherwise indicated.

Concrete detectable warning paver shall be yellow color per US Concrete Precast Group (USCPG), or approved equal. Tile shall be integrally colored, and shall contain 10 pounds color per cubic yard of concrete. Integral color shall consist of iron oxide pigments providing a uniform yellow color throughout the paver.

Reinforcement - Welded steel wire fabric conforming to ASTM A185 or ASTM A497, galvanized, or glass fiber reinforcing, as specified below.

Glass Fiber Reinforcing - Glass reinforcing fiber specifically designed for reinforced and structural concrete and compatibility with aggressive alkaline environment of Portland cement based composites, conforming to PCI MNL-130 and PCI MNL-128, and blended according to the manufacturer's

recommendations, ASTM C 116 and the approved mix design. Acceptable products and manufacturers include “Stealth Fibers, Model 6924” as manufactured by SI Concrete Systems, Chattanooga, Tennessee. Glass fiber content shall be 4.5-6% by weight.

Concrete quality shall meet the following requirements:

1. Minimum Strength: 4000 psi at age 28 days.
2. Concrete unit weight shall be a minimum of 145 pounds per cubic foot.
3. White Portland Cement, conforming to ASTM C150 Type I.

Mortar, Grout and Epoxy Adhesive Materials for Precast Pavers

1. Per Section 18 of the Standard Specifications.

Bituminous Setting Bed: Bituminous setting bed shall be made from the following materials:

Asphalt Cement: Asphalt cement, conforming to ASTM D-3381. The viscosity grad. A.C. 10 or A.C. 20.

Sand for Bituminous Setting Bed: Fine aggregate shall be clean, hard sand with durable particles and shall be free from adherent coating, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from coarse to fine and all passing the No. 4 sieve, and it shall meet the gradation requirements when tested in accordance with the standard method of test or sieve or screen analysis of fine and coarse aggregates ASTM Designation C-136-81.

Bituminous Setting Bed Mix: The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be seven (7) percent asphalt cement and ninety-three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

Mastic and Base: Neoprene-modified asphalt adhesive under pavers, as manufactured by Hastings Pavement Co., Inc., or approved equal.

Mastic (asphalt adhesive)	
Solids (base)	75%+/-1%
Lbs./Gal.	8-8.5 lbs.
Solvent, Mineral Spirits (over 100 degree F Flash)	
Base (2% neoprene, 10% asbestos-free fibers, 88% asphalt)	
Melting point – ASTM D-36	150 degree F Min.
Penetration – 77 degree F 100 Gram Load 5 Sec (.1mm)	23-27
Ductility – ASTM D-113-44 @ 25 degree C	
5 cms/per minute	100-125 cm/Min.

Joint Filler:

Dry mixture of one part colored Portland Cement to match color of pavers, as approved by the Engineer, and three parts clean sand.

Fabrication

Formwork - Conform to reviewed and accepted Working Drawings.

Molds - Conform to reviewed and accepted Working Drawings and PCI MNL 117.

Before placing concrete, scrupulously clean molds and coat with form release agent. Fabricate molds in manner to ensure mold surfaces which contact fresh concrete are smooth and free of irregularities and discernible joint marks.

Concrete Reinforcement - PCI MNL 117.

Embedments - PCI MNL 117.

Lifting Devices - Conform to reviewed and accepted Working Drawings.

Placing and Consolidating Concrete - PCI MNL 117.

Finish

Exposed face matching acceptable full-size test castings.

Provide roughened texture in mold process or other approved means to meet coefficient of friction specified in the Section titled, "Concrete Architectural Pavers," of these Special Provisions.

Curing - After casting, keep concrete continuously covered not less than 24 hours. Maintain temperature of concrete at placement temperature, but not warmer than 38°C (100 F), until concrete has developed final set, but not less than two hours after casting has been completed.

Final Curing - Allow concrete temperature to increase, in increments not more than 14°C (25 F) per hour, to not warmer than 66°C (150 F); maintain temperature until concrete has developed indicated design strength.

Cooling - Cool concrete gradually, at rate not more than 11°C (20 F) per hour.

Sealing

Detectable warning pavers shall include a factory applied, colorless, slip resistant sealer in accordance with the manufacturers' recommendation.

INSTALLATION

Contractor and Engineer shall jointly inspect areas to receive paver system for: defects in existing work that affect proper execution of paver installation, variances beyond allowable tolerances and maximum variation in paver bed not to exceed 1/8" in 10'-0" from required plane.

Before installation of each course of paving, the substrate shall be cleaned to remove any loose material. Dusty concrete or asphalt surfaces shall be washed and excess water removed and disposed of in accordance with local environmental requirements, to the satisfaction of the Engineer prior to application of the bituminous setting bed.

All electrical conduit, pull boxes, trench trains, foundations, and other surface penetrations shall be suitably protected prior to the application of the bituminous setting layer.

Installation of the Bituminous Setting Bed:

Tack Coat: Uniformly apply tack coat at a rate of 0.50 to 0.75 gallons per square yard to all surfaces to be in contact with the bituminous setting bed. Do not apply more asphalt emulsion than can be covered with the bituminous material during the same day. The surface shall be free of water, foreign material or dust when the tack coat is applied.

Bituminous Material: Set depth control depth rails on the existing concrete slab to proper line and level to achieve final surface profiles after installation of pavers. Maximum setting bed thickness to be one inch (1 in.). Minimum depth shall be one-half inch (1/2 in). Optimum depth is one inch .

Spread hot bituminous material over the concrete substrate between the depth control rails. Screed material to level of setting bars. After each pass, low porous spots must be showered with fresh bituminous to produce a smooth, firm and even setting bed.

Fully compact bituminous materials with a 600 lb. power roller while still hot. The bed thickness shall be adjusted so that when the pavers are set on the adhesive layer, their top surface will be at the required grades.

Due to underslab imperfections, areas requiring a setting bed over 1 in. in depth, install material in separate, equal depth lifts.

Installation of Pavers:

Adhesive: Prepare neoprene modified asphalt adhesive in accordance with the manufacturers' instructions.

After the bed has cooled, a coating of two (2) percent neoprene-modified asphalt adhesive shall be applied by squeegeeing or troweling over the top surface of the setting bed, so as to provide a bond under the pavers.

Pavers: Place pavers on adhesive layer with sufficient pressure to achieve a full bond to the setting bed. Pavers shall be set had tight in straight and square courses, and uniform top surface to the patterns and colors depicted on the drawings. Joint widths may vary to ensure good alignment to the proposed pattern and shall be 0 in. minimum to one-quarter inch (1/4 in.) maximum.

Set edge pavers as indicated in Contract Drawings and reviewed and accepted Shop Drawings, level, plumb, square and true with uniform joints and accurate alignment.

Keep pavers in their whole, uncut size to the extent possible. Contractor shall make every effort to minimize cutting of pavers. Contractor shall provide Engineer a layout mock-up for review and approval prior to installing pavers.

Tolerances:

Variation from centerline of track to exposed vertical edge of platform edge paver shall not exceed $\pm 1/16$."

Variation from top of rail to top outside edge of the platform paver shall not exceed $\pm 3/16$."

Variation from top of pavers adjacent to each other shall be 0" to $1/16$."

Variation in width of joint shall be $\pm 1/16$."

The pavers shall be laid away from the existing laying face as indicated on drawings in such a manner to ensure squareness of the pattern.

Fit pavers to surface penetrations, as indicated on the drawings. Cut pavers as required, using masonry saws or coring devices. All cut faces to be vertical and top edges shall be free from chips. No segment shall be smaller than one-fourth (1/4) paver.

If additional leveling of pavers is required, cover the surface with plywood and roll the surface with a light roller to compact the paver into place.

Newly laid pavers shall be protected at all times by panels of plywood or other non-staining rigid board on which the installer shall work.

Filling Joints:

Clean joints of all debris using power air blowers.

Sweep a dry mixture of the required cement and sand until joints are flush with the top surface. Fog lightly with water. Joints may recede up to 1/8 in. Cement stains that remain shall be cleaned immediately.

Expansion joints shall be located in alignment over all structural expansion joints, along the nearest paver pattern joint, at fixed obstructions, at perimeter contact with other paving surfaces and at other locations as indicated on plans. Expansion material shall be a Type A sealant, of a color to match the adjacent paver. Contractor to submit colors for all conditions to Engineer for approval.

Following installation the completed paver surface shall be cleaned and sealed. The cleaning agent shall have a pH factor between 7 and 10, be biodegradable phosphate free. Following cleaning, the pavers shall be rinsed with clean water and allow to dry thoroughly.

Adjusting, Cleaning, and Sealing

Correct castings which do not conform to specified requirements or replace damaged units with new castings when patching is unacceptable to the Engineer.

Contractor must have Engineer's written approval to repair surface damage by patching. Repairs shall be in accordance with PCI MNL 117, Division II, Section 4, and shall be finished as to be indistinguishable from surrounding surface.

Replace precast concrete units which are chipped, broken, stained or do not match adjoining units or which are otherwise damaged. Provide new units to match adjoining units, pointing up mortar joints to eliminate evidence of replacement.

Protect surface from foot traffic for minimum 48 hours to permit initial set of grout and sealants.

Not less than six (6) days after completion of precast installation and tooling of joints, point up joints at corners, openings and adjoining Work to provide a uniform, neat appearance, properly prepared for application of sealants and other Work to follow. Clean exposed surface of precast concrete platform edge paver with detergent, water, fiber brush and sponge; rinse thoroughly with clean water. Field seal completed installation as specified in Concrete Architectural Pavers.

Protect and maintain precast concrete work throughout construction period. Prevent wear and damage up to the time of final acceptance. Normal weathering of exposed precast concrete work is permitted during construction if other construction activities and conditions do not interfere and result in an unacceptable condition of work.

After installation of precast pavers, protect from damage and foot traffic. Provide boxing or other suitable protection. Do not use lumber which will stain or deface surface of pavers. All nails shall be galvanized.

Extra Materials

Furnish extra pre-cast concrete detectable warning pavers from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification. Furnish not less than two percent (2%) of the supplied materials for each type, color and pattern installed, securely packaged on a pallet and delivered to MTS yard.

Measurement and Payment

Concrete detectable warning pavers will be measured for payment by the square foot of concrete detectable warning pavers, over the actual surfaces placed, within the limits shown on the Plans or as otherwise authorized by the Engineer.

The contract unit price paid per square foot for "Concrete Detectable Warning Paver" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in constructing Concrete Detectable Warning Pavers, including factory applied sealer, complete in place, including additional pavers, extra materials, cutting, fitting, mortaring, grouting, jointing, sealing and cleaning as shown on the plans and as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer

10-11.05 CLAY BRICK PAVERS

GENERAL

This work includes furnishing materials, labor, transportation, services, and equipment necessary to

furnish and install clay brick pavers as indicated on drawings and as specified herein.

Clay brick pavers shall conform to ASTM C 902.

The manufacturer shall be a company specializing in the manufacture of clay brick pavers for a minimum of three (3) years. Installation shall be by a contractor and crew with at least (1) year of experience in placing clay brick pavers on projects of similar nature and dollar cost. Installation contractor shall conform to manufacturer's recommendations and all local, state licensing and bonding requirements.

Packaging and Shipping: Brick pavers to be stretch-wrapped in rows and banded on pallets, delivered in original unopened packaging with legible manufacturer identification, including size, quantity, manufacture date and inspector initials.

Manufacturer/Installer shall warrant installed system for a period of 5 years from date of substantial completion against failure of workmanship and materials.

EXTRA MATERIALS

Deliver a supply of maintenance materials (extra materials) to the owner. Furnish maintenance materials (including clay brick pavers and colored joint filler) from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels. Furnish two percent (2%) of total of extra pavers of each type, color, pattern and size of paver product installed, securely packaged on a pallet and delivered to MTS yard. Furnish one 50 pound bag of dry, colored joint filler material in a watertight container.

MOCKUPS

Before installing clay brick pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Engineer. Include patterns as directed by Engineer. Separate mockups shall be prepared for each pavement type/pattern as shown in the Plans.
2. Notify Engineer 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Engineer's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

MATERIALS

Clay Brick Pavers:

Pavers shall be Bear Path clay brick pavers as manufactured by Pacific Clay Products, or approved

equal. Materials used in the fabrication and installation of clay brick pavers shall conform to the following requirements:

Platform Pavers:

Size: 3-5/8" x 7-5/8" x 2-1/4" thickness, and 3-5/8" x 3-5/8" x 2-1/4" thickness.

Finish: Velour

Edges: Beveled edges all 4 top sides.

Color: Colors shall be equivalent to Pacific Clay Products' medium ironspot, brown flashed, and pueblo, with mix proportions and design as shown in the drawings. Manufacturer to provide color samples to the Engineer for approval.

E-Street Off-Platform Pavers:

Paver size, finish and color to match existing adjacent pavers to remain. Contractor to verify the type, size, color, and finish of the existing pavers, and provide product information and samples for review and approval by the Engineer prior to requirement mock up preparation.

Bituminous Setting Bed: Bituminous setting bed shall be made from the following materials:

Asphalt Cement: Asphalt cement, conforming to ASTM D-3381. The viscosity grad. A.C. 10 or A.C. 20.

Sand for Bituminous Setting Bed: Fine aggregate shall be clean, hard sand with durable particles and shall be free from adherent coating, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from coarse to fine and all passing the No. 4 sieve, and it shall meet the gradation requirements when tested in accordance with the standard method of test or sieve or screen analysis of fine and coarse aggregates ASTM Designation C-136-81.

Bituminous Setting Bed Mix: The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be seven (7) percent asphalt cement and ninety-three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

Mastic and Base: Neoprene-modified asphalt adhesive under pavers, as manufactured by Hastings Pavement Co., Inc., or approved equal.

Mastic (asphalt adhesive)

Solids (base)	75%+/-1%
Lbs./Gal.	8-8.5 lbs.
Solvent, Mineral Spirits (over 100 degree F Flash)	

Base (2% neoprene, 10% asbestos-free fibers, 88% asphalt)

Melting point – ASTM D-36	150 degree F Min.
Penetration – 77 degree F 100 Gram Load 5 Sec (.1mm)	23-27
Ductility – ASTM D-113-44 @ 25 degree C	
5 cms/per minute	100-125 cm/Min.

Joint Filler:

Dry mixture of one part colored Portland Cement to match color of pavers, as approved by the Engineer, and three parts clean sand.

INSTALLATION

Contractor and Engineer shall jointly inspect areas to receive paver system for defects in existing work that affect proper execution of paver installation, variances beyond allowable tolerances and maximum variation in paver bed not to exceed 1/8" in 10'-0" from required plane.

Before installation of each course of paving, the substrate shall be cleaned to remove any loose material. Dusty concrete or asphalt surfaces shall be washed and excess water removed and disposed of in accordance with local environmental requirements, to the satisfaction of the Engineer prior to application of the bituminous setting bed.

All electrical conduit, pull boxes, trench trains, foundations, and other surface penetrations shall be suitably protected prior to the application of the bituminous setting layer.

Installation of the Bituminous Setting Bed:

Tack Coat: Uniformly apply tack coat at a rate of 0.50 to 0.75 gallons per square yard to all surfaces to be in contact with the bituminous setting bed. Do not apply more asphalt emulsion than can be covered with the bituminous material during the same day. The surface shall be free of water, foreign material or dust when the tack coat is applied.

Bituminous Material: Set depth control depth rails on the existing concrete slab to proper line and level to achieve final surface profiles after installation of pavers. Maximum setting bed thickness to be one inch (1 in.). Minimum depth shall be one-half inch (1/2 in.). Optimum depth is three-quarter inch (3/4 in.).

Spread hot bituminous material over the concrete substrate between the depth control rails. Screed material to level of setting bars. After each pass, low porous spots must be showered with fresh bituminous to produce a smooth, firm and even setting bed.

Fully compact bituminous materials with a 600 lb. power roller while still hot. The bed thickness shall be adjusted so that when the pavers are set on the adhesive layer, their top surface will be at the required grades.

Due to underslab imperfections, areas requiring a setting bed over 1 in. in depth, install material in separate, equal depth lifts.

Installation of Pavers:

Adhesive: Prepare neoprene modified asphalt adhesive in accordance with the manufacturers' instructions.

After the bed has cooled, a coating of two (2) percent neoprene-modified asphalt adhesive shall be applied by squeegeeing or troweling over the top surface of the setting bed, so as to provide a bond under the pavers.

Pavers: Place pavers on adhesive layer with sufficient pressure to achieve a full bond to the setting bed. Pavers shall be set had tight in straight and square courses, and uniform top surface to the patterns and colors depicted on the drawings. Joint widths may vary to ensure good alignment to the proposed pattern and shall be 0 in. minimum to one-quarter inch (1/4 in.) maximum.

The pavers shall be laid away from the existing laying face as indicated on drawings in such a manner to ensure squareness of the pattern.

Fit pavers to surface penetrations, as indicated on the drawings. Cut pavers as required, using masonry saws or coring devices. All cut faces to be vertical and top edges shall be free from chips. No segment shall be smaller than one-fourth (1/4) brick.

On completion, surface tolerances shall be within 3/16 in. under a 10 foot straight edge and 1/8 in. +/- from finished elevations. There shall not be a difference in elevation between adjacent pavers of greater than 1/16 in., the alignment of pavers shall be 3/8 in. +/- in 50 feet.

If additional leveling of pavers is required, cover the surface with plywood and roll the surface with a light roller to compact the paver into place.

Newly laid brick pavers shall be protected at all times by panels of plywood or other non-staining rigid board on which the installer shall work.

Filling Joints:

Clean joints of all debris using power air blowers.

Sweep a dry mixture of the required cement and sand until joints are flush with the top surface. Fog lightly with water. Joints may recede up to 1/8 in. Cement stains that remain shall be cleaned immediately.

Following installation the completed paver surface shall be cleaned. The cleaning agent shall have a pH factor between 7 and 10, be biodegradable phosphate free. Following cleaning, the pavers shall be rinsed with clean water and allow to dry thoroughly.

Measurement and Payment

Clay brick pavers will be measured for payment by the square foot of the actual area of clay brick surfaces placed within the limits shown on the Plans or as otherwise authorized by the Engineer.

The contract price paid per square foot, separately for "Clay Brick Pavers" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in Clay Brick Pavers, complete in place, including mockups, furnishing and delivery of extra brick paver materials, bituminous setting bed systems, cutting, fitting, joint filling, and cleaning as shown on the plans and as specified in the Standard Specifications and these Special Provisions, and

as directed by the Engineer.

10-11.06 RECONSTRUCT CONCRETE INTERLOCKING PAVERS

GENERAL

This work includes removal, salvaging, storing, reinstalling existing concrete interlocking pavers at the locations and limits indicated on drawings, as specified these Special Provisions and as directed by the Engineer.

Protect existing interlocking pavers during removal, storage, and construction against staining and damage. Attention is directed to Section 7-1.11, "Preservation of Property," of the Standard Specifications.

Prior to performing any interlocking paver reconstruction work, the Contractor shall conduct a joint site survey with the Engineer to determine the condition of the existing paver material. Damages on existing pavers found during the survey shall be replaced as directed by the Engineer. Replacement material ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

MATERIALS

Concrete Underslab

Concrete underslab, shall conform to the requirements in Section 10-12, "Miscellaneous Concrete Construction" of these Special Provisions.

Aggregate Base

Aggregate base shall be Class 2 and shall conform to the requirements in Section 10-10.03, "Aggregate Base" of these Special Provisions.

Concrete Interlocking Pavers

Existing concrete interlocking pavers shall be reused, except those that were found defective.

Replacement pavers shall be commercial quality and shall match the size and color of existing pavers.

Bedding and Joint Sand

- A. New bedding sand shall be clean, washed natural or manufactured concrete sand conforming to the grading and quality requirements in Table 1. It shall be non-plastic and free from deleterious or foreign matter. Do not use limestone screenings or stone dust that do not conform to the grading requirements in Table 1.

Table 1 Grading Requirements for Bedding Sand ASTM C 33	
Sieve Size	Percent Passing
3/8 in.	100
No. 4	95 to 100

No. 8	85 to 100
No. 16	50 to 85
No. 30	25 to 50
No. 50	10 to 30
No. 100	2 to 10
<p>Note: Bedding sand may be used for joint sand. However, extra effort in sweeping and compacting the pavers may be required in order to completely fill the joints. If joint sand other than bedding sand is used, the gradations shown in Table 2 are recommended. Joint sand shall not be used for bedding sand.</p>	

B. The joint sand shall conform to the grading requirements as shown in Table 2 below:

Table 2 Grading Requirements for Joint Sand ASTM C 144		
Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4	100	100
No. 8	95 to 100	95 to 100
No. 16	70 to 100	70 to 100
No. 30	40 to 75	40 to 100
No. 50	10 to 35	20 to 40
No. 100	2 to 15	10 to 25
No. 200	0	0 to 10

EXECUTION

Examination

A. Sub Grade

1. Verify that subgrade preparation, compacted density and elevations conform to the specifications.
2. Verify that geotextiles, if applicable, have been placed according to specifications and drawings.

B. Base

1. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to specifications.
2. Recommended base surface tolerance should be +/- 3/8 inches over a 10 ft straight edge.
3. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.

Installation

Do not install sand or pavers during heavy rain or snowfall.

Subgrade and aggregate base shall be construction as provided in Sections 10-05.02.C “Subgrade Preparation” and Section 10-10.03, “Aggregate Base” of these Special Provisions.

A. Setting Bed

1. Spread the sand evenly over the base course and screed to a nominal 1 inches thickness, not exceeding 1½ inches thickness. The actual thickness shall be determined at the job site based on field trials in order to achieve a uniform depth not less than ¾ inch and not greater than 1 inch after compaction.
2. The screeded sand should not be disturbed or pre-compacted.
3. Do not use the bedding sand to fill depressions in the base surface.

B. Pavers

1. Ensure that pavers are free of foreign material before installation.
2. Set concrete pavers in accordance with patterns shown on the drawings. Units shall be installed straight and true to the required lines. Maintain straight pattern lines.
3. Typical joints between the pavers shall be between 1/16 inch and 3/16 inch wide on average.
4. Cut as necessary to accommodate field conditions and to achieve an accurate and consistent fit to pattern as indicated on plans and details. Concrete pavers shall be free from stain, dirt, or dust after cutting.
5. Install “soldier/sailor” course as shown on the Plans or fill gaps at the edges of the paved area with cut pavers or edge units.
6. Work shall proceed by moving forward on top of the previously installed units. On sloped areas, work shall proceed uphill.
7. Pavers shall be taken from 3 or more pallets at the same time by working vertically through the cubes to blend color evenly.
8. Care shall be taken when transporting material over uncompacted pavement in order to prevent damage or pre-compaction.

C. Compaction

1. After a substantial area of pavers has been placed, use low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Use Table 3 below to select size of compaction equipment:

Table 3 Minimum Centrifugal Compaction Force	
Paver Thickness	Compaction Force
2.36 in.	3000 lbs
3.15 in.	5000 lbs
No. 8	85 to 100

D. Completion

1. Sweep dry sand over the pavers. If more than one type of sand is to be used, the initial sweeping shall be with the coarse material used for the bedding layer. Subsequent sweeping shall use masonry sand conforming to Table 2 and shall continue until the

- joints are full and the pavers fully seated. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. of the unrestrained edges of the paving units.
2. All work to within 3 ft. of the laying face must be left fully compacted with sand-filled joints at the end of each day.
 3. Sweep off excess sand when the job is complete.
 4. The final surface elevations shall not deviate more than 3/8 inch. under a 10 ft. long straightedge.
 5. The surface elevation of pavers shall be 1/8 inch to 1/4 inch above adjacent drainage inlets, concrete collars or channels.

QUALITY CONTROL

- A. After removal of excess sand, check final elevations for conformance to the drawings.
- B. Remove pavers that are loose, chipped, broken, stained or otherwise damaged, with fresh units and re-set.
- C. Units that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.
- D. Clean exposed surfaces with potable water and stiff fiber brushes until all dirt, stains, efflorescence, asphalt, and other blemishes are removed. Use cleaner and procedures recommended by paver manufacturer. Test small sample areas for acceptance of cleaning procedures. Do not use wire brushes, metal scrapers or acids. Protect adjacent surfaces from damage during cleaning and operations.
- E. After cleaning, examine work and repair unacceptable conditions and correct as required.
- F. After installation and cleaning, protect work from damage during subsequent construction activities until work is accepted.

Measurement and Payment

Reconstruct Concrete Interlocking Pavers will be measured for payment by the square foot of determined from actual measurements within the limits shown on the Plans or as otherwise authorized by the Engineer.

The contract price paid per square foot for "Reconstruct Concrete Interlocking Pavers" shall include full compensation for furnishing all labor, materials (except replacement of damaged pavers), tools, equipment and incidentals and for doing all the work involved in reconstructing concrete interlocking pavers, complete in place, including subgrade preparation, concrete underslab or Class 2 aggregate base, sand bedding and joint sand materials, cutting, fitting, and cleaning as shown on the plans and as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-11.07 DIRECTIONAL BAR MAT PAVERS

DESCRIPTION

This Section specifies furnishing and installing directional bar mat pavers where indicated, using an exterior grade directional bar mat mortar set pavers as shown on the plans and as specified herein.

SUBMITTALS

- A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.

- B. Samples for Verification Purposes: Submit three (3) samples of full size pavers.
- C. Shop drawings are required for products specified showing fabrication details; tile surface profile; fastener locations; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.
- D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated.
- E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of directional bar mat and accessory as required.

QUALITY ASSURANCE

Provide directional bar mat paver and accessories as produced by a single manufacturer.

Installer's Qualifications: Engage an experienced Installer certified in writing by paver manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project. Manufacturer's supervisor shall be present at all times.

Americans with Disabilities Act (ADA): Provide tactile warning surfaces which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES). In addition products must comply with CALIFORNIA TITLE 24 requirements regarding patterns, color and sound on cane contact.

Satisfactory field performance is indicated when units similar in composition and made with the same manufacturing process as those to be supplied to the purchaser, do not exhibit objectionable deterioration after at least 3 years.

MOCKUPS

Before installing directional bar mat pavers, build mockups for each form and pattern of tiles and unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Engineer. Include patterns as directed by Engineer.
2. Notify Engineer 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Engineer's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

MATERIALS

Paver

Concrete pavers incorporating directional bars shall conform to the following:

Reference Standard:

- A. Paver: Multiple pavers are used to make up a directional bar mat. Pavers shall be 11-13/16" x 11-13/16" x 1-3/4" thickness. Color and finish to match detectable warning paver, per specification 10-11.04 Concrete Detectable Warning Paver.
- B. Cementitious Materials: Materials shall conform to the following applicable ASTM Specifications
 1. Portland Cement: ASTM C 150 for Portland Cement
- C. Aggregates shall conform to these ASTM specifications, except that grading requirements shall not necessarily apply:
 1. Normal Weight: ASTM C 33 for Concrete Aggregates
- D. Other constituents: Coloring pigments, integral water repellents, finely ground silica, etc., shall be previously established as suitable for use in concrete and either shall conform to ASTM Standards where applicable, or shall be shown by test or experience not to be detrimental to the durability of the concrete.

Performance Requirements:

- A. Compressive Strength: At the time of delivery to the work site, the average compressive strength shall not be less than 7,000 psi with no individual unit less than 6,500 psi per ASTM C 140.
- B. Absorption: The average shall not be greater than 5% per ASTM C140.
- C. Flexural Strength: Not less than 600 psi per ASTM 293.
- D. Load carrying capacity: Paver units shall have a tested center load capacity of 1,750 lbs.
- E. Sealant: As specified in "Sealants and Caulking" of these Special Provisions.
- F. Back-up: As specified in Section "Sealants and Caulking" of these Special Provisions.
- G. Bond Breaker: As specified in Section "Sealants and Caulking" of these Special Provisions.

Bituminous Setting Bed: Bituminous setting bed shall be made from the following materials:

Asphalt Cement: Asphalt cement, conforming to ASTM D-3381. The viscosity grad. A.C. 10 or A.C. 20.

Sand for Bituminous Setting Bed: Fine aggregate shall be clean, hard sand with durable particles and shall be free from adherent coating, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from coarse to fine and all passing the No. 4 sieve, and it shall meet the gradation requirements when tested in accordance with the standard method of test or sieve or screen analysis of fine and coarse aggregates ASTM Designation C-136-81.

Bituminous Setting Bed Mix: The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be seven (7) percent asphalt cement and ninety-three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

Mastic and Base: Neoprene-modified asphalt adhesive under pavers, as manufactured by Hastings Pavement Co., Inc., or approved equal.

Mastic (asphalt adhesive)	
Solids (base)	75%+/-1%
Lbs./Gal.	8-8.5 lbs.
Solvent, Mineral Spirits (over 100 degree F Flash)	
Base (2% neoprene, 10% asbestos-free fibers, 88% asphalt)	
Melting point – ASTM D-36	150 degree F Min.
Penetration – 77 degree F 100 Gram Load 5 Sec (.1mm)	23-27
Ductility – ASTM D-113-44 @ 25 degree C	
5 cms/per minute	100-125 cm/Min.

Joint Filler:

Dry mixture of one part colored Portland Cement to match color of pavers, as approved by the Engineer, and three parts clean sand.

DELIVERY, STORAGE AND HANDLING

Pavers shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings, and shall be identified by model designation or number. Tiles shall be kept dry and away from sources of heat. Store on flat level surface.

INSTALLATION

Contractor and Engineer shall jointly inspect areas to receive paver system for defects in existing work that affect proper execution of paver installation, variances beyond allowable tolerances and maximum variation in paver bed not to exceed 1/8" in 10'-0" from required plane.

Before installation of each course of paving, the substrate shall be cleaned to remove any loose material. Dusty concrete or asphalt surfaces shall be washed and excess water removed and disposed of in accordance with local environmental requirements, to the satisfaction of the Engineer prior to application of the bituminous setting bed.

All electrical conduit, pull boxes, trench trains, foundations, and other surface penetrations shall be suitably protected prior to the application of the bituminous setting layer.

Installation of the Bituminous Setting Bed:

Tack Coat: Uniformly apply tack coat at a rate of 0.50 to 0.75 gallons per square yard to all surfaces to be in contact with the bituminous setting bed. Do not apply more asphalt emulsion than can be covered with the bituminous material during the same day. The surface shall be free of water, foreign material or dust when the tack coat is applied.

Bituminous Material: Set depth control depth rails on the existing concrete slab to proper line and level to achieve final surface profiles after installation of pavers. Maximum setting bed thickness to be one inch (1 in.). Minimum lift depth shall be one-half inch (1/2 in.). Optimum lift depth is three-quarter inch (3/4 in.).

Spread hot bituminous material over the concrete substrate between the depth control rails. Screed material to level of setting bars. After each pass, low porous spots must be showered with fresh bituminous to produce a smooth, firm and even setting bed.

Fully compact bituminous materials with a 600 lb. power roller while still hot. The bed thickness shall be adjusted so that when the pavers are set on the adhesive layer, their top surface will be at the required grades.

Due to underslab imperfections, areas requiring a setting bed over 1 in. in depth, install material in separate, equal depth lifts.

Installation of Pavers:

Adhesive: Prepare neoprene modified asphalt adhesive in accordance with the manufacturers' instructions.

After the bed has cooled, a coating of two (2) percent neoprene-modified asphalt adhesive shall be applied by squeegeeing or troweling over the top surface of the setting bed, so as to provide a bond under the pavers.

Pavers: Place pavers on adhesive layer with sufficient pressure to achieve a full bond to the setting bed. Pavers shall be set had tight in straight and square courses, and uniform top surface to the patterns and colors depicted on the drawings. Joint widths may vary to ensure good alignment to the proposed pattern and shall be 0 in. minimum to one-quarter inch (1/4 in.) maximum.

The pavers shall be laid away from the existing laying face as indicated on drawings in such a manner to ensure squareness of the pattern.

Fit pavers to surface penetrations, as indicated on the drawings. Cut pavers as required, using masonry saws or coring devices. All cut faces to be vertical and top edges shall be free from chips. No segment shall be smaller than one-fourth (1/4) brick.

On completion, surface tolerances shall be within 3/16 in. under a 10 foot straight edge and 1/8 in. +/- from finished elevations. There shall not be a difference in elevation between adjacent pavers of greater than 1/16 in., the alignment of pavers shall be 3/8 in. +/- in 50 feet.

If additional leveling of pavers is required, cover the surface with plywood and roll the surface with a light roller to compact the paver into place.

Newly laid brick pavers shall be protected at all times by panels of plywood or other non-staining rigid board on which the installer shall work.

Filling Joints:

Clean joints of all debris using power air blowers.

Sweep a dry mixture of the required cement and sand until joints are flush with the top surface. Fog lightly with water. Joints may recede up to 1/8 in. Cement stains that remain shall be cleaned immediately.

EXTRA MATERIALS

Furnish extra cast-in-place tile and paver materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification. Furnish not less than two (2)% of the supplied materials for each type, color and pattern installed, securely packaged on a pallet and delivered to MTS yard.

GUARANTEE

Directional bar mat paver shall be guaranteed in writing for a period of five years from date of acceptance by the Engineer of the final Station Work Group. The guarantee includes defective work, breakage, deformation, fading and chalking of finishes, and loosening of panels.

CLEANING AND PROTECTING

Protect pavers against damage during construction period to comply with manufacturer's specification.

Remove and replace pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

Clean pavers by method specified by the manufacturer.

Remove mortar stains and all other types of soiling from exposed paver surfaces, wash and scrub clean.

Provide final protection and maintain conditions in a manner acceptable to installer, which ensures tile and paver work being without damage or deterioration at time of substantial completion

Measurement and Payment

Directional bar mat paver will be measured and paid for by the unit - each, which is an individual 12" +/- square paver determined from actual count of the number of pavers installed in place according to the plans and as directed by the Engineer.

The contract price paid each for "Directional Bar Mat Pavers" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing directional bar mat pavers complete in place, including mockups, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-11.08 SEAL COATING

All asphalt concrete surfaces including patches and overlays, and asphalt concrete ramps, dikes, and all existing adjacent area(s) visibly disturbed by the Contractor's operations, as determined by the Engineer, shall receive a seal coat.

The Contractor shall prepare the surface(s) to receive the seal coat in accordance with Section 37-1.04, "Preparation For Seal Coat," of the Standard Specifications. All striping that is obliterated as a result of the seal coating shall be replaced by the contractor as soon as allowed after curing, per the manufacturer's recommendations. The Contractor shall phase seal coating so as to allow vehicular ingress and egress to the parking lots and transit centers during construction, unless specifically directed to do otherwise by MTS or the Engineer.

Seal coat for asphalt concrete surfaces within roadways and streets including bus lanes, and asphalt concrete dikes, shall be a fog seal coat in accordance with Section 37-1, "Seal Coats," of the Standard Specifications and as specified in these special provisions. Asphaltic emulsion shall be either Grade SS1h or CSS1h, as determined by the Engineer.

Measurement and Payment

Seal coat will be measured for payment by the square yard, placed to the dimensions and limits shown on the plans.

The contract price per square yard for "Seal Coating" shall include full compensation for furnishing all labor, material, tools, equipment and incidental, and for doing all the work involved in constructing the slurry seal, complete in place including cleaning the surface, repairing all cracks above 1/8-inch wide, furnishing added water and set control additives and protecting the seal until it has set.

10-11.09 TRENCH RESURFACING

Where trench work for pipes, conduits, manholes, vaults, pull boxes, junction structures, and similar improvements requires removal of existing pavement to excavate the trench, such pavement shall be restored by the Contractor in accordance with the permit issued by the owner of the surface involved, or if restoration is not covered by permit, restoration by the Contractor shall be as provided in these Special Provisions, Plans and the City Standard Drawings for surface restoration for the appropriate jurisdiction. The Contractor shall perform in accordance with the Standard Specifications all work shown on the referenced City Standard Drawings for the appropriate jurisdiction. Unless otherwise indicated or shown, the Contractor shall provide resurfacing which shall match the original surface which was removed, in respect to materials, thickness, strength, finish, location, and appearance.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for trench resurfacing shall be considered included in the contract prices paid for the various related items of work, therefore no separate payment will be allowed.

10-11.10 ASPHALT CONCRETE

This work shall consist of placing and compaction of Asphalt Concrete within the parking lots, Streets, Transit Centers and between and adjacent to new grade crossing panels within the limits shown on the plans. Asphalt Concrete shall be Type B and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these Special Provisions.

The Asphalt Concrete shall conform to the following requirements:

- A. Asphalt Concrete shall be produced from commercial quality asphalt and aggregates.
- B. Aggregate for base course shall conform to the 3/4-inch maximum. The first lift shall consist of base course paving. Base course shall be 3" thick minimum.
- C. Aggregate for wearing course shall conform to the 1/2-inch maximum. Wearing course shall be 2" thick minimum. A wearing course paving mix shall be provided when only a single lift is required.
- D. Paving asphalt to be used as binder shall be PG 70-10.
- E. The amount of asphalt binder to be mixed with the aggregate will be 5.0 to 7.0 percent by weight of the dry aggregate as determined by the Engineer.

Asphalt Concrete placed on top of portland cement concrete base shall be Class F and shall conform to Section 203-6, "Asphalt Concrete," of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC).

Placement and compaction of Asphalt Concrete around the new panels shall be done with special care to avoid damaging or covering the panels or rail. Geotextile fabric shall be installed between the Asphalt Concrete paving and the existing ballast or subgrade. Asphalt used adjacent to the grade crossing panels shall be placed as shown in the Plans.

A paint binder (tack coat) shall be applied to all surfaces such as existing asphalt paving to be joined, curbs and gutters, and construction joints. Paint binder shall conform to Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," of the Standard Specifications.

The elevation of the completed asphalt pavement surface shall be such that water will not pond on either side of the longitudinal contact joint with the existing parallel asphalt pavement.

Provide asphalt end ramps at the ends of the vehicular track crossing panels on an 8:1 slope (max) as indicated on the plans.

Asphalt concrete for utility trenches in existing pavement and asphalt dikes shall conform to the requirements of Section 39-7.01, "Miscellaneous Areas," in the Standard Specifications and these Special Provisions.

Aggregate

Recycled materials shall be permitted on this project in accordance with the Standard Specifications.

The aggregate from each separate bin used for asphalt concrete, Type B, except for the bin containing the fine material, shall have a Cleanness Value of 57 minimum for contract compliance and a value of 65 minimum for operating range as determined by California Test 227, modified as follows:

- A. Tests will be performed on the material retained on the 2.36-mm (#8) sieve from each bin and will not be a combined or averaged result.
- B. Each test specimen will be prepared by hand shaking for 30 seconds, a single loading of the entire sample on a 305-mm (12-inch) diameter, 4.75-mm (#4) sieve, nested on top of a 305-mm (12-inch) diameter, 2.36-mm (#8) sieve.
- C. Where a coarse aggregate bin contains material which will pass the maximum size specified and is retained on a 9.5-mm (3/8 inch) sieve, the test specimen mass and volume of wash water specified for 25-mm (1 inch) x 4.75-mm (#4) aggregate size will be used.
- D. Samples will be obtained from the weigh box area during or immediately after discharge from each bin of the batching plant or immediately prior to mixing with asphalt in the case of continuous mixers.
- E. The Cleanness Value of the test sample from each of the bins will be separately computed and reported.

At drier-drum and continuous plants with cold feed control, Cleanness Value test samples will be obtained from the discharge of each coarse aggregate storage. An aggregate sampling device shall be provided which will provide a 25-kg (55 lb.) sample of each coarse aggregate.

If the results of the Cleanness Value tests do not meet the requirements specified for operating range but meet the contract compliance requirements, placement of the material may be continued for the remainder of that day. However, another day's work may not be started until tests, or other information, indicate to the satisfaction of the Engineer that the next material to be used in the work will comply with the requirements specified for operating range.

If the results of the Cleanness Value tests do not meet the requirements specified for contract compliance, the material which is represented by these tests shall be removed. However, if requested by the Contractor and approved by the Engineer, material having a Cleanness Value of 48 or greater may remain in place and accepted on the basis of a reduced payment for material left in place.

Asphalt concrete that is accepted on the basis of reduced payment will be paid for at the contract prices for the items of asphalt concrete involved multiplied by the following factors:

Test Value	Pay Factor
56	0.90
55	0.85
54	0.80
53	0.75
52	0.70
51	0.65

50	0.60
49	0.55
48	0.50

If asphalt concrete is accepted on the basis of reduced payment due to a Cleanness Value of 48 to 56 and also accepted on the basis of aggregate grading or Sand Equivalent tests not meeting the contract compliance requirements, the reduced payment for Cleanness Value shall apply and payment by the Contractor to SANDAG for asphalt concrete not meeting the contract compliance requirements for aggregate grading or Sand Equivalent shall not apply.

Aggregate for asphalt concrete dikes shall be in conformance with the provisions for 9.5-mm (3/8 inch) Maximum grading in Section 39-2.02, "Aggregate," of the Standard Specifications.

Measurement and Payment

Asphalt Concrete shall be measured by the ton, determined as provided in Section 9-1.01, "Measurements of Quantities," of these Special Provisions. Quantity shall be confirmed by submittal of weigh tickets for all asphalt concrete material used on the project.

The contract unit price paid per ton for "Asphalt Concrete" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing the asphalt concrete in lifts, including end ramps, geotextile fabric, Paint Binder, and seal coat, complete in place, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Aggregate used in the Asphalt Concrete shall be included in the cost per ton of Asphalt Concrete. No additional measurement or payment shall be made therefore.

10-11.11 ASPHALT CONCRETE DIKE SDRSD G-5

Asphalt Concrete dikes shall be constructed in accordance with the San Diego Regional Standard Drawings, Detail G-5.

The amount of asphalt binder used in hot mix asphalt placed in dikes, gutters, gutter flares, overside drains and aprons at the ends of drainage structures shall be increased one percent by mass of the aggregate over the amount of asphalt binder determined for use in the Asphalt Concrete placed on the traveled way.

Aggregate for asphalt concrete dikes shall be in conformance with the provisions for 9.5-mm (3/8 inch) Maximum grading in Section 39-2.02, "Aggregate," of the Standard Specifications.

Measurement and Payment

Asphalt Concrete Dikes (SDRSD G-5) shall be measured by the linear foot.

The contract unit price paid per linear foot for "Asphalt Concrete Dike SDRSD G-5" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing the asphalt concrete dikes (SDRSD G-5) complete in place, as specified in the Standard Specifications, the San Diego Regional Standard Drawings and these Special Provisions, and as directed by the Engineer.

10-11.12 STREET PAVING

Asphaltic concrete and Portland Cement Concrete (PCC) street paving shall apply to the construction of asphalt or PCC pavement in the vehicular travelled way, within the applicable City's public right-of-way. Asphaltic concrete and PCC street paving shall conform to the City of San Diego Regional Standard Drawings, Detail SDG-113. Resistance values (R-values) have been obtained for the project and range from 10 to 44. All R-values shall be confirmed in the field by the contractor. The Contractor shall confirm street classifications with the City Engineer of the municipality having jurisdiction. Minimum asphaltic concrete section shall be 4.5 inches A.C. on 15 inches of CTB and minimum PCC Pavement Section shall be 8.5" PCC on 6 inches CTB.

Where Portland Cement Concrete is used for Street Paving, it shall be colored black. Pigmentation shall be done per Section 10-11.14.

Measurement and Payment

Street Paving shall be measured per the various items required to complete the work. Asphalt Concrete shall be measured per Section 10-11.10, "Asphalt Concrete," of these Special Provisions. Base and Subbase material shall be measured per Section 10-10, "Subbases and Bases," of these Special Provisions and Portland cement concrete pavement shall be measured per Section 10-11.14, "Portland Cement Concrete Pavements," of these Special Provisions.

Street Paving shall be paid per the various items required to complete the work. Asphalt Concrete shall be paid per Section 10-11.10, "Asphalt Concrete," of these Special Provisions. Base and Subbase material shall be paid per Section 10-10, "Subbases and Bases," of these Special Provisions and Portland cement concrete pavement shall be paid per Section 10-11.14, "Portland Cement Concrete Pavement." The contract unit price paid per the various items of Street Paving shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing the asphalt concrete, base and subbase and Portland cement concrete complete in place, as specified in the Standard Specifications, the San Diego Regional Standard Drawings and these Special Provisions, and as directed by the Engineer.

10-11.13 ASPHALT CONCRETE (AC) OVERLAY

Prior to placing new asphalt on existing asphalt surfaces, Contractor shall perform crack sealing and pothole filling. Cracks 1/8" wide or greater shall be cleaned and filled with suitable bituminous material or by a method approved by the Engineer. Potholes and other pavement distresses shall be repaired. All repairs shall be performed as directed by the Engineer. The existing pavement surface shall be dry and thoroughly cleaned of all dirt, oil, vegetation and any other debris to the satisfaction of the Engineer, prior to placing new asphalt.

New asphalt shall be placed in accordance with these Special Provisions.

Measurement and Payment

Asphalt Concrete for overlay will be measured for payment by the square foot of 3" asphalt concrete overlay as applicable, placed to the dimensions, limits, and thicknesses shown on the Plans, adjusted by changes requested by the Engineer, in accordance with Section 39-8.01, "Measurement," of the Standard Specifications, except that paragraph 5 of Section 39-8.01 shall not apply.

The contract unit prices for "Asphalt Concrete (AC) Overlay" shall be paid per square foot of 3" AC Overlay and Grind and in accordance with Section 39-8.02 of the Standard Specifications, and including full compensation for repair of cracks larger than 1/8" inch, seal coat, paint binder, and prime coat.

10-11.14 PORTLAND CEMENT CONCRETE PAVEMENTS

GENERAL

Portland Cement Concrete Pavements includes transit center bus maneuvering areas and colored concrete crosswalks, as shown in the Construction Plans. Portland cement concrete pavement shall be constructed in conformance with the provisions in Section 90, "Portland Cement Concrete" of the Standard Specifications and these Special Provisions, and as shown on the plans.

Longitudinal and transverse weakened plan joints shall be placed at 15' on center and shall be saw-cut 3" deep or one-third slab thickness, whichever is greater. Joints shall be per Caltrans Standard Plans, 2006, P20. Expansion joints and tied contact joints shall be placed per the contract drawings and these special provisions.

Insert method for forming joints in pavement shall not be used. A prepaving conference is not required. Just In Time Training (JITT) is not required. A test strip is not required. All Portland Cement Concrete (PCC) pavement shall reach a minimum 7-day compressive strength of 3,000 psi. The Contractor shall submit 7-day break test results for approval to the Engineer before traffic will be permitted on the pavement. No traffic will be permitted on the new concrete pavement before a period of 10 calendar days.

CONCRETE

Attention is directed to Section 90, "Portland Cement Concrete," of the Standard Specifications, regarding mix proportions for concrete being determined by the Contractor. The Contractor shall submit concrete mixes for the approval of the Engineer. Concrete shall be Class 2 concrete per Section 90 of the Standard specifications.

Primary aggregate gradings shall conform to the gradation requirements of Section 90-3, "Aggregate Gradings," of the Standard Specifications. When combined in the proportions determined by the Contractor, the percent passing the 3/8-inch (9.5 mm) sieve and retained on the No. 8 (2.36 mm) sieve shall not be less than 16 percent of the total aggregate.

An air-entraining admixture conforming to the provisions in Section 90-4, "Admixtures," of the Standard Specifications shall be added to the concrete pavement in the amount required to result in an air content of 4 ± 1.5 percent in the freshly mixed concrete.

COLORED CONCRETE CROSSWALKS

Construction for colored concrete crosswalks shall incorporate integrally colored admixture, color as identified in the plans and shall be the following (or equal, as approved by the Engineer):

Manufacturer:	L.M. Schofield Company
Series:	Chromix Integral Color Admixture

Color: Multiple colors as identified in the Plans

Curing: Schofield Lithochrome Colorwax

Integral color shall consist of colored admixtures developed for use in ready mixed concrete. The product shall be made of the highest quality synthetic pigments as well as other ingredients designed to enhance the color and improve pigment dispersion, workability and finishing performance of the concrete.

Integral color pigments shall meet or exceed ASTM-C-979. The dosage shall not exceed 10 percent by weight of cementitious material in the concrete mix design. The coloring method shall be designed for concrete flatwork applications (broom finished, sandblast finishes, smooth finished), as well as vertical surfaces, and other types of architectural concrete. Pigment shall be a permanent coloration, uniform throughout the concrete surface and interior, and shall be highly UV and fade resistant. The appearance of the finished colored surface shall be uniform, consistent and free of color variations.

Colored admixture shall be air-entraining and water-reducing, meeting the requirements of ASTM C494, AASHTO M 194, and CRD C87.

The Contractor shall submit technical data and manufacturer's specifications for colored concrete components and a proposed plan for mixing, delivery, placement, finishing, and curing of the colored concrete. This plan shall be submitted to the Engineer for approval at least 20 days prior to constructing the architectural texture test panel placing colored concrete.

A test panel of at least 4' x 4' with a minimum depth of 5 inches shall be successfully completed at a location approved by the Engineer at least 20 days before placing colored concrete. The test panel shall be constructed, finished, and cured with the same materials, tools, equipment, and methods that will be used in placing the colored concrete. At the completion of the curing period, the test panel shall exhibit a color that closely matches the specified color. If ordered by the Engineer, additional test panels shall be constructed, finished, and cured until the specified color is obtained.

The approved test panel shall be the standard of comparison in determining the acceptability of colored concrete. Upon successful completion of all colored concrete, the test panel may be incorporated into the final product if approved by the Engineer, or shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The Contractor shall monitor the water content, weight of cementitious materials, and size, weight, and color of aggregate to maintain consistency and accuracy of the mixed colored concrete. The Contractor shall schedule delivery of concrete to provide consistent mix times from batching until discharge. No water shall be added after a portion of the batch has been discharged.

When more than one concrete pump is used to place concrete, the Contractor shall designate the pumps to receive colored concrete. The designated pumps shall receive only colored concrete throughout the concrete placement operation.

Consistent finishing practices shall be used to ensure uniformity of texture and color.

Integrally colored concrete shall be cured with Schofield Lithochrome colorwax, or approved equal, color shall match to the concrete. Provide sample panel of all colors to be used in the installation on identical surfaces for approval of the Engineer prior to construction. Curing compounds containing calcium chloride shall not be used. The time between completing surface finishing and applying curing compound shall be the same for each colored concrete component. Contractor shall provide a maintenance schedule for integrally colored concrete.

Surrounding exposed surfaces shall be protected during placement, finishing, and curing operations of colored concrete.

SUPPLEMENTARY CEMENTITIOUS MATERIALS

The Contractor may use rice hull ash as a supplementary cementitious material (SCM) to make minor concrete. Rice hull ash shall conform to the requirements in AASHTO Designation: M 321 and the following chemical and physical requirements:

Chemical Requirements	Percent
Silicon Dioxide (SiO ₂) ^a	90 min.
Loss on ignition	5.0 max.
Total Alkalies (as Na ₂ O) equivalent	3.0 max.

Physical Requirements	Percent
Particle size distribution	
Less than 45 microns	95
Less than 10 microns	50
Strength Activity Index with portland cement ^b	
7 days	95 (minimum % of control)
28 days	110 (minimum % of control)
Expansion at 16 days when testing job materials in conformance with ASTM C 1567 ^c	0.10 max.
Surface Area when testing by nitrogen adsorption in conformance with ASTM D 5604	40.0 m ² /g min.

Notes:

^a A maximum of 1.0% of the SiO₂ may exist in crystalline form.

^b When tested in conformance with the requirements for strength activity testing of silica fume in AASHTO Designation: M 307

^c In the test mix, Type II or Type V portland cement shall be replaced with at least 12% RHA by weight.

Rice hull ash will be considered as a Type UF SCM for the purposes of calculating cementitious material requirements in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications and these special provisions.

BACKER RODS

Backer rods shall have a diameter prior to placement at least 25 percent greater than the width of the sawcut and shall be expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Hot pour sealant that will melt the backer rod shall not be used. The Contractor shall submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

Hydraulic cement grout (non-shrink) shall conform to the requirements in ASTM Designation: C 1107. At the Contractor's option, clean, uniform rounded aggregate filler may be used to extend the grout. The extension of grout shall not exceed 60 percent of the mass or the maximum recommended by the manufacturer, whichever is less. The moisture content of the aggregate filler shall not exceed 0.5 percent. Grading of the aggregate filler shall conform to the following:

Sieve Size	Percentage Passing
1/2-in (12.5 mm)	100
3/8-in (9.5 mm)	85-100
No. 4 (4.75 mm)	10-30
No. 8 (2.36 mm)	0-10
No. 16 (1.10 mm)	0-5

SILICONE JOINT SEALANT

Low modulus silicone joint sealant shall be furnished in a one-part silicone formulation. Acid cure sealant shall not be used. The compound shall be compatible with the surface to which it is applied and shall conform to the following requirements:

Property	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 77°± 2°F (25°± 1°C) and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	45 psi (310 kPa) max.
Flow at 25° ± 1°C	ASTM C 639 ^a	Shall not flow from channel
Extrusion Rate at 77°± 2°F (25° ± 1°C)	ASTM C 603 ^b	75-250 g/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at -18°C, Shore A, cured 7 days at 77°± 2°F (25° ± 1°C)	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5000 hours	ASTM C 793	No chalking, cracking or bond loss
Tack free at 77°± 2°F (25° ± 1°C) and 45% to 55% R.H. ^e	ASTM C 679	Less than 75 minutes
Elongation, 7 day cure at 77°± 2°F (25° ± 1°C) and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	500 percent min.
Set to Touch, at 77°± 2°F (25° ± 1°C) and 45% to 55% R.H. ^e	ASTM D 1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.

Bond, to concrete mortar-concrete briquettes, air cured 7 days at 77°± 2°F (25° ± 1°C)	AASHTO T 132 ^c	50 psi (345 kPa) min.
Movement Capability and Adhesion, 100% extension at -18°C after, air cured 7 days at 77°± 2°F (25° ± 1°C), and followed by 7 days in water at 77°± 2°F (25° ± 1°C)	ASTM C 719 ^d	No adhesive or cohesive failure after 5 cycles

Notes:

- a. ASTM Designation: C 639 Modified (15 percent slope channel A).
- b. ASTM Designation: C 603, through 1/8-inch (3-mm) opening at 50 psi (345 kPa).
- c. Mold briquettes in conformance with AASHTO Designation: T 132, sawed in half and bonded with a 1/16-inch (1.5 mm) maximum thickness of sealant and tested in conformance with AASHTO Designation: T 132. Briquettes shall be dried to constant mass at 212 ± 10° F (100 ± 5° C).
- d. Movement Capability and Adhesion: Prepare 12-inch x 1-inch x 3-inch (305 mm x 25 mm x 75 mm) concrete blocks in conformance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 2-inch (50 mm) of block leaving ½-inch (12.5 mm) on each end of specimen unsealed. The depth of sealant shall be 3/8-inch (9.5 mm) and the width ½-inch (12.5-mm).
- e. R.H. equals relative humidity.

The silicone joint sealant shall be formulated to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

A Certificate of Compliance for the silicone sealant shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate shall also be accompanied with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

PAVEMENT CONCRETE MIX PROPORTIONS

The Contractor shall determine the mix proportions for pavement concrete. Section 40-1.015, "Cement Content," of the Standard Specifications shall not apply. The laboratory used to develop the mix proportions shall meet the requirements of ASTM Designation: C 1077, and shall have current AASHTO accreditation for test methods AASHTO Designation: T 97 or ASTM Designation: C 78, and AASHTO Designation: T 126 or ASTM Designation: C 192.

The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be determined in conformance with the requirements in California Test 559. Trial mixtures shall be made no more than 24 months before field qualification. The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be that determined from the trial mixtures curve to produce a minimum modulus of rupture of 490 psi (3.4 MPa) at 7 days, 570 psi (3.9 MPa) at 28 days age and 650 psi (4.5 MPa) at 42 days age. To account for variances in materials, production of concrete, and modulus of rupture testing, the Contractor shall include as part of the proposed mix proportions an increase to the cementitious material content or a decrease to the water to cementitious materials ratio, determined from trial mixtures, to ensure that portland cement concrete

produced during paving operations conforms to the requirements in "Modulus of Rupture," in this section.

At least 14 days prior to field qualification, the Contractor shall submit the proposed pavement concrete mix proportions with laboratory test reports. Laboratory test reports shall include modulus of rupture determined for each trial mixture at ages of 7, 21, 28 and 42 days in conformance with the applicable portions of California Test 559.

FIELD QUALIFICATION

Field qualification of proposed mix proportions will be required prior to placement of pavement concrete. The Contractor shall perform field qualification and submit certified test data to the Engineer. Field qualification data shall be based upon the proposed use of materials, mix proportions, mixing equipment, procedures and size of batch.

The certified field qualification test data reports shall include the following:

- A. Date of mixing,
- B. Mixing equipment and procedures used,
- C. Volume of batch in cubic meters and the mass or volume,
- D. Type and source of ingredients used,
- E. Penetration and slump of the concrete,
- F. The air content of the concrete, and
- G. The age at time of testing and strength of concrete specimens tested.

Field qualification test data reports shall be signed by a certified representative in charge of the laboratory that performed the tests.

MODULUS OF RUPTURE

The Engineer will test portland cement concrete pavement for modulus of rupture in conformance with the requirements in California Test 523. Acceptance will be on a lot basis. Each lot shall not to exceed 980 y³ (750 m³) of concrete pavement. The Engineer will determine sample locations. A minimum of six beam specimens shall be made from each sample. Beam specimens will be tested for modulus of rupture at 7, 21, and 28 days. The modulus of rupture for each lot will be calculated by averaging the results of two beams representing that lot tested at 28 days of age. The difference in modulus of rupture between each individual beam result shall not exceed 64 psi (0.44-MPa).

The Contractor shall perform sampling and testing of beam specimens to determine if concrete pavement has achieved a modulus of rupture of 350 psi (2.4 MPa) when requesting early use of concrete pavement in conformance with the provisions in Section 90-8.03, "Protecting Concrete Pavement," of the Standard Specifications. Beam specimens shall be made and tested in conformance with the requirements in California Test 523.

INSTALLING TIE BARS

Tie bars shall be installed at longitudinal contact joints and longitudinal weakened plane joints as directed by the Engineer. Consecutive width of new portland cement concrete pavement tied together with tie bars shall not exceed 50-ft (15 m). Tie bars shall not be used at a joint where portland cement concrete and asphalt concrete pavements abut.

Tie bars shall be installed at longitudinal joints by one of the following methods:

- A. Drilling and bonding tie bars with two-component, epoxy-resin that conforms to this section. Drilled holes shall be cleaned in conformance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Tie bars will be rotated 180° while being inserted into the epoxy filled holes. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured as specified by the manufacturer instructions. Tie bars that are improperly placed or bonded, as determined by the Engineer, will be rejected. If rejected, new holes shall be drilled and new tie bars shall be placed and securely bonded to the concrete. Rejected tie bars shall be cut flush with the joint face. Exposed ends of tie bars shall be epoxy coated. The center of the new holes shall be offset 3-inches (75 mm) horizontally from the center of the rejected hole to maintain the minimum clearance to the dowel bar. Work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
- B. Inserting tie bars into the plastic slipformed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been an insertion performed. Loose tie bars shall be replaced by drilling and bonding as described in A above, at the Contractor's expense.

LIQUID JOINT SEALANT INSTALLATION

The joint sealant detail for transverse and longitudinal joints, as shown on the plans, shall apply only to weakened plane joints. Weakened plane joints shall be constructed by the sawing method. Should grinding or grooving be required over or adjacent to joints after sealant has been placed, the joint materials shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, and replaced at the Contractor's expense.

At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the plans. Longitudinal weakened plane joints shall be Type SSC.

Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, the joint walls shall be cleaned by the dry sand blast method and other means as necessary to remove from the joint objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, traces of sand, dust and loose material shall be removed from and near the joint for a distance along the pavement surfaces of at least 2-inches (50 mm) on each side of the joint by the use of a vacuum device. Surface moisture shall be removed at the joints by means of compressed air or moderate hot compressed air or other means approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used. Sandblasting equipment shall have a maximum nozzle diameter size of $1/4 \pm 1/32$ -inch (6 ± 1 -mm) and a minimum pressure of 90 psi (0.62-MPa).

Backer rods shall be installed when the temperature of the Portland cement concrete pavement is above the dew point of the air and when the air temperature is 40°F (4°C) or above. Backer rod shall be installed when the joints to be sealed have been properly patched, cleaned and dried, as determined by the Engineer. Methods of placing backer rod that leave a residue or film on joint walls shall not be used.

Immediately after placement of the backer rod, joint sealant shall be placed in the clean, dry, prepared joints as shown on the plans. The joint sealant shall be applied using a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Adequate pressure shall be applied to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant, the surface of the sealant shall be recessed as shown on the plans.

Failure of the joint material in either adhesion or cohesion will be cause for rejection of the joint. The finished surface of joint sealant shall conform to the dimensions and allowable tolerances shown on the plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the plans, as determined by the Engineer, shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

After each joint is sealed, surplus joint sealer on the pavement surface shall be removed. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

CONSTRUCTING TRANSVERSE CONTACT JOINTS

A transverse contact (construction) joint shall be constructed, including dowels, at the end of each day's work or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

If sufficient concrete has not been mixed to form a slab to match the next weakened plane joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of excess concrete shall be at the Contractor's expense. Excess material shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of dowels.

JOINTS

Trolley Platform Areas:

The Contractor shall follow the expansion and contact joint locations as shown in the construction plans and referenced in these special provisions. Any proposed revisions to the joint type or spacing shall be submitted in writing to the Engineer for approval at least 5 working days prior to the construction of the improvements affected the revisions.

Bus Platform Areas:

The Contractor shall submit a jointing plan to the Engineer for approval. The plan shall be submitted at least 5 working days prior to construction of the bus platform areas and shall show the locations and types of joints to be used in the bus platform areas.

Bus Drive Areas:

The Contractor shall follow the expansion joint locations as shown in the construction plans and these special provisions. The Contractor shall follow the San Diego Regional Standard Drawings G-18

through G-21 as applicable, for contact, transverse and weakened plane joint spacing. The Contractor shall submit a jointing plan to the Engineer for approval. The plan shall be submitted at least 5 working days prior to construction of the bus platform areas and shall show the locations and types of joints to be used in the bus platform areas.

Sidewalk Areas:

The Contractor shall follow the San Diego Regional Standard Drawings G-9 for expansion and weakened plane joints spacing.

Measurement and Payment

Portland Cement Concrete pavement will be measured by the cubic yard of concrete pavement construction placed to the dimensions, limits, and thickness shown on the plans, adjusted by the Engineer, in accordance with the provisions in Section 40-1.13, "Measurement," and Section 40-1.14 "Payment," of the Standard Specifications and as modified herein these Special Provisions.

Sealing longitudinal and transverse weakened plane joints, and longitudinal isolation joints in Portland cement concrete pavement will not be measured for payment.

The contract price paid per cubic yard for "Portland Cement Concrete Pavement" shall include full compensation for furnishing all labor, materials (including cementitious material in the amount determined by the Contractor), tools, equipment, and incidentals, and for doing all the work involved in constructing the Portland cement concrete pavement complete in place, including furnishing and placing tie bars and, submittal to the Engineer all test data for determination of mix proportions of concrete for concrete pavement and for constructing and repairing all joints; finishing; for constructing and sealing pavement joints;, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-11.15 EPOXY PEBBLE CURB SUBSTITUTE

Epoxy Pebble Curb Substitute consists of a combination of epoxy and pebbles, which when mixed and applied according to specification, creates a raised strip which serves as a physical warning to the sight-impaired.

A. Material.

The mixture of epoxy and hardener shall be 100 percent reactive and contain no solvents, and must be compatible with placement on Portland Cement Concrete. The epoxy mixture shall be as accepted by the Engineer prior to use and shall be mixed with pebbles and installed according to methods recommended by the manufacturer. The pebbles shall be 1/8" minimum dimension and 3/8" maximum dimension caramel color "Pebblestone" brand or equal.

B. Temperature.

The paving material shall be placed when the ambient temperature is between 60°F and 90°F and preferably toward the higher end of the range to encourage a more rapid curing time.

C. Surface Preparation.

Immediately prior to installation, the surface shall be clean, dry and free of all dust and debris to provide for an adequate surface adhesion. Remove all grease, wax and oil contaminants by scrubbing with an industrial grade detergent or degreasing compound and follow with a mechanical cleaning.

D. Application/Installation.

Construct according to the manufacturer's recommendation. The epoxy pebble strip shall be installed in a 1'-6" wide x 3/4-inch deep formed depression in the paving. The transition along the walking surface from the existing concrete or AC to the epoxy pebble strip shall be smooth and flush. With the outside edges flush, the middle section shall arc to a maximum height of 1/2-inch above grade.

Contractor shall ensure curing time is 24 hours, maximum.

Measurement and Payment

Epoxy Pebble Curb Substitute shall be measured for payment by the linear foot.

The contract unit price paid per linear foot for "Epoxy Pebble Curb Substitute" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved constructing Epoxy Pebble Curb Substitute, complete in place as indicated on the plans and these special provisions.

10-12 MISCELLANEOUS CONCRETE CONSTRUCTION

10-12.01 CAST-IN-PLACE CONCRETE

10-12.01.1 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

STRENGTH DEVELOPMENT TIME

The time allowed to obtain the minimum required compressive strength as specified in Section 90-1.01, "Description," of the Standard Specifications will be 56 days when the Contractor chooses cementitious material that satisfies the following equation:

$$\frac{(41 \times UF) + (19 \times F) + (11 \times SL)}{TC} \geq 7.0$$

Where:

F = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N, including the amount in blended cement, pounds per cubic yard. F is equivalent to the sum of FA and FB as defined in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications

- SL = GGBFS, including the amount in blended cement, pounds per cubic yard
 UF = Silica fume, metakaolin, or UFFA, including the amount in blended cement, pounds per cubic yard
 TC = Total amount of cementitious material used, pounds per cubic yard

For concrete satisfying the equation above, the Contractor shall test for the modulus of rupture or compressive strength specified for the concrete involved, at least once every 500 cubic yards, at 28, 42, and 56 days. The Contractor shall submit test results to the Engineer.

SUPPLEMENTARY CEMENTITIOUS MATERIALS

The Contractor may use rice hull ash as a supplementary cementitious material (SCM) to make minor concrete. Rice hull ash shall conform to the requirements in AASHTO Designation: M 321 and the following chemical and physical requirements:

Chemical Requirements	Percent
Silicon Dioxide (SiO ₂) ^a	90 min.
Loss on ignition	5.0 max.
Total Alkalies (as Na ₂ O) equivalent	3.0 max.

Physical Requirements	Percent
Particle size distribution Less than 45 microns Less than 10 microns	95 50
Strength Activity Index with portland cement ^b 7 days 28 days	95 (minimum % of control) 110 (minimum % of control)
Expansion at 16 days when testing job materials in conformance with ASTM C 1567 ^c	0.10 max.
Surface Area when testing by nitrogen adsorption in conformance with ASTM D 5604	40.0 m ² /g min.

Notes:

- ^a A maximum of 1.0% of the SiO₂ may exist in crystalline form.
- ^b When tested in conformance with the requirements for strength activity testing of silica fume in AASHTO Designation: M 307
- ^c In the test mix, Type II or Type V portland cement shall be replaced with at least 12% RHA by weight.

For the purposes of calculating cementitious material requirements in Section 90-2.01C, "Required Use of Supplementary Cementitious Materials," of the Standard Specifications and these special provisions, rice hull ash is considered to be represented by the variable *UF*.

10-12.01.2 CORROSION CONTROL FOR PORTLAND CEMENT CONCRETE

Portland cement concrete placed in contact with the ground at each station location is considered to be in a corrosive environment and shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions, except the specifications for supplementary cementitious material content in Section 90-2.01C, "Required Use Of Supplementary Cementitious Materials," of the Standard Specifications shall not apply.

Cementitious material to be used in portland cement concrete shall conform to the provisions in Section 90-2, "Materials," of the Standard Specifications, and shall be a combination of either Type II or Type V portland cement and supplementary cementitious material.

Concrete in a corrosive environment shall contain not less than 675 pounds of cementitious material per cubic yard.

Reduction in the cementitious material content specified or ordered in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications, is not permitted for concrete in a corrosive environment.

For concrete in a corrosive environment, the cementitious material shall be comprised of one of the following:

- A. 25 percent by weight of either fly ash or natural pozzolan with a CaO content of up to 10 percent, and 75 percent by weight of portland cement
- B. 20 percent by weight of either fly ash or natural pozzolan with a CaO content of up to 10 percent, 5 percent by weight of silica fume, and 75 percent by weight of portland cement
- C. 12 percent by weight of either silica fume, metakaolin, or UFFA; and 88 percent by weight of portland cement
- D. 50 percent by weight of ground granulated blast furnace slag, and 50 percent by weight of portland cement

The ratio of the amount of free water to the amount of cementitious material used in concrete in a corrosive environment shall not exceed 0.50.

Full compensation for conforming to the above requirements shall be considered as included in the contract prices paid for the various contract items of work, and no additional compensation will be allowed therefor.

10-12.02 MINOR CONCRETE

The work in this section includes furnishing and placement of the following:

- A. Cast-in-place concrete and reinforcement for the slab on grade platform slab and slab on grade sloped platform access slab including associated curbs, thickened edges and turndowns as shown on the Plans.
- B. Cast-in-place concrete and reinforcement for the platform concrete seatwall, concrete steps and shelter concrete column pedestals as shown in the Plans.
- C. Cast-in-place concrete medians as shown in the Plans.

Concrete for platform slabs, sloped platform access slabs, concrete seatwalls, concrete steps and concrete median shall conform to the provisions in Sections 90-09, "Compressive Strength" and 90-10, "Minor Concrete" of the Standard Specifications and these Special Provisions.

Reinforcement for platform slabs, sloped platform access slabs, concrete seatwalls, concrete steps and shelter concrete column pedestals shall conform to the provisions in Section 52, "Reinforcement" of the Standard Specifications and these Special Provisions.

EXPANSION JOINT FILLERS AND SEALANTS FOR CONCRETE SLABS

All finished concrete surfaces shall have a ½" continuous expansion joint filler at locations indicated on the plans and notes.

Where required the Contractor shall provide joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seal without causing staining or deterioration of joint substrates.

Contractor shall submit product data from the manufacturer of each joint sealant product required including instructions for joint preparation and joint sealer application. Contractor shall also submit samples for initial selection purposes in the form of manufacturer's standard based samples, consisting of strips of actual products showing full range of colors available for each product exposed to view. Samples shall be submitted to the Engineer.

Contractor shall engage an experienced installer who has completed joint sealant applications similar in material, design, and extent to that indicated for this Project that have resulted in construction with a record of successful in-service performance.

Provide joint sealants, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

Provide color selections made by the Engineer from manufacturer's full range of standard colors for products of type indicated on the plans. Color shall match French Gray color concrete or Black where specified on the plans.

CONCRETE SURFACE FINISHES

Exposed faces of concrete seatwalls and buried faces of concrete seatwalls to a minimum of 1 foot below finished grade shall receive a Class 1 Surface Finish in accordance with the requirements of Section 51-1.18B, "Class 1 Surface Finish" of the Standard Specifications.

Exposed faces of platform slab and buried faces to a minimum of 1 foot below finished grade shall receive a Class 1 Surface Finish in accordance with the requirements of Section 51-1.18B, "Class 1 Surface Finish" of the Standard Specifications.

The exposed to surface of the sloped platform access slab shall receive a broomed finish which shall be broomed perpendicular to the slop of the platform access slab. All other exposed surfaces of the sloped platform access slab and buried faces to a minimum of 1 foot below finished grade shall receive a Class 1 Surface Finish in accordance with the requirements of Section 51-1.18B, "Class 1 Surface Finish" of the Standard Specifications.

Concrete step landings shall be finished in accordance with the requirements shown on the Plans.

Concrete pedestals shall receive an Ordinary Surface Finish in accordance with the requirements of Section 51-1.18A, "Ordinary Surface Finish" of the Standard Specifications.

Measurement and Payment

Measurement for quantities of minor concrete shall conform to the provisions in Section 73-1.07 of the Standard Specifications and these Special Provisions. Quantities for Minor Concrete (Concrete Seatwall) will be based on the full depth of the portion of the concrete seatwall beyond the end of platform limits as shown on the Plans and the portion of the concrete seatwall placed above the top of platform slab within the platform limits.

Payment for quantities of minor concrete shall conform to the provisions in Section 73-1.08 of the Standard Specifications and these Special Provisions.

The contract price paid per cubic yard for "Minor Concrete (Platform Slab)," "Minor Concrete (Sloped Platform Slab)," "Minor Concrete (Concrete Seatwall)," "Minor Concrete (Concrete Steps)," "Minor Concrete (Column Pedestal)," and "Minor Concrete (Median)" shall include full compensation for furnishing all labor, materials (including reinforcing steel, reinforcing steel mat, expansion joint filler, sealant and dowels, and colored nosing bands), tools, equipment, and incidentals, and for doing all the work involved in constructing minor concrete items, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-12.03 ARCHITECTURAL PRECAST CONCRETE - PLANT CAST

GENERAL

Summary

This section refers to architectural precast concrete units required for the column cladding of platform shelters, and architectural precast concrete pavers (Stand Behind Line), as shown on the plans.

The architectural precast concrete includes column cladding bases and caps, and pavers designed to be cast out of concrete as shown on the plans. These are non-structural, self-supporting units.

SUBMITTALS

- A. Product data and instructions for manufactured materials and products.
- B. Shop drawings. Provide dimensioned plan view, elevations and details concerning the precast concrete units. Unless otherwise noted, anchors will be embedded in a standard configuration. Shop drawing submittals shall include engineering calculations for the attachment of precast concrete panels to existing passenger shelter masonry columns. Shop drawings and calculations shall be signed and sealed by a Professional Engineer licensed in the state of California.
- C. Samples - Submit samples of standard color options and standard texture options for selection by the Engineer.
- D. Mock-up – Construct one column mock-up panel where directed by Engineer. Accepted mock-up may be incorporated as part of the final work.

QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabricator has proven experience with precast concrete elements for the last 5 years and has sufficient production capacity to produce, transport and deliver required units without causing delay in the project.

- B. Design units under direct supervision of Professional Engineer experienced in design of this Work and licensed in the state of California.
- C. Design modifications will be made only as necessary to meet field conditions and to ensure proper fitting of the work and only as acceptable to the Engineer. Maintain general design concept shown without increasing or decreasing sizes of members or altering profiles and alignment shown without Engineer's approval.

DELIVERY AND STORAGE

Deliver precast concrete units to project site in such quantities and at such times to assure continuity of installation. Schedules and priorities will be based on the information provided by the General Contractor. Products to be packaged to protect the finish during transport. Precast may be a long lead time item and should be ordered accordingly.

PRODUCTS

Reinforcing Materials

Use reinforcing steel to insure safe handling.

- A. Corrugated Wall Ties: Include in moldings as the mechanical fastener. 22 gauge mill galvanized steel - 7/8" x 7."
- B. Threaded Inserts: Plastic inserts included in very large castings such as large moldings, columns and stackable column components are for mechanical ties and not for lifting purposes.
- C. Adhesives: Latex - modified mortar or equivalent used on a stable substrate in conjunction with the mechanical fastener should be used. White cement can be used to adjust the greenish color created by using the latex mortar.

Use premium grade construction adhesives which come in tubes for bonding columns and on flat surfaces where latex mortar cannot be used.

Concrete Materials

- A. Portland Cement: Type 1 Portland Cement Gray or Lehigh White
- B. Coarse/Fine Aggregate - Sand and Gravel: Hard, durable, selected and graded; free of material that causes staining or reacting with cement.
- C. Pigments: Nonfading, resistant to lime and other alkalis.
- D. Water: Drinkable, free from foreign materials in amounts harmful to concrete and embedded steel.
- E. Air-Entraining Admixture: Utilize standard mix designs incorporating admixtures which facilitate the workability, curing and strength of the mix.
- F. Compressive Strength: 3500-5000 psi minimum at 28 days.

Fabrication

- A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and following dimensional tolerances, unless otherwise indicated.
- B. Molds: Accurately construct molds mortar-tight and of sufficient strength to withstand pressures due to concrete placing operations and temperature changes. Maintain mold work to provide

completed precast concrete units of shapes, lines and dimensions indicated, within specified fabrication tolerances.

- C. Dimensional Tolerances of Finished Units: Ornamental architectural precast concrete, being tapered by design, is measured for length, width and thickness at the surface from which the mold is loaded maintaining plus or minus 1/16 of an inch tolerance. Overall height and width measured at face adjacent to mold at time of casting.
- D. Surface Finish: Fabricate precast units and provide exposed surface finished as follows:
 - 1. Cladding Bases and Caps: Finish – medium sandblast, Color – equivalent to Pacific Clay Bear Path paver brick color Pueblo
 - 2. Platform Paver: Finish – light sandblast, Color – black, which may require a custom coloration. The recess of each of the letters shall be painted White.

EXECUTION OF INSTALLATION

Contractor shall engage an experienced Installer who has completed projects of similar scope and scale to this project and shall submit a list of similar completed projects to the Engineer to demonstrate capabilities and experience. Local building codes should be followed. Considerations for installation include:

- A. Install precast concrete members plumb, level and in alignment. Provide temporary supports and bracing as required to maintain position, stability and alignment as members are being permanently connected.
- B. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
- C. Accessories: Install clips, hangers and other accessories required for erection of precast units to supporting members and backup materials.
- D. Anchor units in final position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges and spacers as soon as possible after anchoring and grouting are completed.
- E. Cleaning: Clean exposed facings to remove dirt and stains on units after erection and completion of joint treatments. Protect other work from damage due to cleaning operations. Do not use cleaning materials or processes that could change the character of exposed concrete finishes.

Measurement and Payment

There is no separate measurement and payment for Architectural Precast Concrete Cap and Column Base. All required work identified within this section shall be considered incidental to the cost of the work for each of the shelter and VMS sign foundations, as identified within Section 10-12.06, "Cast in Drilled Concrete Holes."

The architectural precast concrete pavers (Stand Behind Line) units shall be measured and payment made as identified within Section 10-11, "Surfacings and Pavements."

10-12.04 CONCRETE WHEEL STOP

The work in this section includes furnishing and installing precast concrete wheel stops including the reinforcing pins in locations as shown on the plans or designated by the Engineer.

Requirements for material and fabrication of the precast wheel stop shall be the same as specified in Subsection 10-12.03, "Architectural Precast Concrete – Plant Cast." The details and dimensions shall be as shown on the plans.

Anchorage pins shall be No. 4 reinforcing steel with a minimum length of 22 inches. Except for the anchorage pins, all reinforcement within the wheel stops shall have a minimum 2 inch cover.

The precast wheel stop shall be set in place on top of the pavement with both ends bearing evenly on the same. A steel dowel shall be driven into the underlying pavement through the hole at each end of the wheel stop. If necessary, a hole shall be pre-drilled in the pavement.

Measurement and Payment

Concrete Wheel Stop will be measured as each according to the number of concrete wheel stops furnished and installed according to the plans and as directed by the Engineer. A concrete wheel stop is measured as the wheel stop and anchorage pins required to install the concrete wheel stop.

The contract unit price paid each for "Concrete Wheel Stop" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing concrete wheel stops, complete in place, including anchorage system, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-12.05 MINOR CONCRETE – CONCRETE RETAINING WALL

DESCRIPTION

The work under this item consists of furnishing all materials, equipment and labor necessary to construct the cast-in-place reinforced concrete retaining walls at the locations and in accordance with the details as shown on the Plans and these Special Provisions.

MATERIALS

Concrete for retaining walls shall conform to the provisions in Sections 90-09, "Compressive Strength" and 90-10, "Minor Concrete" of the Standard Specifications and these Special Provisions.

Reinforcement for retaining walls shall conform to the provisions in Section 52, "Reinforcement" of the Standard Specifications and these Special Provisions.

CONSTRUCTION REQUIREMENTS

All work shall conform to the requirements of the applicable sections and subsections of the Standard Specifications and these Special Provisions.

Pipe penetrations in the retaining walls shall be in accordance with the details shown on the Plans.
Surface Treatment/Rustication

The exposed/front face of all retaining walls shall receive a smooth rubbed finish unless noted otherwise on the Plans.

Measurement and Payment

Minor concrete for concrete in retaining walls shall be measured for payment by the cubic yard. The calculation of the quantity of concrete for payment will be made only to the neat lines of the retaining walls as shown on the Plans and on the basis of the concrete having the specified dimensions or such other dimensions as may be ordered in writing by the Engineer, and contractor will not be paid for concrete placed in excess of these dimensions.

The contract price paid per cubic yard for "Minor Concrete (Retaining Wall)" shall include full compensation for furnishing all labor, materials (including reinforcing steel, wall drainage system, structure backfill, expansion joint filler, sealant and dowels), tools, equipment, and incidentals, and for doing all the work involved in constructing minor concrete items, complete in place, including subgrade preparation, structure excavation and backfill, as shown on the Plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

No additional measurement or payment will be made for structure excavation, structure backfill, shoring, concrete, reinforcing steel, wall drainage systems (free draining backfill and drain pipes), pipe penetrations, rustication, painting, these costs being considered as included in the contract price paid per cubic yard of concrete for the retaining walls.

10-12.06 CAST-IN-DRILLED-HOLE CONCRETE PILES

GENERAL

Piling for platform shelter foundations, light standard footings, and variable message sign foundations shall conform to the provisions in Section 49, "Piling" of the Standard Specifications and these special provisions.

Unless otherwise specified, welding of any work performed in conformance with the provisions in Section 49, "Piling" of the Standard Specifications, shall be in conformance with the requirements in AWS D1.1.

Contractor may encounter concrete debris, loose soils, cobbles, boulders, and hard rock during drilling for cast-in-drilled piles. In addition, some of the site soils have little cohesion and caving of drilled holes should be anticipated.

Summary

Cast-in-drilled-hole (CIDH) concrete piling shall conform to the provisions in Section 49-4, "Cast-In-Place Concrete Piles" of the Standard Specifications and these special provisions.

The provisions of "Welding" of these special provisions shall not apply to temporary steel casings.

SUBMITTALS

Pile Installation Plan

Pile Installation Plan: The Contractor shall submit a pile installation plan to the Engineer for approval for all CIDH concrete piling. The pile installation plan shall be submitted at least 15 days before constructing CIDH concrete piling and shall include complete descriptions, details, and supporting calculations for the following:

- A. Concrete mix design, certified test data, and trial batch reports.
- B. Drilling or coring methods and equipment.
- C. Proposed method for casing installation and removal when necessary.
- D. Plan view drawing of pile showing reinforcement. Include inspection pipes on the drawing if inspection pipes are required.
- E. Methods for placing, positioning, and supporting bar reinforcement.
- F. Methods and equipment for determining the depth of concrete and actual and theoretical volume placed, including effects on volume of concrete when any casings are withdrawn.
- G. Methods and equipment for verifying that the bottom of the drilled hole is clean before placing concrete.
- H. Methods and equipment for preventing upward movement of reinforcement, including the Contractor's means of detecting and measuring upward movement during concrete placement operations.

For concrete placed under slurry, the pile installation plan shall also include complete descriptions, details, and supporting calculations for the following:

- A. Concrete batching, delivery, and placing systems, including time schedules and capacities. Time schedules shall include the time required for each concrete placing operation at each pile.
- B. Concrete placing rate calculations. When requested by the Engineer, calculations shall be based on the initial pump pressures or static head on the concrete and losses throughout the placing system, including anticipated head of slurry and concrete to be displaced.
- C. Suppliers' test reports on the physical and chemical properties of the slurry and any proposed slurry chemical additives, including Material Safety Data Sheet.
- D. Slurry testing equipment and procedures.
- E. Methods of removal and disposal of excavation, slurry, and contaminated concrete, including removal rates.
- F. Methods and equipment for slurry agitating, recirculating, and cleaning.

QUALITY ASSURANCE

Concrete Test Batch

Before concrete is deposited under slurry, a concrete test batch shall be produced and delivered to the project under conditions and in time periods similar to those expected during placement of concrete in the piles. Concrete shall be placed in an excavated hole or suitable container of adequate size to allow for testing as specified herein. Depositing of concrete under slurry will not be required. In addition to meeting the specified nominal slump, the concrete test batch shall meet the following requirements:

- A. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be 2 hours or less, the concrete test batch shall demonstrate that the proposed concrete mix design achieves a slump of at least 7 inches after twice that time has elapsed.

- B. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be more than 2 hours, the concrete test batch shall demonstrate that the proposed concrete mix design achieves a slump of at least 7 inches after that time plus 2 hours has elapsed.

The time period shall begin at the start of placement. Concrete shall not be vibrated or agitated during the test period. Slump tests will be performed in conformance with the requirements in California Test 556.

Upon completion of testing, concrete shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Preconstruction Meeting

A preconstruction meeting for CIDH concrete pile construction shall be held (1) at least 5 business days after submitting the pile installation plan and (2) at least 10 days before the start of CIDH concrete pile construction.

The meeting shall include the Engineer, the Contractor, and any subcontractors involved in the CIDH concrete pile construction.

The purpose of this meeting is to:

- A. Establish contacts and communication protocol between the Contractor, any subcontractors involved in CIDH concrete pile construction, and the Engineer.
- B. Review the construction process, acceptance testing, and anomaly mitigation of CIDH concrete piles.

The Contractor shall provide a facility for the meeting. The Engineer will conduct the meeting. The following will be discussed at the meeting:

- A. Pile placement plan, dry and wet
- B. Acceptance testing, including gamma-gamma logging, cross-hole sonic logging, and coring
- C. Pile Design Data Form
- D. Mitigation process
- E. Timeline and critical path activities
- F. Structural, geotechnical, and corrosion design requirements
- G. Future meetings, if necessary, for pile mitigation and pile mitigation plan review
- H. Safety requirements, including Cal/OSHA and Tunnel Safety Orders

MATERIALS

Concrete

Concrete deposited under slurry shall have a nominal slump equal to or greater than 7 inches, contain not less than 675 pounds of cementitious material per cubic yard, and be proportioned to prevent excessive bleed water and segregation. The nominal and maximum slump and penetration requirements in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications shall not apply.

Concrete shall conform to the requirements in "Corrosion Control for Portland Cement Concrete" of these special provisions.

Aggregate Grading

The combined aggregate grading shall be either the 1-inch maximum grading, the 1/2-inch maximum grading, or the 3/8-inch maximum grading and shall conform to the requirements in Section 90-3, "Aggregate Gradings," of the Standard Specifications.

When concrete is placed under slurry, the combined aggregate grading shall be either the 1/2-inch maximum grading or the 3/8-inch maximum grading and shall conform to the requirements in Section 90-3, "Aggregate Gradings," of the Standard Specifications.

Nonshrink Grout

Nonshrink Grout for base plate leveling shall conform to ASTM C 1107.

Reinforcing Steel

Reinforcement shall conform to the provisions in Section 52, "Reinforcement" of the Standard Specifications and these Special Provisions.

CONSTRUCTION

General

CIDH concrete piling 24 inches in diameter or larger may be constructed by excavation and depositing concrete under slurry.

Portions of CIDH concrete piling shown on the plans to be formed shall be formed and finished in conformance with the provisions for concrete structures in Section 51, "Concrete Structures," of the Standard Specifications.

Placing Concrete

Concrete deposited under slurry shall be carefully placed in a compact, monolithic mass and by a method that will prevent washing of the concrete. Concrete deposited under slurry need not be vibrated. Placing concrete shall be a continuous operation lasting not more than the time required for each concrete placing operation at each pile, as submitted in the placing plan, unless otherwise approved in writing by the Engineer. Concrete shall be placed with concrete pumps and delivery tube system of adequate number and size to complete the placing of concrete in the time specified. The delivery tube system shall consist of one of the following:

- A. Tremie tube or tubes, each of which are at least 10 inches in diameter, fed by one or more concrete pumps.
- B. One or more concrete pump tubes, each fed by a single concrete pump.

The delivery tube system shall consist of watertight tubes with sufficient rigidity to keep the ends always in the mass of concrete placed. If only one delivery tube is utilized to place the concrete, the tube shall be placed near the center of the drilled hole. Multiple tubes shall be uniformly spaced in the hole.

Internal bracing for the steel reinforcing cage shall accommodate the delivery tube system. Tremies shall not be used for piles without space for a 10-inch tube.

Spillage of concrete into the slurry during concrete placing operations shall not be allowed. Delivery tubes shall be capped with a watertight cap, or plugged above the slurry level with a good quality, tight fitting, moving plug that will expel the slurry from the tube as the tube is charged with concrete. The cap or plug shall be designed to be released as the tube is charged. The pump discharge or tremie tube shall extend to the bottom of the hole before charging the tube with concrete. After charging the delivery tube system with concrete, the flow of concrete through a tube shall be induced by slightly raising the discharge end. During concrete placement, the tip of the delivery tube shall be maintained as follows to prevent reentry of the slurry into the tube. Until at least 10 feet of concrete has been placed, the tip of the delivery tube shall be within 6 inches of the bottom of the drilled hole, and then the embedment of the tip shall be maintained at least 10 feet below the top surface of the concrete. Rapid raising or lowering of the delivery tube shall not be permitted. If the seal is lost or the delivery tube becomes plugged and must be removed, the tube shall be withdrawn, the tube cleaned, the tip of the tube capped to prevent entrance of the slurry, and the operation restarted by pushing the capped tube 10 feet into the concrete and then reinitiating the flow of concrete.

When slurry is used, a fully operational standby concrete pump, adequate to complete the work in the time specified, shall be provided at the site during concrete placement. The slurry level shall be maintained 10 feet above the piezometric head or within 12 inches of the top of the drilled hole, whichever is higher.

A log of concrete placement for each drilled hole shall be maintained by the Contractor when concrete is deposited under slurry. The log shall show the pile location, tip elevation, dates of excavation and concrete placement, total quantity of concrete deposited, length and tip elevation of any casing, and details of any hole stabilization method and materials used. The log shall include a 8-1/2" x 11" sized graph of the concrete placed versus depth of hole filled. The graph shall be plotted continuously throughout placing of concrete. The depth of drilled hole filled shall be plotted vertically with the pile tip oriented at the bottom and the quantity of concrete shall be plotted horizontally. Readings shall be made at least at each 5 feet of pile depth, and the time of the reading shall be indicated. The graph shall be labeled with the pile location, tip elevation, cutoff elevation, and the dates of excavation and concrete placement. The log shall be delivered to the Engineer within 1 working day of completion of placing concrete in the pile.

After placing reinforcement and before placing concrete in the drilled hole, if drill cuttings settle out of the slurry, the bottom of the drilled hole shall be cleaned. The Contractor shall verify that the bottom of the drilled hole is clean.

If a temporary casing is used, maintain concrete placed under slurry at a level at least 5 feet above the bottom of the casing. The equivalent hydrostatic pressure inside the casing must be greater than the hydrostatic pressure on the outside of the casing. The withdrawal of the casing must not cause contamination of the concrete with slurry.

Material resulting from using slurry shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Acceptance Test and Mitigation Plan

Vertical inspection pipes for acceptance testing shall be provided in all CIDH concrete piling 24 inches in diameter or larger, except when the holes are dry or when the holes are dewatered without the use of temporary casing in a manner that controls ground water.

The furnishing and placing of inspection pipes shall conform to the following:

- A. Inspection pipes shall be Schedule 40 PVC pipe with a nominal inside diameter of 2 inches. Watertight PVC couplers are permitted to facilitate pipe lengths in excess of those which are commercially available. The Contractor shall log the location of the inspection pipe couplers with respect to the plane of pile cut off, and these logs shall be delivered to the Engineer upon completion of the placement of concrete in the drilled hole.
- B. Each inspection pipe shall be capped at the bottom and shall extend from 3 feet above the pile cutoff down to the bottom of the reinforcing cage. A temporary top cap or similar means shall be provided to keep the pipes clean before testing. If pile cutoff is below the ground surface or working platform, inspection pipes shall be extended to 3 feet above the ground surface or working platform. Approved covers or railings shall be provided and inspection pipes shall be located as necessary to minimize exposure of testing personnel to potential falling hazards.
- C. Inspection pipes shall be completely clean, dry, and unobstructed at the time of testing providing a 2-inch diameter clear opening.
- D. The inspection pipes shall be installed in straight alignment, parallel to the main reinforcement, and securely fastened in place to prevent misalignment during installation of the reinforcement and placing of concrete in the hole. The CIDH concrete piling shall be constructed so that the relative distance of inspection pipes to vertical steel reinforcement shall remain constant.
- E. When any changes are made to the tip of CIDH concrete piling, the Contractor shall also extend the inspection pipes to the bottom of the reinforcing cage.

The following additional requirements apply if inspection pipes are not shown on the plans:

- A. Inspection pipes shall be placed radially around the pile, inside the outermost spiral or hoop reinforcement and no more than 1 inch clear of the outermost spiral or hoop reinforcement.
- B. Inspection pipes shall be placed around the pile at a uniform spacing not exceeding 33 inches measured along the circle passing through the centers of inspection pipes. A minimum of 2 inspection pipes per pile shall be used. Inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the spacing required herein.
- C. Inspection pipes shall be placed a minimum of 3 inches clear of the vertical reinforcement. When the vertical reinforcement configuration does not permit this clearance while achieving radial location requirements, distance to vertical rebar shall be maximized while still maintaining the requirement for radial location.
- D. Where the dimensions of the pile reinforcement do not permit inspection pipes to be placed per these requirements, a plan for tube placement shall be submitted to the Engineer for approval in the Pile Placement Plan with a request for deviation before fabricating pile reinforcement.

After placing concrete, inspection pipes shall be filled with water to prevent debonding of the pipe. Before requesting acceptance tests, each inspection pipe shall be tested by the Contractor in the presence of the Engineer by passing a 1-1/4-inch-diameter rigid cylinder 4.5 feet long through the length of pipe. If an inspection pipe fails to pass the 1-1/4-inch-diameter cylinder, the Contractor shall immediately fill all inspection pipes in the pile with water.

For each inspection pipe that does not pass the 1-1/4-inch-diameter cylinder, the Contractor shall core a nominal 2-inch diameter hole through the concrete for the entire length of the pile. Cored holes shall be located as close as possible to the inspection pipes they are replacing and shall be no more than 5 inches clear from the reinforcement.

Coring shall not damage the pile reinforcement. Cored holes shall be made with a double wall core barrel system utilizing a split tube type inner barrel. Coring with a solid type inner barrel will not be allowed. Coring methods and equipment shall provide intact cores for the entire length of the pile. The coring operation shall be logged by an Engineering Geologist or Civil Engineer licensed in the State of California and experienced in core logging. Coring logs shall be in conformance with the Department's "Soil and Rock Logging, Classification, and Presentation Manual." Coring logs shall include Core Recovery (REC), Rock Quality Designation (RQD), locations of breaks, and complete descriptions of inclusions and voids encountered during coring, and shall be delivered to the Engineer upon completion. Concrete cores shall be preserved, identified with the exact location the core was recovered from within the pile, and delivered to the Engineer upon completion. The Engineer will evaluate the portion of the pile represented by the cored hole based on the submitted core logs.

Acceptance tests of the concrete will be made by the Engineer, without cost to the Contractor. Acceptance tests will evaluate the homogeneity of the placed concrete. Tests will include gamma-gamma logging conducted in conformance with California Test 233. The Contractor shall not conduct operations within 25 feet of the gamma-gamma logging operations. The Contractor shall separate reinforcing steel as necessary to allow the Engineer access to the inspection pipes to perform gamma-gamma logging or other acceptance testing. After requesting acceptance tests and providing access to the piles, the Contractor shall allow 15 days for the Engineer to conduct these tests and make determination of acceptance.

The Engineer may elect to perform additional tests to further evaluate a pile. These tests may include crosshole sonic logging and other means of inspection selected by the Engineer. The pile acceptance test report will indicate if the Department intends to perform any additional testing and when the testing will be performed. The Contractor shall allow the Department 20 additional days for a total of 50 days to perform these tests and to provide supplemental results. The Contractor may progress with the mitigation plan process without waiting for these supplemental results.

Inspection pipes and cored holes shall be dewatered and filled with grout after notification by the Engineer that the pile is acceptable. Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. Inspection pipes and holes shall be filled using grout tubes that extend to the bottom of the pipe or hole or into the grout already placed.

If acceptance testing performed by the Engineer determines that a pile does not meet the requirements of the specifications and California Test 233, Part 5C, then that pile will be rejected and all depositing of concrete under slurry or concrete placed using temporary casing for the purpose of controlling groundwater shall be suspended until written changes to the methods of pile construction are approved in writing by the Engineer.

The Engineer will determine whether the rejected pile requires mitigation due to structural, geotechnical, or corrosion concerns. The Engineer will consider the estimated size and location of the anomaly and potential effects upon the design. The Engineer will provide the conclusions of this analysis to the Contractor for development of a mitigation plan, if required. The Contractor shall allow 30 days for the Engineer to determine whether the pile requires mitigation and provide information to the Contractor. Day 1 of the 30 days shall be the 1st day after access has been provided to the

Engineer to perform acceptance testing. If the Contractor submits additional information to the Engineer that modifies the size, shape, or nature of the anomaly, the Contractor shall allow 10 additional days for the subsequent analysis.

If a rejected pile does not require mitigation, you may repair the pile per an approved mitigation plan or the Engineer will deduct the amount shown in the table for each anomaly up to the maximum total deduction:

Anomaly Location	Anomaly Deduction		
	D < 4 feet	4 ≤ D < 6	D ≥ 6
Entirely or partially within the upper 2/3 of the pile length	\$1,000	\$2,000	\$4,000
Entirely within the lower 1/3 of the pile length	\$500	\$1,000	\$2,000
Maximum total deduction	\$2,000	\$4,000	\$8,000

Note:

D = Nominal pile diameter

The Engineer will deduct the amount from any moneys due, or that may become due to the Contractor under the Contract.

If the Engineer determines that a rejected pile requires mitigation, the Contractor shall submit to the Engineer for approval a mitigation plan for repair, supplementation, or replacement for each rejected CIDH concrete pile conforming to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. If the Engineer determines that it is not feasible to repair the rejected pile, the Contractor shall not include repair as a means of mitigation and shall proceed with the submittal of a mitigation plan for replacement or supplementation of the rejected pile.

Pile mitigation plans shall include the following:

- A. The designation and location of the pile addressed by the mitigation plan.
- B. A review of the structural, geotechnical, and corrosion design requirements of the rejected pile.
- C. A step by step description of the mitigation work to be performed, including drawings if necessary.
- D. An assessment of how the proposed mitigation work will address the structural, geotechnical, and corrosion design requirements of the rejected pile.
- E. Methods for preservation or restoration of existing earthen materials.
- F. A list of affected facilities, if any, with methods and equipment for protection of these facilities during mitigation.
- G. The Owner assigned contract number, full project name and station name where the structure is located as shown on the contract plans, and the Contractor (and subcontractor if applicable) name on each sheet.
- H. A list of materials, with quantity estimates, and personnel, with qualifications, to be used to perform the mitigation work.
- I. The seal and signature of an engineer who is licensed as a Civil Engineer by the State of California. This requirement is waived for approved mitigation plans when either of the following conditions are present:

1. The proposed mitigation will be performed in conformance with the most recent approved version of "ADSC Standard Mitigation Plan 'A' - Basic Repair" without exception or modification.
2. The Engineer has determined that the rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, and the Contractor elects to repair the pile using most recent Department approved version of "ADSC Standard Mitigation Plan 'B' - Grouting Repair" without exception or modification.

The most recent version of the "ADSC Standard Mitigation Plan" is available at:

<http://www.dot.ca.gov/hq/esc/geotech/ft/adscmitplan.htm>

For rejected piles to be repaired, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. An assessment of the nature and size of the anomalies in the rejected pile.
- B. Provisions for access for additional pile testing if required by the Engineer.

For rejected piles to be replaced or supplemented, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. The proposed location and size of additional piles.
- B. Structural details and calculations for any modification to the structure to accommodate the replacement or supplemental piles.

All provisions for CIDH concrete piling shall apply to replacement piles.

The Contractor shall allow the Engineer 20 days to review the mitigation plan after a complete submittal has been received.

When repairs are performed, the Contractor shall submit a mitigation report to the Engineer within 10 days of completion of the repair. This report shall state exactly what repair work was performed and quantify the success of the repairs relative to the submitted mitigation plan. The mitigation report shall be stamped and signed by an engineer that is licensed as a Civil Engineer by the State of California. The mitigation report shall show the Owner assigned contract number, full project name and station name where the structure is located as shown on the contract plans, and the Contractor (and subcontractor if applicable) name on each sheet. The Engineer will be the sole judge as to whether a mitigation proposal is acceptable, the mitigation efforts are successful, and to whether additional repairs, removal and replacement, or construction of a supplemental foundation is required.

Platform shelter structures shall not be erected until the shelter CIDH foundation has been accepted and concrete has reached specified design strength.

Measurement and Payment

"CIDH Shelter Foundation" will be measured as linear foot based on the diameter of the foundation to be installed. The length of each CIDH Shelter Foundation to be paid for shall be the length, measured along the longest side, from the tip elevation shown on the plans, or the tip elevation ordered by the Engineer for the diameter of pile shown on the plans, to the plane of pile cut-off. No reduction in the length for payment will be made for any cast-in-drilled-hole concrete pile where the tip elevation is revised in conjunction with a request by the Contractor to increase the pile diameter.

The contract unit price paid per linear foot for "CIDH Shelter Foundation" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in the foundation, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. Incidental work shall also include CIDH Shelter Foundation brick cladding and mortar joints, precast concrete cap and precast concrete base as identified in Section 10-12.03 "Architectural Precast Concrete – Plant Cast." "CIDH VMS Sign Foundation" will be measured as linear foot based on the diameter of the foundation to be installed. The length of each CIDH VMS Sign Foundation to be paid for shall be the length, measured along the longest side, from the tip elevation shown on the plans, or the tip elevation ordered by the Engineer for the diameter of pile shown on the plans, to the plane of pile cut-off. No reduction in the length for payment will be made for any cast-in-drilled-hole concrete pile where the tip elevation is revised in conjunction with a request by the Contractor to increase the pile diameter.

The contract unit price paid per linear foot for "CIDH VMS Sign Foundation" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in the foundation, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. Incidental work shall also include CIDH VMS Sign Foundation brick cladding and mortar joints, precast concrete cap and precast concrete base as identified in 10-12.03 "Architectural Precast Concrete – Plant Cast."

10-12.07 CURING COMPOUNDS

A curing compound shall be applied to all freshly placed and finished concrete surfaces in accordance with the requirements of Section 90-7 "Curing Concrete" of the Standard Specifications. The curing compound shall consist of non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A or B.

Full compensation for curing compounds shall be considered as included in the contract unit price paid for the various items of work requiring curing compounds, and no separate payment will be made therefor.

10-12.08 PRECAST CONCRETE TURNDOWN

The work in this section includes constructing, furnishing and placement of the platform slab-on-grade front edge precast concrete turndown as shown on the Plans.

Concrete for precast concrete turndowns shall conform to the provisions in Sections 90-9, "Compressive Strength." and 90-10, "Minor Concrete." of the Standard Specifications and these Special Provisions

Reinforcement for precast concrete turndowns shall conform to the provisions in Section 52 of the Standard Specifications and these Special Provisions.

Precast concrete members be constructed to the dimensions shown on the plans and shall be placed in conformance with the plans and these special provisions. Extreme care shall be exercised in handling, storing, moving and erecting precast reinforced concrete members to avoid twisting, racking or other distortion that would result in cracking or damage to the members. Precast members shall be handled, transported and erected in an upright position and the points of support and directions of the reactions with respect to the member shall be approximately the same as when the member is in its final position

Measurement and Payment

“Precast Concrete Turndown” will be measured for payment by the linear foot. Quantities shall be determined based on the limits shown on the plans or as directed by the Engineer. No allowance will be made for precast concrete turndown placed outside the limits shown on the plans unless otherwise directed by the Engineer.

The contract price paid per linear foot for “Precast Concrete Turndown” shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in constructing the precast concrete turndown, complete in place, as shown on the plans, and as specified in these special provisions, and as directed by the Engineer.

10-12.09 MINOR CONCRETE - CONCRETE CURBS, GUTTERS, SIDEWALKS, AND MISCELLANEOUS SURFACE IMPROVEMENTS

Concrete sidewalk, curbs, on-platform and off-platform planter curbs, combined curb and gutter, utility pads, vending machine pads, and curb ramps, shall conform to the provisions in Section 73, “Concrete Curbs and Sidewalks,” of the Standard Specifications, unless required otherwise by the local jurisdiction, and these special provisions. Where conflict exists the local jurisdiction will apply.

A. Curb and Combined Curb and Gutter

Concrete curb and combined curb and gutter shall conform to the applicable San Diego Regional Standard Drawings referenced on the plans. Curb height and gutter width shall match existing adjacent curb and gutter where applicable.

When curb and curb and gutter are installed in areas of existing AC pavement, pavement shall be sawcut 1 foot from the face of the new curb, or 1 foot from the gutter lip as applicable and as shown on the plans. Pavement replacement shall be in accordance the Type J Pavement Schedule as shown in the City of San Diego Standard Drawings and Section 10-11.12 of these special provisions.

Curb, combined curb and gutters, shall be placed on a minimum of 6” of aggregate base, unless otherwise required by the local jurisdiction. Where conflict exists within the jurisdiction’s right-of-way, the local jurisdiction will apply.

Measurement and Payment

Minor concrete for concrete curbs and combined curb and gutters is to be measured for payment by the linear foot constructed as shown on the Plans and as specified in these Special Provisions.

The contract unit price paid per linear foot for “Curb,” “Curb and Gutter SDRSD G-2 (18’),” and “Curb and Gutter SDRSD G-2 (24”)” shall be in accordance with Section 73-1.08, "Payment," of the Standard Specifications and shall include full compensation for all labor, materials, tools, equipment, and incidentals and for doing all work involved as shown on the Plans and as specified in these Special Provisions, complete in place. Admixtures, joints, and finishing shall be in accordance with the contract documents, these special provisions and included in the unit cost per item.

B. Concrete Planter Curbs

Concrete planter curbs shall conform to the drawings referenced and the details shown on the plans. There are two (2) types of planter curbs identified: On-platform and off-platform. Both types of planter curbs shall have a lightly broomed finish, perpendicular to the length.

Control joints shall conform to the applicable San Diego Regional Standard Drawings and Specifications.

Pre-molded expansion joint filler shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and shall be installed as shown on the plans and as shown on the standard drawings. Placement of expansion joints shall conform to the standard drawings.

Measurement and Payment

Minor concrete for concrete planter curbs is to be measured for payment by the linear foot for each of the two (2) types separately as On-Platform Planter Curb, and Off-Platform Planter Curb, calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the Engineer.

The contract unit price paid per linear foot for "On-Platform Planter Curb" and "Off-Platform Planter Curb" shall include full compensation for all labor, materials, tools, equipment, and incidentals and for doing all work involved as shown on the Plans and as specified in these Special Provisions. Admixtures, joints, and finishing shall be in accordance with the contract documents, these special provisions and included in the unit cost per item.

C. Sidewalk or Driveway

Minor concrete construction for sidewalks and driveways shall conform to the San Diego Regional Standard Drawings referenced in the plans, and the details shown on the plans, including ramp details at grade crossings. The Concrete sidewalk and driveway pavements section shall be per the concrete sidewalk detail shown in the plans. The concrete sidewalk and driveway pavement section shall apply to all sidewalk and bus platform areas as indicated in the plans.

4" crushed aggregate base shall be provided, placed and compacted in accordance with Section 10-10.03, "Aggregate Base" of these Special Provisions.

The 8 inches of compacted subgrade shall be constructed in accordance with Section 10-5.02.B, "Roadway Excavation" and Section 10-5.02 C, "Subgrade preparation" of these Special Provisions.

Pre-molded expansion joint filler shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and shall be installed as shown on the plans and as shown on the standard drawings. Placement of expansion joints shall conform to the San Diego Regional Standard Drawings.

Sidewalk and driveway improvements shown on the plans vary in size, geometry, and include ramps and detectable warning surface. See the site construction plans for the geometric layout of sidewalks.

Measurement and Payment

Minor concrete for concrete sidewalks is to be measured for payment by the square foot, calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the Engineer. Concrete vending pad shall be measured for payment by the square foot, and shall be include in the quantity of "Sidewalk." Aggregate Base shall be measured per Section 10-10.03 of these Special Provisions and Compacted Subgrade shall be measured per Section 10-5.02.C of these Special Provisions.

Minor concrete for concrete driveways is to be measured for payment by the cubic yard, calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the Engineer. Aggregate Base shall be measured per Section 10-10.03 of these Special Provisions and Compacted Subgrade shall be measured per Section 10-5.02.C of these Special Provisions.

The contract unit price paid per unit for "Concrete Sidewalk," which shall include concrete for vending pads, shall be in accordance with Section 73-1.08, "Payment," of the Standard Specifications and shall include full compensation for all labor, materials, tools, equipment, and incidentals and for doing all work involved as shown on the Plans and as specified in these Special Provisions. Admixtures, joints, and finishing shall be in accordance with the contract documents, these special provisions and included in the unit cost per item. Aggregate Base shall be paid per Section 10-10.03 of these Special Provisions and compacted subgrade shall be paid per Section 10-5.02.C of these Special Provisions.

The contract unit price paid per cubic yard for "Concrete Driveway" shall be in accordance with Section 73-1.08, "Payment," of the Standard Specifications and shall include full compensation for all labor, materials, tools, equipment, and incidentals and for doing all work involved as shown on the Plans and as specified in these Special Provisions. Admixtures, joints, and finishing shall be in accordance with the contract documents, these special provisions and included in the unit cost per item. Aggregate Base shall be paid per Section 10-10.03 of these Special Provisions and Compacted subgrade shall be paid per Section 10-5.0C of these Special Provisions.

D. Colored Concrete Sidewalk

Minor concrete construction for colored concrete sidewalks shall incorporate integrally colored admixture, color as identified in the plans and shall be the following (or equal, as approved by the Engineer):

Manufacturer: L.M. Schofield Company
Series: Chromix Intergral Color Admixture
Color: Multiple colors as identified in the Plans

Curing: Schofield Lithochrome Colorwax

Integral color shall consist of colored admixtures developed for use in ready mixed concrete. The product shall be made of the highest quality synthetic pigments as well as other ingredients designed to enhance the color and improve pigment dispersion, workability and finishing performance of the concrete.

Integral color pigments shall meet or exceed ASTM-C-979. The dosage shall not exceed 10 percent by weight of cementitious material in the concrete mix design. The coloring method shall be designed for concrete flatwork applications (broom finished, sandblast finishes, smooth finished), as well as vertical surfaces, and other types of architectural concrete. Pigment shall be a permanent coloration, uniform throughout the concrete surface and interior, and shall be highly UV and fade resistant. The appearance of the finished colored surface shall be uniform, consistent and free of color variations.

Colored admixture shall be air-entraining and water-reducing, meeting the requirements of ASTM C494, AASHTO M 194, and CRD C87.

The Contractor shall submit technical data and manufacturer's specifications for colored concrete components and a proposed plan for mixing, delivery, placement, finishing, and curing of the colored concrete. This plan shall be submitted to the Engineer for approval at least 20 days prior to constructing the architectural texture test panel placing colored concrete.

A test panel of at least 4' x 4' with a minimum depth of 5 inches shall be successfully completed at a location approved by the Engineer at least 20 days before placing colored concrete. The test panel shall be constructed, finished, and cured with the same materials, tools, equipment, and methods that will be used in placing the colored concrete. At the completion of the curing period, the test panel shall exhibit a color that closely matches the specified color. If ordered by the Engineer, additional test panels shall be constructed, finished, and cured until the specified color is obtained.

The approved test panel shall be the standard of comparison in determining the acceptability of colored concrete. Upon successful completion of all colored concrete, the test panel may be incorporated into the final product if approved by the Engineer, or shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The Contractor shall monitor the water content, weight of cementitious materials, and size, weight, and color of aggregate to maintain consistency and accuracy of the mixed colored concrete. The Contractor shall schedule delivery of concrete to provide consistent mix times from batching until discharge. No water shall be added after a portion of the batch has been discharged.

When more than one concrete pump is used to place concrete, the Contractor shall designate the pumps to receive colored concrete. The designated pumps shall receive only colored concrete throughout the concrete placement operation.

Consistent finishing practices shall be used to ensure uniformity of texture and color.

Integrally colored concrete shall be cured with Schofield Lithochrome colorwax, or approved equal, color shall match to the concrete. Provide sample panel of all colors to be used in the installation on identical surfaces for approval of the Engineer prior to construction. Curing compounds containing calcium chloride shall not be used. The time between completing surface finishing and applying curing compound shall be the same for each colored concrete component. Contractor shall provide a maintenance schedule for integrally colored concrete.

Surrounding exposed surfaces shall be protected during placement, finishing, and curing operations of colored concrete.

Measurement and Payment

Measurement for integrally colored concrete sidewalk will be measured by the square foot placed complete in place.

The contract unit prices paid per square foot for "Integrally Colored Concrete Sidewalk - Type A & B" shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in constructing Integrally Colored Concrete Sidewalk complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

E. Utility Pads

Minor concrete for utility pads as shown on the plans shall meet the requirement of Sidewalk or Driveway, unless noted otherwise. The utility pads shall be provided around the perimeter of each case and adjacent to the door openings of the instrument houses as shown.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for conformance with the requirements of this section shall be considered included in the contract prices paid for the various Instrument Shelters installed, therefore no separate payment will be allowed.

F. Cross Gutter

Cross Gutter shall consist of a concrete cross gutter in accordance with San Diego Regional Standard Drawing G-12 and the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

Minor concrete for cross gutters as shown on the plans at the proposed instrument shelters shall meet the requirement of Minor Concrete (Sidewalk), unless noted otherwise. The cross gutter shall be constructed per the details included within the plans and these specifications.

Measurement and Payment

Minor concrete for cross gutters is to be measured by the square foot placed complete in place.

The contract unit prices paid per square foot for "Cross Gutter," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in constructing Cross Gutter complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

G. Wall Gutter

Minor concrete for wall gutters as shown on the plans shall meet the requirement of Sidewalk or Driveway, unless noted otherwise. The wall gutter shall be constructed per the details included within the plans and these specifications.

Measurement and Payment

Minor concrete for wall gutters is to be measured by the square foot placed complete in place.

The contract unit prices paid per square foot for "Wall Gutter," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in constructing Wall Gutter complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

H. ADA Accessible Ramps

ADA accessible curb ramps shall comply with the California Building Code, Section 1112A and these Special Provisions. New ADA accessible ramps shall also comply with the, San Diego Regional Standard Drawings, Detail G-27 and the construction plans and details. Retrofitted ramps shall also comply with The San Diego Standard Drawings, Detail G-28 and the construction plans and details.

Measurement and Payment

ADA accessible curb ramps shall be measured per unit installed.

The contract unit prices paid per unit for "ADA Accessible Curb Ramp" shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in constructing ADA accessible ramps complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer. ADA ramps installed shall include the curb ramp detectable warning as measured and paid in section 10-12.09.I.

I. Curb Ramp Detectable Warning Surface

This work includes installing detectable warning surface on the existing curb ramp as shown on the plans, and as specified in these special provisions.

Curb ramp detectable warning surface must be:

1. Yellow color complying with Federal Standard 595B, Color No. 33538
2. Prefabricated
3. Raised truncated domes

The manufacturer must provide a written 5-year warranty for detectable warning surface, guaranteeing replacement when there is defect in the dome shape, color fastness, sound-on-cane acoustic quality, resilience, or attachment. The warranty period will begin upon acceptance of the contract.

Installation of curb ramp detectable warning surface must comply with the manufacturer's recommendations.

Measurement and Payment

Curb ramp detectable warning surface will be measured by the square foot for the actual curb ramp or sidewalk area covered.

The contract price paid per square foot for "Curb Ramp Detectable Warning Surface" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all work involved in installing detectable warning surface on new or existing curb ramp or sidewalk, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-12.10 EXPANSION JOINT FILLER AND JOINT SEALANTS FOR SIDEWALKS

All finished concrete surfaces shall have a ½" continuous expansion joint at locations indicated on the plans and notes and shall be located either parallel or perpendicular to the curb line. When not otherwise indicated all expansion joints located in or adjacent to sidewalk concrete shall be sealant Type "A" Per section 201-3 of the Regional Standard Specifications and colored to match the color of the concrete surface.

Contractor shall provide joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

Contractor shall submit product data from the manufacturer of each joint sealant product required, including instructions for joint preparation and joint sealer application. Contractor shall also submit samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view. Samples shall be submitted to Engineer. Submit complete schedule of type (and location where type is to be used) of each sealant.

Contractor shall engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent of this Project that have resulted in construction with a record of successful in-service performance. Contractor shall submit list of completed projects to the Owner, demonstrating capabilities and experience.

Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

Provide color selections made by Engineer from manufacturer's full range of standard colors for products of type indicated. Color shall match French Gray color concrete. Sealant color parallel to curb line shall match color of adjacent concrete sidewalk.

Measurement and Payment

Expansion joints and sealants shall be included in the pay items for the individual paving types, and no additional compensation shall be provided therefore.

10-13 PLATFORM AND SITE FURNISHINGS

10-13.01 GENERAL

Trolley station work shall consist of construction and modification of ancillary station structures, station furnishings, and station facilities as shown in the drawings for the various trolley stations.

Structures include ancillary concrete structures, minor foundations, and passenger shelters.

Station furnishings include ticket vending machines, benches, trash receptacles, refreshment vending machines, pedestrian railings, hand railings, chain link fencing, steel picket fencing and gates, skate deterrent devices, bike lockers, and tree grates.

Station facilities include water service, irrigation, plumbing, lighting, electrical, telephone and communication systems.

Refer to other sections in these Special Provisions for related station improvements, including demolition, station paving, signs, planting and irrigation work.

10-13.02 CHAIN LINK FENCING

The Contractor shall submit manufacturers' catalog data and brochures confirming fencing and railing materials, dimensions, and metal thicknesses in accordance with Section 5-1.04, "Submittals," of these special provisions.

Chain-link fence type CL-6 as indicated on the drawings, shall match existing if indicated, and shall conform to the provisions in Section 80, "Fences," and Section 80-4, "Chain-link Fence," of the Standard Specifications, the San Diego Regional Standard Drawings and these Special Provisions. Chain link height shall be as indicated in the construction plans.

Chain-link fabric shall be 9 gauge galvanized steel wire woven into approximately 2 -inch mesh, unless shown otherwise in the plans. Posts, rails, braces, and hardware shall be unpainted, as required to match existing.

Fencing that is installed on top of retaining walls and fencing that is installed on the track side of retaining walls in the ballasted track section shall be grounded in accordance with anchor and footing details shown on the Plans.

Measurement and Payment

“Chain Link Fence” shall be measured and paid for in accordance with Section 80-4.03, "Measurement," of the Standard Specifications.

The contract unit price paid per linear foot for “Chain Link Fence” shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-13.03 CHAIN LINK GATE

Chain link walk gates shall be Type CL-6 conforming to the provisions in Section 80, "Fences," of the Standard Specifications, the San Diego Regional Drawings and these special provisions.

Gates shall be installed in new or existing fences at the locations shown on the plans. Gate installations shall be complete with gate post, latch post, concrete footings, braces, truss rods, and hardware. Gate and latch posts shall be braced to the next existing line post as shown on the plans. At each gate location within an existing fence, an existing line post shall be removed and the new gate installed so that the gate is centered on the post hole of the removed post. Holes resulting from the removal of line posts shall be backfilled.

Gate mounting and latching hardware shall not contain open-end slots for the fastening bolts. Chain link fabric for gates shall be of the same mesh size as the existing fence in which the gates are installed.

Openings made in existing fences for installation of gates shall be closed during the working day in which the openings are made and when work is not in progress. Temporary closures shall be made with the existing fence fabric or with additional 6-foot chain link fabric as directed by the Engineer.

Locks shall be required at all gate locations. Locks shall be Masterlock Padlock #1 or equal with a shackle length of 3 inches and diameter of ¼ inch. All locks shall be keyed the same.

Measurement and Payment

“Chain Link Gate (12’)” will be measured and paid for by the unit determined from actual count of chain link gates installed.

The contract unit price per each “Chain Link Gate (12’)” shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Full compensation for making the openings in existing fences, for temporary closing of the openings (including furnishing additional fence fabric if necessary), and for new posts, footings, hardware,

braces, truss rods, locks, and keys shall be considered as included in the contract unit price paid for chain link gate (Type CL-6) and no additional compensation will be allowed therefore.

10-13.04 STEEL PICKET FENCING AND GATES

Work under this section includes the installation of steel picket fencing, of the height indicated, at Trolley stations as shown on the plans. Fabrication, installation and painting of new steel picket fencing and gates shall conform to Section "Miscellaneous Metal" of these Special Provisions and Section 75-1.02 "Miscellaneous Iron and Steel" of the Standard Specifications. This project includes steel picket fencing with spear point ends on the individual pickets.

Measurement and Payment

"Steel Picket Fence" will be measured by the linear foot according to the actual length installed as shown on the plans and as directed by the Engineer. "Steel Picket Gate (4')" will be measured and paid for by the unit determined from actual count of steel picket fence gates installed.

The contract unit price paid per linear foot for "Steel Picket Fence" and per each for "Steel Picket Gate (4')" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing steel picket fence, complete in place, including painting, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. No additional compensation will be allowed therefore.

10-13.05 PEDESTRIAN RAILINGS AND GATES

Work under this section includes the installation of pedestrian railings, of the type and height indicated, at locations as shown on the plans. Fabrication, installation and painting of steel post, tube railing and frame, and wire mesh infill panels shall conform to Section "Miscellaneous Metal" of these Special Provisions and Section 75-1.02 "Miscellaneous Iron and Steel" of the Standard Specifications. This project includes three pedestrian railing designs, as shown on the plans as Type A, Type B, and Type C.

Measurement and Payment

Pedestrian Railings and gates for access roads at Pacific Fleet and 8th Street Stations – Types A, B and C shall be measured for payment by the linear foot, by type, according to the actual length installed as shown on the plans and as directed by the Engineer.

The contract unit price paid per linear foot for new "Pedestrian Railing – Type" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing Pedestrian Railing, complete in place, including painting, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer. The Pedestrian Railing Gates for the access roads at the Pacific Fleet and 8th Street stations shall be measured and paid per linear foot as part of Type A railing, and all additional materials and special construction shall be considered incidental.

"8th Street Bus Island Swing Gate" shall be measured for payment by the lump sum, in the location as shown on the plans. The contract unit price paid by the lump sum shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing the work involved in furnishing and installing the 8th Street Bus Island Swing Gate, complete in place including painting, as

shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-13.06 HANDRAIL

Work under this section includes the installation of handrails, at both steps and ramp locations, at locations as shown on the plans. Fabrication, installation and painting of steel post and tube railing shall conform to Section "Miscellaneous Metal" of these Special Provisions and Section 75-1.02 "Miscellaneous Iron and Steel" of the Standard Specifications.

Measurement and Payment

Handrails shall be measured for payment by the linear foot parallel to top of the handrail exclusive of returns, according to the actual length installed as shown on the plans and as directed by the Engineer.

The contract unit price paid per linear foot for new "Handrail" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing Handrail, complete in place, including painting, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-13.07 BENCHES

1. GENERAL:

Work under this section includes the installation of benches at locations as shown on the plans.

Refer to 15-03300 "Cast-In-Place Concrete" of these Special Provisions for other related work required for bench mounting.

2. MATERIALS:

Benches shall be Landscape Forms "Presidio," Collection series or approved equal. Benches shall be of two sizes. The shorter bench shall be a straight, two-unit group, 46" in length, with arms, embedded mount support with vertical support extension to provide 18-inch seat height when measured from the paving surface. The longer bench shall be a straight, five-unit group, 115" in length, with mid-bench and end arms, embedded mount support with vertical support extension to provide 18-inch seat height when measured from the paving surface. Color: Dark Bronze powdercoat finish per manufacturer's standard coating system. Verify color selection with Engineer prior to placing order.

3. REQUIREMENTS:

The Contractor shall submit the manufacturer's product data (including finish data) and installation specifications and other data required to demonstrate compliance with the specified item.

Deliver, store, and handle benches to prevent damage and deterioration.

Install benches in coordination with platform underslab and paver installation work. Examine subgrades, finished surfaces, and installation conditions. Do not start bench installation work until unsatisfactory conditions are corrected.

Remove loose material and debris from base surface before placing benches.

Locate and layout benches, and obtain Engineer's acceptance of layout prior to installation.

Install benches per manufacturer's specifications and/or recommendations, using the embedded system. Installation shall be secure and stable.

Benches shall be set in place as indicated on the plans and as approved by the Engineer. Benches shall be true and square to platform pavement design and shelters, installed level and shall not wobble.

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from bench installation work.

Protect benches from damage during construction.

Measurement and Payment

Benches shall be measured for payment by the unit each, separately by the 2-unit group and 5-unit group type, (one Bench).

The contract unit price paid for separate items – "Benches - 5 Unit" and "Benches - 2 Unit" shall include full compensation for furnishing all labor, materials, tools, equipment, attachment to surface, and incidentals, and for doing all the work involved in providing Benches, complete in place, as shown on the Plans and as specified in these Special Provisions.

10-13.08 TRASH RECEPTACLES

1. GENERAL:

Work under this section includes the installation of trash receptacles at locations as shown on the plans Refer to 15-03300 "Cast-In-Place Concrete" of these Special Provisions for other related work required for trash receptacle mounting.

2. MATERIALS:

Trash receptacles shall be Victor Stanley Ironsites, SD-42, or approved equal, with matching liner. Color: Dark Bronze powdercoat finish per manufacturer's standard coating system. Verify color selection with Engineer prior to placing order. Receptacles shall be side door opening. Receptacle shall be mounted to platform paving using stainless steel anchor per the manufacturer's recommendations. Provide stainless steel padlock to secure the door. Provide lock and one-hundred (100) clear poly bag liners

3. REQUIREMENTS:

The Contractor shall submit the manufacturer's product data (including finish data) and installation specifications and other data required to demonstrate compliance with the specified item. Deliver, store, and handle trash receptacles to prevent damage and deterioration. Install trash receptacles in coordination with platform underslab and paver installation work.

Examine subgrades, finished surfaces, and installation conditions. Do not start trash receptacle installation work until unsatisfactory conditions are corrected.

Remove loose material and debris from base surface before placing trash receptacle.

Locate and layout trash receptacles, and obtain Engineer's acceptance of layout prior to installation.

Install trash receptacles per manufacturer's specifications and/or recommendations.

Trash receptacles shall be set in place as indicated on the plans and as approved by the Engineer. Trash receptacles shall be fabricated, cut or ground to fit grade to provide a level installation. Installed trash receptacles shall be true and square to paving design, installed level and shall not wobble.

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from trash receptacle installation work.

Protect trash receptacles from damage during construction.

Measurement and Payment

Trash Receptacles shall be measured for payment by the unit each (one Receptacle).

The contract unit price paid per "Trash Receptacles" shall include full compensation for furnishing all labor, materials, tools, equipment, attachment to surface, and incidentals, and for doing all the work involved in providing the Trash Receptacle, complete in place, as shown on the Plans and as specified in these Special Provisions.

10-13.09 SKATE DETERRENT DEVICE

1. GENERAL:

Work under this section includes the installation of skate deterrent devices at locations, and to the spacing as shown on the Plans.

Refer to 15-03300 "Cast-In-Place Concrete" of these Special Provisions for other related work.

2. MATERIALS:

Skate deterrent devices shall be 'Skatestoppers' by Intelliccept, or approved equal. Device shall be model Arlington for 1/8" radius, in cast bronze with brown patina, and shall be installed during the installation of the concrete wall or seatwall where shown on the Plans.

3. REQUIREMENTS:

The Contractor shall submit the manufacturer's product data (including finish data) and installation specifications and other data required to demonstrate compliance with the specified item.

Deliver, store, and handle to prevent damage and deterioration.

Examine subgrades, finished surfaces, and installation conditions. Do not start installation work until unsatisfactory conditions are corrected.

Locate and layout skate deterrent devices, and obtain Engineer's acceptance of layout prior to installation.

Install per manufacturer's specifications and/or recommendations.

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from skate deterrent device installation work.

Protect from damage during construction.

Measurement and Payment

Skate Deterrent Device shall be measured for payment by the unit each (one Skate Deterrent Device).

The contract unit price paid per "Skate Deterrent Device" shall include full compensation for furnishing all labor, materials, tools, equipment, attachment to surface, and incidentals, and for doing all the work involved in providing the Skate Deterrent Device, complete in place, as shown on the Plans and as specified in these Special Provisions.

10-13.10 STATION PLATFORM PASSENGER SHELTER

Work under this section includes furnishing and constructing new passenger shelters at LRT stations shown on the plans and as specified in these Special Provisions.

Attention is directed to Sections "Minor Concrete," "Architectural Precast Concrete – Plant Cast," "Cast-in-Drilled-Hole Concrete Piles," "Miscellaneous Metal," "Caulking and Sealants," "Painting and Coating Ancillary Architectural Structures," and "Electrical and Communications" of these Special Provisions for related work required in the construction of platform passenger shelters.

10-13.10.A STEEL STRUCTURES

GENERAL

Structural steel shall conform to the provisions in Section 55, "Steel Structures," of the Standard Specifications.

Attention is directed to Section 10-13.10.B, "Welding" of these Special Provisions.

Structural steel and miscellaneous steel components of passenger shelters shall be coated and painted as shown on the plans and in accordance with the requirements in "Painting and Coating Ancillary Architectural Structures" of these Special Provisions.

The steel fabricator for the passenger shelters shall be currently certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for Building Standard as set forth in the AISC Certification Program.

Within 20 days of NTP, the contractor shall provide the Engineer with statements from each vendor that the orders have been received and accepted by the vendors.

MOCK-UP

Contractor shall fabricate a 1:1 (full scale) mock-up of an interior column and roof beam assembly for a Type A Shelter. The mock-up shall include all features of a typical full height interior column and roof beam and shall include a minimum width of 5-ft (centered on the column) of horizontal beams, wire mesh screening, roofing, and cladding as would be required if the mock-up was constructed as part of a complete Type A shelter per the details shown in the Plans. The mock-up shall include complete finishes as specified; roof penetration details for the structural metal roof deck and manufactured sheet metal roofing; gutter and downspout details; and column cladding details at the column to roof beam connection. One end of the roofing (along the length of the roof beam) shall be finished per the required roofing edge fascia details. The mock-up shall include installation of conduits and at least one light bracket per the details shown on the Plans.

The mock-up shall be constructed on a full scale mock-up of the concrete pedestal and foundation with embed connection plate as shown on the Plans. The concrete pedestal shall be finished with brick cladding and precast concrete cap/base per the details shown on the Plans. Lean rail embed plates and associated 2-ft minimum length lean rail segments shall be included as part of the concrete pedestal mock-up. The completed mock-up shall be self-supporting.

The mock-ups shall be constructed and finished with the materials, tools, equipment, and methods to be used in constructing the platform shelter structures. The Contractor should construct the mock-up in the vicinity of the Project, and should request approval of the Engineer in writing prior to construction commencing. The mock-up shall be approved by the Engineer prior to full scale fabrication and production of shelters and/or shelter components.

Mock-ups and/or components of the mock-up can be used in the final work with written approval of the Engineer.

MATERIALS

Material standards and properties shall be as specified on the plans.

WELDING

Table 2.2 of AWS D1.5 is superseded by the following table:

Base Metal Thickness of the Thicker Part Joined, inches	Minimum Effective Partial Joint Penetration Groove Weld Size*, inches
Over 1/4 to 1/2 inclusive	3/16
Over 1/2 to 3/4 inclusive	1/4
Over 3/4 to 1-1/2 inclusive	5/16
Over 1-1/2 to 2-1/4 inclusive	3/8
Over 2-1/4 to 6 inclusive	1/2
Over 6	5/8

* Except the weld size need not exceed the thickness of the thinner part

Dimensional details and workmanship for welded joints in tubular and pipe connections shall conform to the provisions in Part A, "Common Requirements of Nontubular and Tubular Connections," and Part D, "Specific Requirements for Tubular Connections," in Section 2 of AWS D1.1.

10-13.10.B WELDING

GENERAL

Unless otherwise specified, Section 10-13.10.B, "Welding," shall apply to any welding that is specified to conform to an AWS welding code.

Requirements of the AWS welding codes shall apply unless otherwise specified in the Standard Specifications, on the plans, or in these special provisions. Wherever the abbreviation AWS is used, it shall be equivalent to the abbreviations ANSI/AWS or AASHTO/AWS.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans, or in these special provisions, the year of adoption for these codes shall be as listed:

AWS Code	Year of Adoption
D1.1	2008
D1.3	2008
D1.4	2005
D1.5	2008
D1.6	2007
D1.8	2009

Flux cored welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform welding for this project.

Unless otherwise specified, Clause 6.1.3 of AWS D1.1, paragraph 1 of Section 7.1.2 of AWS D1.4, and Clause 6.1.1.2 of AWS D1.5, are replaced with the following:

The QC Inspector shall be the duly designated person who acts for and on behalf of the Contractor for inspection, testing, and quality related matters for all welding.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

The QC Inspector shall be responsible for quality control acceptance or rejection of materials and workmanship.

When the term "Inspector" is used without further qualification, it shall refer to the QC Inspector.

Inspection and approval of all joint preparations, assembly practices, joint fit-ups, welding techniques, and the performance of each welder, welding operator, and tack welder shall be documented by the QC Inspector on a daily basis for each day welding is performed. For each inspection, including fit-up, Welding Procedure Specification (WPS) verification, and final weld inspection, the QC Inspector shall confirm and document compliance with the requirements of the AWS or other specified code criteria and the requirements of these special provisions on all welded joints before welding, during welding, and after the completion of each weld.

The Engineer shall have the authority to verify the qualifications or certifications of any welder, QC Inspector, or NDT personnel to specified levels by retests or other means approved by the Engineer.

When joint weld details that are not prequalified to the details of Clause 3 of AWS D1.1 or to the details of Figure 2.4 or 2.5 of AWS D1.5 are proposed for use in the work, the joint details, their intended locations, and the proposed welding parameters and essential variables, shall be approved by the Engineer. The Contractor shall allow the Engineer 15 days to complete the review of the proposed joint detail locations.

In addition to the requirements of AWS D1.1, welding procedure qualifications for work welded in conformance with this code shall conform to the following:

When a nonstandard weld joint is to be made using a combination of WPSs, a single test may be conducted combining the WPSs to be used in production, provided the essential variables, including weld bead placement, of each process are limited to those established in Table 4.5.

Upon approval of the proposed joint detail locations and qualification of the proposed joint details, welders and welding operators using these details shall perform a qualification test plate using the WPS variables and the joint detail to be used in production. The test plate shall have the maximum thickness to be used in production and a minimum length of 18 inches. The test plate shall be mechanically and radiographically tested. Mechanical and radiographic testing and acceptance criteria shall be as specified in the applicable AWS codes.

The Engineer will witness all qualification tests for WPSs that were not previously approved by the Department.

In addition to the requirements specified in the applicable code, the period of effectiveness for a welder's or welding operator's qualification shall be a maximum of 3 years for the same weld process, welding position, and weld type. If welding will be performed without gas shielding, then qualification shall also be without gas shielding. Excluding welding of fracture critical members, a valid qualification at the beginning of work on a contract will be acceptable for the entire period of the contract, as long as the welder's or welding operator's work remains satisfactory.

The Contractor shall notify the Engineer 7 days prior to performing any procedure qualification tests. Witnessing of qualification tests by the Engineer shall not constitute approval of the intended joint locations, welding parameters, or essential variables. The Contractor shall notify the Engineer using the "Standard TL-38 Inspection Form" located at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm>

Clause 6.14.6, "Personnel Qualification," of AWS D1.1, Section 7.8, "Personnel Qualification," of AWS D1.4, and Clause 6.1.3.4, "Personnel Qualification," of AWS D1.5 are replaced with the following:

Personnel performing nondestructive testing (NDT) shall be qualified and certified in conformance with the requirements of the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the Written Practice of the NDT firm. The Written Practice of the NDT firm shall meet or exceed the guidelines of the ASNT Recommended Practice No. SNT-TC-1A. Individuals who perform NDT, review the results, and prepare the written reports shall be either:

- A. Certified NDT Level II technicians, or;
- B. Level III technicians who hold a current ASNT Level III certificate in that discipline and are authorized and certified to perform the work of Level II technicians.

Clause 6.6.5, "Nonspecified NDT Other than Visual," of AWS D1.1, Section 7.6.5 of AWS D1.4 and Clause 6.6.5 of AWS D1.5 shall not apply.

For any welding, the Engineer may direct the Contractor to perform NDT that is in addition to the visual inspection or NDT specified in the AWS or other specified welding codes, in the Standard Specifications, or in these special provisions. Except as provided for in these special provisions, additional NDT required by the Engineer, and associated repair work, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. Prior to release of welded material by the Engineer, if testing by NDT methods other than those originally specified discloses an attempt to defraud or reveals a gross nonconformance, all costs associated with the repair of the deficient area, including NDT of the weld and of the repair, and any delays caused by the repair, shall be at the Contractor's expense. A gross nonconformance is defined as the sum of planar type rejectable indications in more than 20 percent of the tested length.

When less than 100 percent of NDT is specified for any weld, it is expected that the entire length of weld meet the specified acceptance-rejection criteria. Should any welding deficiencies be discovered by additional NDT directed or performed by the Engineer that utilizes the same NDT method as that originally specified, all costs associated with the repair of the deficient area, including NDT of the weld and of the weld repair, and any delays caused by the repair, shall be at the Contractor's expense.

Repair work to correct welding deficiencies discovered by visual inspection directed or performed by the Engineer, and any associated delays or expenses caused to the Contractor by performing these repairs, shall be at the Contractor's expense.

WELDING QUALITY CONTROL

Welding quality control shall conform to the requirements in the AWS or other specified welding codes, the Standard Specifications, and these special provisions.

Unless otherwise specified, welding quality control shall apply to work welded in conformance with the provisions in the following:

- A. Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," and Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications
- B. "Structural Steel for Building Work" of these special provisions

Unless otherwise specified, Clauses 6.1.4.1 and 6.1.4.3 of AWS D1.1, paragraph 2 of Section 7.1.2 of AWS D1.4, and Clauses 6.1.3.2 through 6.1.3.3 of AWS D1.5 are replaced with the following:

The QC Inspector shall be currently certified as an AWS Certified Welding Inspector (CWI) in conformance with the requirements in AWS QC1, "Standard for AWS Certification of Welding Inspectors."

The QC Inspector may be assisted by an Assistant QC Inspector provided that this individual is currently certified as an AWS Certified Associate Welding Inspector (CAWI) in conformance with the requirements in AWS QC1, "Standard for AWS Certification of Welding Inspectors." The Assistant QC Inspector may perform inspection under the direct supervision of the QC Inspector provided the assistant is always within visible and audible range of the QC Inspector. The QC Inspector shall be responsible for signing all reports and for determining if welded materials conform to workmanship and acceptance criteria. The ratio of QC Assistants to QC Inspectors shall not exceed 5 to 1.

The Contractor shall designate in writing a welding Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of welding, including materials and workmanship, performed by the Contractor and subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, reviewing, and approving all correspondence, required submittals, and reports to and from the Engineer. The QCM shall be a registered professional engineer or shall be currently certified as a CWI.

Unless the QCM is hired by a subcontractor providing only QC services, the QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

The QCM shall sign and furnish to the Engineer, a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each item of work for which welding was performed. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work, have been performed in conformance with the details shown on the plans, the Standard Specifications, and these special provisions.

Welding inspection personnel or NDT firms to be used in the work shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project, except for the following conditions:

- A. The work is welded in conformance with AWS D1.5 and is performed at a permanent fabrication or manufacturing facility that is certified under the AISC Quality Certification Program, Category CBR, Major Steel Bridges and Fracture Critical endorsement F, when applicable.
- B. Structural steel for building work is welded in conformance with AWS D1.1 and is performed at a permanent fabrication or manufacturing facility that is certified under the AISC Quality Certification Program, Category STD, Standard for Steel Building Structures.

For welding performed at such facilities, the inspection personnel or NDT firms may be employed or compensated by the facility performing the welding provided the facility maintains a QC program that is independent from production.

Unless otherwise specified, an approved independent third party will witness the qualification tests for welders or welding operators. The independent third party shall be a current CWI and shall not be an employee of the contractor performing the welding. The Contractor shall allow the Engineer 15 days to review the qualifications and copy of the current certification of the independent third party.

Prior to submitting the Welding Quality Control Plan (WQCP) required herein, a prewelding meeting between the Engineer, the Contractor's QCM, and a representative from each entity performing welding or inspection for this project, shall be held to discuss the requirements for the WQCP.

Information regarding the contents, format, and organization of a WQCP, is available at the Transportation Laboratory and at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbresources.htm>

The Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 2 copies of a separate WQCP for each subcontractor or supplier for each item of work for which welding is to be performed.

The Contractor shall allow the Engineer 15 days to review the WQCP submittal after a complete plan has been received. No welding shall be performed until the WQCP is approved in writing by the Engineer.

An amended WQCP or any addendum to the approved WQCP shall be submitted to, and approved in writing by the Engineer, for proposed revisions to the approved WQCP. An amended WQCP or addendum will be required for revisions to the WQCP, including but not limited to a revised WPS; additional welders; changes in NDT firms, QC, or NDT personnel or procedures; or updated systems for tracking and identifying welds. The Engineer shall have 7 days to complete the review of the amended WQCP or addendum. Work affected by the proposed revisions shall not be performed until the amended WQCP or addendum has been approved.

After final approval of the WQCP, amended WQCP, or addendum, the Contractor shall submit 7 copies to the Engineer of the approved documents. A copy of the Engineer approved document shall be available at each location where welding is to be performed.

All welding will require inspection by the Engineer. The Contractor shall request inspection at least 3 business days prior to the beginning of welding for locations within California and 5 business days for locations outside of California. The Contractor shall request inspection at:

<http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm>

Continuous inspection shall be provided when any welding is being performed. Continuous inspection, as a minimum, shall include having a QC Inspector within such close proximity of all welders or welding operators so that inspections by the QC Inspector of each welding operation at each welding location does not lapse for a period exceeding 30 minutes.

A daily production log for welding shall be kept for each day that welding is performed. The log shall clearly indicate the locations of all welding. The log shall include the welders' names, amount of welding performed, any problems or deficiencies discovered, and any testing or repair work performed, at each location. The daily report from each QC Inspector shall also be included in the log.

The following items shall be included in a Welding Report that is to be submitted to the Engineer within 15 days following the performance of any welding:

- A. A daily production log.
- B. Reports of all visual weld inspections and NDT.
- C. Radiographs and radiographic reports, and other required NDT reports.
- D. A summary of welding and NDT activities that occurred during the reporting period.
- E. Reports of each application of heat straightening.
- F. A summarized log listing the rejected lengths of weld by welder, position, process, joint configuration, and piece number.
- G. Documentation that the Contractor has evaluated all radiographs and other nondestructive tests and corrected all rejectable deficiencies, and that all repaired welds have been reexamined using the required NDT and found acceptable.

The following information shall be clearly written on the outside of radiographic envelopes: name of the QCM, name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers, report numbers, and station markers or views, as detailed in the WQCP. In addition, all interleaves shall have clearly written on them the part description and all included weld numbers and station markers or views, as detailed in the WQCP. A maximum of 2 pieces of film shall be used for each interleave.

Reports of all visual inspections and NDT shall be signed by the inspector or technician and submitted daily to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or typewritten next to all signatures. Reports of all NDT, whether specified, additional, or informational, performed by the Contractor shall be submitted to the Engineer.

The Engineer will review the Welding Report to determine if the Contractor is in conformance with the WQCP. Except for field welded steel pipe piling, the Engineer shall be allowed 15 days to review the report and respond in writing after the complete Welding Report has been received. Prior to receiving notification from the Engineer of the Contractor's conformance with the WQCP, the Contractor may encase in concrete or cover welds for which the Welding Report has been submitted. However, should the Contractor elect to encase or cover those welds prior to receiving notification from the Engineer, it is expressly understood that the Contractor shall not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection.

For field welded steel pipe piling, including bar reinforcement in the piling, the Contractor shall allow the Engineer 2 business days to review the Welding Report and respond in writing after the required items have been received. No field welded steel pipe piling shall be installed, and no reinforcement in the piling shall be encased in concrete until the Engineer has approved the above requirements in writing.

In addition to the requirements in AWS D1.1 and AWS D1.5, third-time excavations of welds or base metal to repair unacceptable discontinuities, regardless of NDT method, and all repairs of cracks require prior approval of the Engineer.

The Engineer shall be notified immediately in writing when welding problems, deficiencies, base metal repairs, or any other type of repairs not submitted in the WQCP are discovered, and also of the proposed repair procedures to correct them. For requests to perform third-time excavations or repairs of cracks, the Contractor shall include an engineering evaluation of the proposed repair. The engineering evaluation, at a minimum, shall address the following:

- A. What is causing each defect?
- B. Why the repair will not degrade the material properties?
- C. What steps are being taken to prevent similar defects from happening again?

The Contractor shall allow the Engineer 7 working days to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer.

Clause 6.5.4 of AWS D1.5 is replaced with the following:

The QC Inspector shall inspect and approve each joint preparation, assembly practice, welding technique, joint fit-up, and the performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved Welding Procedure Specification (WPS) are met. The QC Inspector shall examine the work to make certain that it meets the requirements of Clauses 3 and 6.26. The size and contour of all welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities shall be aided by strong light, magnifiers, or such other devices as may be helpful. Acceptance criteria different from those specified in this code may be used when approved by the Engineer.

In addition to the requirements of AWS D1.5, Clause 5.12 or 5.13, welding procedures qualification for work welded in conformance with that code shall conform to the following requirements:

- A. Unless considered prequalified, fillet welds shall be qualified in each position. The fillet weld soundness test shall be conducted using the essential variables of the WPS as established by the Procedure Qualification Record (PQR).
- B. For qualification of joints that do not conform to Figures 2.4 and 2.5 of AWS D1.5, a minimum of 2 WPS qualification tests are required. The tests shall be conducted using both Figure 5.1 and Figure 5.3. The test conforming to Figure 5.1 shall be conducted in conformance with AWS D1.5, Clause 5.12 or 5.13. The test conforming to Figure 5.3 shall be conducted using the welding electrical parameters that were established for the test conducted conforming to Figure 5.1. The ranges of welding electrical parameters established during welding per Figure 5.1 in conformance with AWS D1.5, Clause 5.12, shall be further restricted according to the limits in Table 5.3 during welding per Figure 5.3.
- C. Multiple zones within a weld joint may be qualified. The travel speed, amperage, and voltage values that are used for tests conducted per AWS D1.5 Clause 5.13 shall be consistent for each pass in a weld joint, and shall in no case vary by more than ± 10 percent for travel speed, ± 10 percent for amperage, and ± 7 percent for voltage as measured from a predetermined target value or average within each weld pass or zone. The travel speed shall in no case vary by more than ± 15 percent when using submerged arc welding.
- D. For a WPS qualified in conformance with AWS D1.5 Clause 5.13, the values to be used for calculating ranges for current and voltage shall be based on the average of all weld passes made in the test. Heat input shall be calculated using the average of current and voltage of all weld passes made in the test for a WPS qualified in conformance with Clause 5.12 or 5.13.
- E. Macroetch tests are required for WPS qualification tests, and acceptance shall be per AWS D1.5 Clause 5.19.3.
- F. When a nonstandard weld joint is to be made using a combination of WPSs, a test conforming to Figure 5.3 may be conducted combining the WPSs to be used in production, provided the essential variables, including weld bead placement, of each process are limited to those established in Table 5.3.

- G. Prior to preparing mechanical test specimens, the PQR welds shall be inspected by visual and radiographic tests. Backing bar shall be 3 inches in width and shall remain in place during NDT testing. Results of the visual and radiographic tests shall comply with AWS D1.5 Clause 6.26.2, excluding Clause 6.26.2.2. Test plates that do not comply with both tests shall not be used.

10-13.10.C MISCELLANEOUS METALS

GENERAL

Decorative column cladding, screened arch framing, and other miscellaneous metals to be furnished and installed as shown on the plans shall conform to the provisions in Section 10-13.12, "Miscellaneous Metal," of these Special Provisions.

Attention is directed to Section 10-13.10.B, "Welding," of these Special Provisions.

10-13.10.D STRUCTURAL METAL ROOF DECK

GENERAL

The work in this section includes furnishing and installing structural metal roof decking as shown on the plans.

References

The following publications form a part of these special provisions to the extent indicated by their references. The exclusion of a publication from this section will not relieve the contractor from complying with the publication reference elsewhere.

American Iron and Steel Institute (AISI):

1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

ASTM International:

1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
3. ASTM A 924/A 924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

American Welding Society (AWS):

1. AWS D1.1/D1.1M Structural Welding Code - Steel.
2. AWS D1.3; Structural Welding Code - Sheet Steel.

Steel Deck Institute (SDI):

1. SDI 30, Design Manual for Composite Decks, Form Decks and Roof Decks.

Coordination:

Coordinate the location and size of shop cut openings in the bottom of the structural metal roof decking panels required to accommodate the shelter framing and the Work of other Sections with the decking manufacturer. 10 days before metal deck is to be erected, give notice to those performing other construction work related to the deck erection, such as to those performing work that must be supported by or that will provide support of the deck, to allow such items to be introduced or furnished before the deck is erected.

Sequencing:

Sequence the erection of structural metal roof deck to follow erection of supporting structural steel roof beams.

Submittals

In accordance with the requirements of Section 5-1.04 "Submittals," submit the following to the Engineer for approval:

- A. Product Data:

- 1) Structural metal roof deck.
 - 2) Rib closure strips.
 - 3) Reinforcement at deck openings, including column closures, end closures, Z-closures, and cover plates.
 - 4) Mechanical fasteners.
 - 5) Galvanizing repair paint.
 - 6) Finishes.
- B. Shop Drawings:
- 1) Deck panel layout; deck profile and material thickness; finish; anchorage details; conditions requiring closure panels, special jointing, and other accessories.
- C. Certificates:
- 1) Manufacturer's Certification
 - 2) Steel Certificate.
- D. Special Procedure Submittals:
- 1) Welding procedure specification (WPS) test records.
- E. Qualification Statements:
- 1) Installer's qualifications.
 - 2) Welder Certificates.

In accordance with the requirements of Section 5-1.04 "Submittals," submit the following to the Engineer for information: Manufacturer's Installation Instructions.

Quality Assurance

Qualifications:

Structural Metal Roof Deck Installer's Qualifications: Engage an experienced Installer who has completed steel deck installation similar in material, design, and extent to that indicated for this Contract, and which exhibits a record of successful in-service performance. Submit the Installer's qualifications to the Engineer for approval.

Welding Qualifications: Welding Procedure Specifications (WPS): Prior to beginning work that requires welding, submit the pre-qualifying welding procedures to the Engineer for approval. For all procedures, other than those set forth in AWS D1.1/D1.1M or AWS D1.3, submit a copy of the welding procedure qualification test records (PQRs) and welding procedure specifications (WPSs) to the Engineer for approval.

Welders' Qualifications: Prior to beginning work that requires welding, submit the procedures to be used for pre-qualifying welders to the Engineer for approval. Only use welders, tackers, and welding operators demonstrating they are qualified to perform the types of work required by having passed the qualification tests prescribed in AWS D1.1/D1.1M or AWS D1.3 for the procedures. Submit Welding Certificates certifying the welders employed to fabricate and to erect the Work of this Section have been certified by the American Welding Society (AWS) within the previous 12 months to the Engineer for approval.

Include certified copies of qualification test records and photographic identification indicating each welder, welding operator, and tacker employed to perform the Work has satisfactorily passed the AWS qualification tests for the required welding procedures and, if pertinent, has undergone recertification.

Delivery, Storage and Handling

Delivery and Acceptance Requirements:

Use special care in shipping metal deck. Ensure materials are delivered to the Site at times and intervals that facilitate uninterrupted progress of the Work and continuity of installation.

Storage and Handling Requirements:

Store decking on platforms, skids, blocking or other supports, and with one end elevated. Protect decking from the weather with non-asphaltic waterproof covering, adequately ventilated to prevent condensation. Do not damage decking during handling or rigging.

Do not use decking for bulk storage, or as a working platform for other construction materials. Do not overload decking during installation and the entire construction period. Do not place deck bundles on unbolted/unwelded building frames.

During installation, do not locate bundles of uninstalled decking where they will overload supporting members.

Site Conditions

Ambient Conditions: Do not weld decking when the base metal temperature is below 32 degrees Fahrenheit (0 degrees Celsius), or when the surface to be welded is wet.

PRODUCTS

Structural Metal Roof Deck System

Manufacturer List

Subject to compliance with the requirements specified in this Section, manufacturers offering products that may be incorporated in the Work include the following:

- a. Epic® Metals Corporation, www.epicmetals.com.
- b. Metal Dek Group, a Unit of CSi® (Consolidated Systems Incorporated), <http://www.metaldek.com>.
- c. Loadmaster Roof Deck Systems, www.loadmaster.net.
- d. Approved equal.

Design Criteria:

Structural Metal Roof Deck Panels:

Provide metal deck panels designed in accordance with the requirements of SDI 30, listing the gravity and diaphragm load values of the decking. Provide deck configurations complying with basic design specifications in SDI 30, and as specified herein.

Structural Metal Roof Deck Profile: Dovetail as indicated and shown on the Plans

Structural Properties: Provide metal deck sections having at a minimum the structural properties required by the General Structural Notes on the Plans and computed in accordance with the AISI North American Specification for the Design of Cold-Formed

Steel Structural Members.

Welding Standards:

Comply with applicable provisions of AWS D1.1/D1.1M and AWS D1.3.

Product Data:

Submit the manufacturer's Product Data for each product specified and provided to the Engineer for approval. Include data regarding the structural metal roof deck properties. Include data regarding the structural metal roof deck finishes.

Submit the manufacturer's installation instructions for each product specified to the Engineer for information.

Shop Drawings:

Submit detailed Shop Drawings showing the layout of deck panels; deck profile and material; finish; anchorage details; and every condition requiring closure panels, special jointing, and other accessories to the Engineer for approval.

Components

Structural Metal Roof Deck:

Steel Sheet: Provide steel sheet conforming to ASTM A 653/A 653M, Grade 40, or equal, having a minimum yield strength of 40,000 psi. Provide roof deck having the deck profile, depth, and the design uncoated-steel thickness indicated on the Plans.

Reinforcement at Deck Openings:

Unless otherwise shown, prior to cutting openings provide additional steel reinforcement and closure pieces as required to provide strength, continuity of the deck, and support for other work, including column closures, end closures, Z-closures, and cover plates.

Finishes

Before forming, steel sheets shall receive a hot-dip protective coating of zinc conforming to ASTM A-924, Class G90. Final primer and painted finish shall be in accordance with the requirements of Section 10-13.14 "Painting and Coating Ancillary Architectural Structures."

Shop Fabrication

Fabricate structural metal roof deck panels in accordance with the requirements of SDI 30.

Steel Sheet Accessories: Fabricate steel sheet accessories from steel sheet conforming to ASTM A 653/A 653M, Grade 40, or equal, having a minimum yield strength of 40,000 psi. Steel sheets shall receive a hot-dip protective coating of zinc conforming to ASTM A-924, Class G90.

Miscellaneous Structural Metal Roof Deck Accessories: Fabricate miscellaneous metal roof deck

accessories, such as finish strips, from the same material and thickness as the metal roof deck.

Accessories

Provide accessory materials for the structural metal roof deck that comply with the requirements indicated and the recommendations of the metal roof deck manufacturer.

Mechanical Fasteners: Provide the manufacturer's standard, corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon steel fasteners; or self-drilling, self-threading screws, that have a current approved ICC Evaluation Service Report.

Column Closures, End Closures, Z-Closures, and Cover Plates: Provide column closures, and closures, Z-closures, and cover plates fabricated from the same steel sheet material and thickness as the metal roof deck panels, unless otherwise indicated.

Reinforcement at Deck Openings: Unless otherwise shown, prior to cutting openings provide additional steel reinforcement and closure pieces as required to provide strength, continuity of the deck, and support for other work.

Galvanizing Repair Paint: Provide high zinc-dust content paint complying with the requirements of ASTM A 780 to repair damaged galvanized surfaces.

EXECUTION

Examination

Verification of Conditions: Examine the deck support framing and other field conditions for compliance with the specified installation tolerances and other conditions which may affect the performance of the steel deck.

Evaluation and Assessment: Do not install metal roof deck on support framing insufficient to support the decking, or that would detrimentally affect the performance of the deck.

Installation

Before the metal roof deck is permanently fastened, place the deck on the supporting frame, and adjust it to its final position with its ends accurately aligned and adequately bearing on the supporting frame. Maintain consistent coverage so the panels located in adjacent bays will be properly aligned.

Cut metal roof deck to suit Site conditions in a neat and professional manner. Only cut those openings indicated on the structural Plans. Cut and reinforce other openings required only as approved by the Engineer.

Fasten the metal roof deck to the supporting members as specified in the General Structural Notes on the Plans. If the roof deck fastening requirements are not specified in the General Structural Notes on the Plans, provide three 3/4-inch diameter puddle welds for each 24-inch wide panel to fasten the metal roof deck to the supporting members, or fasten the metal roof deck as indicated on the manufacturer's erection drawings. Fasten the sides of metal roof deck located at the perimeter of the shelter to supporting members as indicated on the Plans.

If the fastening requirements for the sides of metal roof deck located at the perimeter of the shelter are not indicated on the Plans fasten the sides with 3/4-inch diameter puddle welds at a maximum spacing of 12 inches on center or less as indicated on the manufacturer's erection drawings.

Fasten the metal roof deck sidelaps together as indicated on the Plans. If the fastening requirements for the metal roof deck sidelaps are not indicated on the Plans fasten the metal roof deck sidelaps using Number 12 screws spaced apart a maximum of 36 inches on center or less as indicated on the manufacturer's erection drawings.

Do not apply construction loads to the deck until after the panels are permanently fastened to supporting members, and the sidelaps are attached. Do not apply construction loads exceeding the capacity of the panels.

Do not suspend items such as ceilings, light fixtures, conduit, pipe and ductwork from the metal roof deck without specific approval from the Engineer.

Fasten transition plates, eave plates, and supplied reinforcement for small openings as indicated on the manufacturer's erection drawings.

Do not leave metal roof deck unattached at the end of each day's work.

Perform connecting welding work in accordance with the requirements specified in AWS D1.1/D1.1M and AWS D1.3.

Repair/Restoration

Damaged Decking: Repair or replace damaged decking prior to placing topping materials on the decking.

Metal Roof Decking Welds: Clean and repair field metal roof decking welds with not less than 2 coats of galvanized repair paint.

Galvanizing Repairs: Repair damaged galvanized coatings by preparing surfaces and using galvanized repair paint according to the requirements of ASTM A 780 and the manufacturer's instructions.

Site Quality Control

Site Tests and Inspections:

During the period when metal roof deck is being erected, the SANDAG will perform routine and other testing of materials.

Advise the Testing and Inspection Agency and code-required Approved Agency sufficiently in advance of operations to allow testing personnel to be assigned and to provide sufficient time for quality tests to be performed and completed. Periodic Special Inspections will be performed during the erection of metal roof deck. Field welds are subject to testing and inspection.

The Testing and Inspection Agency and the code-required Approved Agency will

perform additional materials testing due to changes in materials requested by the Contractor or testing required due to failure of material to meet specified requirements.

Failure of the Testing and Inspection Agency and/or the code-required Approved Agency to detect defective work will not prevent its rejection later when the defect is discovered, neither does it obligate the Engineer to grant final acceptance of the Work.

Confirmation Testing:

Test Procedure: The Code Required Approved Agency for Special Inspections will perform additional tests, at the Contractor's expense, as necessary to reconfirm any noncompliance of the original work, and to show compliance of corrected work.

Acceptance Criteria: The work must conform to specified requirements.

Inspections:

Verify that only erectors qualified as specified herein erect the metal roof deck.

After placing the decking, inform the Code Required Approved Agency for Special Inspections that the decking is ready to be inspected for tears, dents, and other damage that may prevent the deck from acting as a diaphragm.

All welds will be visually inspected.

10-13.10.E MANUFACTURED SHEET METAL ROOFING

GENERAL

Structural Metal roof deck shall be as shown on the Plans and in accordance with these Special Provisions.

Summary

This section includes:

1. Architectural standing seam metal roofing.
2. Underlayment.
3. Eave protection.
4. Metal fascias.
5. Fasteners.

References

- A. American Architectural Manufacturers Association:
 - 1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- B. American Iron and Steel Institute:
 - 1. AISI General - Standard for Cold-Formed Steel Framing - General Provisions.
- C. ASTM International:
 - 1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - 3. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
 - 4. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
- D. National Roofing Contractors Association:
 - 1. NRCA - The NRCA Roofing and Waterproofing Manual.
- E. Underwriters Laboratories Inc.:
 - 1. UL 580 - Tests for Uplift Resistance of Roof Assemblies.

Design Requirements

- A. Roof Loads: Design metal roofing to resist live and dead loads with 1/240 maximum deflection.
 - 1. Roof Live Loads: Minimum 20 psf.
 - 2. Dead Loads: Actual weight of materials incorporated into Work.
- B. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
 - 1. Design Wind Load: As calculated in accordance with applicable code and ASCE 7 with 100 mph basic wind speed, exposure C.
- C. Wind Uplift Resistance: UL 580; Class 90.
- D. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with CBC 2007.
 - 1. Roof Live Loads: Minimum 20 psf.
 - 2. Dead Loads: Actual weight of materials incorporated into Work.

Submittals

- A. Submittal procedures shall conform to the provisions in Section 10-1.12, "Submittals" of these Special Provisions.
- B. Shop Drawings:
 - 1. Conform to the provisions in Section "Working Drawings" of these Special Provisions.
 - 2. Indicate metal roofing panel profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, crickets, and installation details.
- C. Product Data:
 - 1. Submit data on metal types, finishes, and characteristics.
 - 2. Submit color charts for finish selection.
- D. Samples:
 - 1. Submit two samples 12 x 12 inch in size illustrating metal roofing illustrating typical material, and finish.
 - 2. Submit two samples 4 x 4 inch in size illustrating metal finish color.
- E. Design Data:
 - 1. Submit structural design calculations for metal roofing and structural supports signed and sealed by professional engineer.
- F. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.

Qualifications

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience approved by manufacturer.
- C. Design sheet metal roofing and structural supports under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California.

Mockup

- A. Attention is directed to Section "Control of Materials" of these Special Provisions for quality requirements for mockups.
- B. Construct mockup of sheet metal roofing, 12'-0" long by width of typical shelter, including structural supports, fascias, associated attachments, flashings, joints and junctions, control or expansion joints, terminating items, crickets, underlayment, and eave protection.
- C. Locate where directed by Architect/Engineer.
- D. Incorporate Accepted mockup may be incorporated as part of Work as approved by the Engineer.

Pre-Installation Meeting

- A. Convene with Engineer minimum one week prior to commencing work of this section.

Delivery and Storage

- A. Attention is directed to Section "Control of Materials" of these Special Provisions for transporting, handling, storing, and protecting products.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

Field Measurements

- A. Verify field measurements prior to fabrication.

Coordination

- A. Coordinate with Work of Section 10-13.12,05 50 00 "Miscellaneous Metal" of these special provisions for connecting structural supports to building shelter structural frame.
- B. Coordinate with work of Section 10-13.10.D, "of Section 05 31 23 Structural Metal Roof Decking."

Warranty

- A. Conform to Sections 2-1.12, "Material Guaranty," and 6-1.01 "Source of Supply and Quality of Materials," of the Standard Specifications and these Special Provisions.
- B. Furnish 20 year manufacturer warranty for sheet metal roofing against structural failure and corrosion.
- C. Furnish 20 year manufacturer warranty for metal finish against fading, chipping, chalking, and blistering.

MATERIALS

Manufactured Sheet Metal Roofing

- A. Manufacturers:
 - 1. Firestone Metal Products – Una-Clad UC-3
 - 2. Englert Metal Roofing Systems – Series C1300
 - 3. Merchant & Evans – Zip Lock
 - 4. Atas International, Inc. Model PC-SNAP SYSTEM.
- B. Furnish materials in accordance with Section 6-1.01, "Source of Supply and Quality of Materials," of the Standard Specifications and these Special Provisions.
- C. Architectural Standing Seam Metal Roofing: Factory formed metal roofing panel system with concealed fasteners.
 - 1. Panel Materials: Pre-finished aluminum sheet 0.032 inch base metal thickness.
 - 2. Panel Width: Nominal 20" inches
 - 3. Panel Profile: Flat.
 - 4. Seam Type: Standing seam mechanical double lock. 5. Seam Height: 1-1/2 inches.

5. Color: Slate Gray (from Firestone color selector)
- D. Roof Surface: Minimum solar reflectance index (SRI) of 78 for 75 percent of roof area, calculated in accordance with ASTM E1980.
 1. Reflectance: Measured in accordance with ASTM E903, ASTM E1918, or ASTM C1549.
 2. Emittance: Measured in accordance with ASTM E408 or ASTM C1371.

Sheet Metal Materials

- A. Pre-Finished Aluminum Sheet: Coil coated.
 1. Base Metal: ASTM B209 (ASTM B209M), 3003 alloy, H14 temper.

Structural Supports

- A. Metal framing and structural roof deck as indicated in structural drawings.

Accessories

- A. Fasteners: Stainless steel, with soft neoprene washers.

Fabrication

- A. Form sections shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate fascia, trim, flashing, cricket and other metal components from same material as metal roof panels. Provide exposed metal surfaces with same finish and color as exposed face of metal roof panels.
- C. Fabricate cleats of same material as sheet, to interlock with sheet.
- D. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.
- E. Form pieces in single length sheets.
- F. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- G. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- H. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- I. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

CONSTRUCTION

Examination

- A. Verify existing conditions before starting work.
 1. Inspect structural metal roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to eaves.
 2. Verify structural metal roof deck is dry. Verify substrate joints are solidly supported and fastened.
- B. Structural Framing Substrate:
 1. Verify primary and secondary framing members are installed and fastened, properly aligned and sloped.
 2. Verify damaged shop coatings are repaired with touch up paint.

Preparation

- A. Metal Deck Substrate:
 - 1. Broom clean deck surfaces under eave protection and underlayment.

Installation-Structural Supports

- A. Install structural supports in accordance with Drawings.
- B. Install supports spaced maximum as indicated on drawings.

Installation – Underlayment

- A. Apply underlayment over entire roof area in single layer fastened to substrate.
 - 1. Install underlayment laid perpendicular to slope.
 - 2. Weather lap edges 2 inches (50 mm) and nail in place.
 - 3. Stagger end joints minimum 24 inches (600 mm).

Installation – Standing Seam Metal Roofing

- A. Snap standing seam cap in place over roofing panel vertical legs. Miter seam cap at changes in direction. Form, Cut and trim end cap to conceal batten space at roofing panel terminations.
- B. Terminate roofing panels with sheet metal trim and flashing for watertight installation. Close and conceal openings between roofing panels, panel seams, and roof substrate.
- C. Seal metal joints watertight.
- D. Install crickets, other flashing and fascia to insure a weather tight seal prior to and during roof installation.

Protection of Installed Construction

- A. Protect all installed work and materials in accordance with the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," of the Standard Specifications.

10-13.10.F MEASUREMENT AND PAYMENT

Furnish and Install Station Platform Passenger Shelter will be measured and paid for by each based on the various shelter types designated in the Bid Schedule and shown on the Plans.

The contract unit price paid for each for "Station Platform Passenger Shelter – (*Type*)," of the various types of Station Platform Passenger Shelter furnished and installed, shall include full compensation for furnishing all labor, materials, tools, equipment. and incidentals and for doing all the work involved in constructing passenger shelter, including fabricating mock-ups, miscellaneous metals, painting, and electrical system, including lean rail, gutters and downspouts, base plate inserts and lean rail and downspout insert assemblies as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-13.11 BAR REINFORCEMENT

Bar reinforcement for ancillary station structures shall be in accordance with the requirements of the California Building Code, and ACI 318, "Building Code Requirements for Reinforced Concrete" and Section 52 "Reinforcement" of the standard specifications except as follows:

1. Welded reinforcing shall conform to ASTM A-706, Grade 60 (fy = 413.7 Mpa/60,000 psi).
2. Reinforcing not welded shall conform to ASTM A-615, Grade 60 (fy = 413.7 Mpa/60,000 psi).

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for bar reinforcement shall be considered as included in the contract prices paid for the various contract items of work requiring bar reinforcement for ancillary station structures and paving, and no separate payment will be made therefore.

10-13.12 MISCELLANEOUS METAL

Miscellaneous metal for ancillary structures shall conform to the provisions for miscellaneous metal items in Section 75, "Miscellaneous Metal," of the Standard Specifications and these Special Provisions.

Attention is directed to "Welding Quality Control" of Section 55-3.17 "Welding," of the Standard Specifications and these Special Provisions.

Cast-in-place inserts shall be the ferrule loop type unless otherwise specified on the plans.

A. Metal Fabrications

DESCRIPTION -The Work specified in this Section consists of furnishing and installing metal fabrications and related items for architectural and structural work, including surface mounted items and items embedded in concrete or masonry.

QUALITY CONTROL - Conform to AISC S335, ANSI A1264.1-1995, ANSI A14.3, ANSI A58.1, ASTM A6, and AWS D1.1, D1.2 and D1.6.

SUBMITTALS

- Shop Drawings for fabrication and installation of metal work not completely shown by manufacturer's data sheets. Indicate anchorage and accessory items.
- Manufacturer's product data, load tables, dimension diagrams, anchor details, and installation instructions for products to be used in fabrication of metal work, including paint products.
- Name and product data shall be given for coatings.
- Manufacturer's product data for insert anchors including installation instructions, diameter and depth of drilled holes and test reports.

MATERIALS -Free from mill pitting, mill scale and flake rust.

STEEL GRATINGS -ASTM A36M, finished and coated in accordance with the requirements of Section 10-13.14, "Painting and Coating Ancillary Architectural Structures," unless otherwise noted or specified to be galvanized as shown on the plans.

STAINLESS STEEL PLATES, BARS AND GRATINGS -ASTM A167, Type 316.

CHECKERED PLATE -ASTM A283, flat back, Class 2, Pattern A or B per ASTM A793, finished and coated in accordance with the requirements of Section 10-13.14, "Painting and Coating Ancillary Architectural Structures," unless otherwise noted or specified to be galvanized as shown on the plans..

STEEL PIPE -ASTM A53, standard weight unless otherwise indicated, finished and coated in accordance with the requirements of Section 10-13.14, "Painting and Coating Ancillary Architectural Structures," unless otherwise noted or specified to be galvanized as shown on the plans.

BOLTS, NUTS, AND FASTENERS -shall be ASTM A307, Grade B, galvanized, unless otherwise noted and shall be capable of meeting strength requirements.

ANCHOR BOLTS -Shall be stud type, expansion anchors with Type 316 stainless steel studs, nuts, wedges and washers conforming to ASTM F 594 (AISC 316) and A 240 (AISC 316). Acceptable products include "Kwik Bolt II Stainless Steel Anchor 316SS Extra Thread Stud Version" as manufactured by Hilti Corporation, Tulsa, OK or approved equal. Minimum embedment shall be as shown on the plans with a minimum of 4 bolt diameters into fully cured concrete.

WELDS -shall be ground smooth and finished flush where exposed.

NONFERROUS GROUT AND SETTING COMPOUND - As specified herein
FINISHES

- Coatings and Finishes shall be in accordance with the requirements of Section 10-13.14, "Painting and Coating Ancillary Architectural Structures."
- Miscellaneous Metal specified on the plans to be galvanized shall meet the following requirements:

GALVANIZING -Per ASTM A123 or A153M and Sections 75-1.02 and 75-1.05 on the Standard Specifications.

- Fabricate items complete or in largest practicable sections before galvanizing.
- Thoroughly clean ferrous metal before application of zinc coating.
- Apply zinc coating to products after fabrication by hot-dip method; coating weighing not less than 2.0 ounces per square foot (5.27 grams per square meter).

- Coat field welded surfaces and damaged galvanized surfaces with inorganic zinc coating before final finish.

INORGANIC ZINC COATING – Conform to SSPC PS 12.00.

FABRICATIONS

- Metal Work Exposed to View -Use materials that are smooth and free of surface blemishes including pitting, seam marks, and roller and grinding marks, before cleaning, treating and applying finishes including zinc coatings.
- Use materials of sizes and thickness indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use. Work to dimensions shown on reviewed and accepted Shop Drawings, using proven details of fabrication and support. Use types of materials indicated for various components of Work.
- Form exposed Work true to line and level with accurate angles. Surfaces and straight, sharp edges. Ease exposed edges to a radius of 0.04 in (1 mm) unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.
- Verify dimensions by accurate field measurement before fabrication where Work of this Section adjoins preceding work. Do not delay job progress; allow for trimming and fitting metalwork where taking field measurements before fabrication might delay the Work. Note on Shop Drawings dimensions verified by field measurement.
- Weld corners and seams continuous and in accordance with recommendations of AWS. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- Form exposed connections with hairline joints flush and smooth using concealed fasteners wherever possible. Exposed fasteners -Of type indicated or if not indicated, use Phillips flat-head countersunk screws or bolts.
- Pre-drill bolt and screw holes as indicated and required for attachment of metalwork and adjacent materials.
- Furnish inserts and anchoring devices to be set in concrete or built into masonry for installation of metalwork. Coordinate delivery with other Work to avoid delay. Install inserts and anchoring devices in accordance with Cast-in-Place Concrete, and Concrete Unit Masonry.
- Provide anchorage of type indicated. Fabricate and space-anchoring devices as indicated and required to provide adequate support for intended use of Work.
- Cut, reinforce, drill and tap metalwork as required to receive finish hardware and similar items of Work.

- Use hot-rolled steel bar for Work fabricated from bar stock, unless Work is indicated to be fabricated from cold-finished or cold-rolled stock.
- Pre-assemble Work in shop to greatest extent practicable; minimize field splicing and assembly of units at Worksite. Disassemble units to extent necessary to comply with shipping and handling limitations. Clearly mark units for reassembly and proper installation.
- Where indicated as galvanized, complete shop fabrication before applying coating. Remove mill scale and rust, clean and pickle units as required for coating. Apply hot-dip zinc coating, two ounces per square foot, in accordance with ASTM A123.
- Fabricate complete with anchors, inserts and hardware.
- Form and finish to shape and size with sharp angles and lines.
- Countersink metalwork to receive required hardware and to provide bevels and clearances.
- Weld on hardware mounting plates. Drill or punch holes for bolts and screws. Conceal fastenings wherever possible.
- Grind exposed edges smooth. Construct joints exposed to weather to exclude water and provide weep holes indicated.
- Brackets, lugs and similar accessories required for installation -Include as part of fabrication.

B. MISCELLANEOUS STEEL FABRICATIONS – Galvanize unless indicated to be painted. Where painting is indicated on the plans it shall be in accordance with the requirements of Section 10-13.14, "Painting and Coating Ancillary Architectural Structures."

- Plates, Shapes and Bars -ASTM A36M.
- Tubing -ASTM A500, Grade B.
- Pipe -ASTM A53, Type E or S, Grade B, galvanized.

C. (Not Used)

D. Stainless Steel Assemblies

DESCRIPTION -The Work specified in this Section consists of furnishing and installing custom items fabricated from stainless steel sheets, plates, bars, tubes and miscellaneous shapes where indicated.

QUALITY CONTROL

- Provide major items of Work fabricated by firm specializing in custom stainless steel

fabrication. Employ tradespersons experienced in fabrication and installation Work herein specified.

- Use finishes for stainless steel complying with NAAMM Metal Finishes Manual.
- Anti-Contamination -Comply with applicable requirements of ASTM A380.
- Sheet work, except as otherwise indicated or specified -Comply with SMACNA 87 and SMACNA80.
- Qualify welding procedures and welding operators in accordance with Basic Welding Requirements. Do not weld before welding procedures and welding operator qualifications have been reviewed and accepted by Engineer.
- Welding Operations -In accordance with Basic Welding Requirements.

SUBMITTALS

- Samples -Six-inch by six-inch samples of each required metal finish. Prepare samples on metal of same gauge, form, alloy, temper and hardness to be used in Work.
- Shop Drawings for fabrication and erection of stainless steel assemblies and proprietary products not otherwise completely shown by manufacturer's data sheets. Include plans and elevations at not less than one-inch-to-one-foot scale, and include details of sections and connections at not less than three-inches-to-one-foot scale. Show anchorage and accessory items, and finishes.
- Manufacturer's, fabricator's and finisher's specifications and installation instructions for proprietary products and products to be used in fabrication of custom stainless steel Work, including metal finishing materials.
- Welding procedures, welder qualifications and welder certifications as required by AWS B2.1 for stainless steel.
- Certification and necessary documentation as specified herein.
- Manufacturer's literature and product data.

PRODUCTS

METAL SURFACES

- For fabrication of Work which will be exposed to view, use materials which are smooth and free of surface blemishes. Do not use materials which have stains and discolorations, including welds which do not match materials in color and grain characteristics.
- Surface Flatness and Edges -For exposed Work, provide materials which have been cold-rolled, cold-finished, cold-drawn, extruded, stretcher leveled, machine cut or otherwise produced to highest commercial standard for flatness with edges and corners sharp and true to angle or curvature as required.

STAINLESS STEEL -Type 316 unless otherwise indicated. Comply with following general standards, with specific type, alloy, heat treatment and finish as required to produce specified Work. Finish products to NO.4 directional satin unless otherwise shown or specified. Protect with adhesive paper covering.

- Sheet -ASTM A167, ASTM A240 and ASTM M80, use Type 316 for Z clips.
- Plate -ASTM A240. For plates with welds exposed to view, use Type 316 or 316L.
- Bar Stock -ASTM A276, Type 316 or 316L.
- Tubing -Round ASTM A269, seamless; square ASTM A554.
- Castings -ASTM A744.
- Extruded Shapes -Manufacturer's standards.
- Insert channels -Type 316.

FASTENERS AND ANCHORAGE MATERIALS

Welding Electrodes and Filler Metal -Provide alloy and type required for strength, workability, compatibility and color match after grinding smooth and finishing fabricated product.

Fasteners -Same basic metal or alloy as metal fastened, and finished to match in color and texture. Comply with FS FF-S-92 for machine screws. When concealed fasteners are impractical or impossible, provide Phillips flat-head screws for exposed fasteners, unless otherwise indicated. Install vandal resistant, tamperproof fasteners where indicated.

Anchors and Inserts -Stainless steel expansion anchors as specified herein.

FABRICATION

Fabricate from thicknesses, sizes and shapes indicated or, if not indicated, as required to produce Work of adequate strength and durability, without deflection and "oil canning."

Form exposed Work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to a 1/32-inch (0.75 mm) radius, unless otherwise indicated. Miter exposed corner joints and machine fit to hairline joint.

Weld corners and seams continuous, grind smooth and flush on exposed surfaces. For exposed metal finishes, use metals which will blend and match with sheet metals being joined; discoloration and stains will not be acceptable for exposed portions of natural finish metals.

Form exposed Work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to a 1/32-inch (0.75 mm) radius, unless otherwise indicated. Miter exposed corner joints and machine fit to hairline joint.

Provide brackets, plates and straps with each assembly, as required for proper support and anchorage to other Work.

Cut, reinforce, drill and tap Work as required to receive finish hardware and similar items of Work.

Preassemble Work at shop to greatest extent practicable; minimize mechanical joints, splicing and assembly of units at Worksite.

Ticket Vending Machine -Provide brackets, plates and straps with each assembly as required for proper support and anchorage. Weld blocks to base plates and drill holes as indicated. Tap holes to accept 5/8-inch (15.88 mm) 18 UNC-2A bolts in accordance with ANSI B1.1.

E. Aluminum Assemblies

DESCRIPTION -The Work specified in this Section consists of furnishing and installing aluminum assemblies as indicated.

QUALITY CONTROL

Comply with Contractor Construction Control Requirements.

Qualifications -Provide Work fabricated by a firm specializing in custom aluminum fabrication. Employ workers experienced in fabrication and installation Work specified.

Aluminum Assemblies Manufacturer - Approved by the Engineer.

The requirements, terminology, and standards of performance, fabrication and workmanship are those specified and recommended by the Aluminum Association (AA).

Welding Operations - In accordance with AWS 01.2.

SUBMITTALS

Shop Drawings for fabrication and erection of assemblies. Show anchorage and accessory items and finishes.

Certified test reports, as required, for materials specified in PRODUCTS section.

Welding procedures and welder qualifications as required in AWS D1.2.

PRODUCTS

ALUMINUM -Provide forms and types indicated for each item of Work and comply with following general standards. Except for specific requirements of workability, strength and hardness, provide alloy 6063-T5 or 6061-T6. Where no other finish is indicated or specified, provide clear anodized finish, or as acceptable to the Engineer. Furnish aluminum exposed to weather or dampness with Architectural Class I Anodic coating, AA-MI2C22A42.

- Plate and Sheet -ASTM B209.
- Bars, Rods and Wire -ASTM B211.
- Extruded Shapes and Tubes -ASTM B221 or B308.

WELDING ELECTRODES AND FILLER METAL -Provide alloy and type required for strength, workability, compatibility and color match after grinding smooth and finishing fabricated product.

FASTENERS -Match color and texture of assembly where exposed. Use stainless steel fasteners for attachment to dissimilar metals. Comply with FS FF-S-92 for machine screws.

ANCHORS AND INSERTS -Furnish inserts to be set in concrete and masonry Work, or provide other anchoring devices as required for installation of Work. Furnish stainless steel anchors as specified in Metal Fabrications.

FABRICATIONS

Fabricate from thicknesses, sizes and shapes indicated or, if not indicated as required, to produce Work of adequate strength and durability, without unacceptable deflection. Use proven details of fabrication to achieve proper assembly and alignment of various components of Work. Form exposed Work true to line, level and with flush surfaces and accurate angles. Miter exposed corner joints and machine-fit to hairline joint.

Continuously weld corners and seams. Grind exposed welds smooth and flush; match and blend with adjoining surfaces.

Provide brackets, plates and straps with assemblies as required for support and anchorage to other Work.

Cut, reinforce, drill and tap aluminum Work as required to receive finish hardware and similar items of Work.

Complete fabrication and assembly of units before chemical treatment and application of coatings so that untreated or uncoated edges will not be exposed.

Isolate aluminum from dissimilar metal with closed cell neoprene tape or spacers.

INSTALLATION

Accurately measure Work from established building lines and levels; plumb and align with previously completed Work. Temporarily brace or securely anchor Work to be built into concrete, masonry and similar construction.

Securely anchor in place using concealed anchorage where practicable.

Accurately fit mechanical joints together to form tight joints and uniform reveals and spaces for joint fillers and sealants. Restore damaged finishes.

Do not cut or abrade finishes, which cannot be completely restored in field. Return damaged units to shop for required alterations, followed by complete refinishing.

Isolate surfaces of aluminum in contact with concrete, masonry and dissimilar metals with heavy coat of bitumastic paint or tape as recommended by aluminum manufacturer and acceptable to the Engineer.

WELD INSPECTION

Visual Inspection - Welds per AWS D1.2.

Gratings

General - Fabricate gratings, trench drain covers and frames of size and configuration as indicated.

Construction - Press-lock type.

Provide No.3 finish walking surfaces.

Provide maximum 3/8 inch (9.5 mm) opening width between cross bars at gratings subject to public foot traffic.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for miscellaneous metal shall be considered as included in the contract unit prices paid for the various items of work requiring miscellaneous metal and no additional compensation will be allowed therefore.

10-13.13 CAULKING AND SEALANTS

A. Description of Work

Caulking and sealant work includes materials and installation of architectural caulking and sealants for waterproofing buildings and structures.

B. Submittals

Manufacturer's catalog data and descriptive literature in accordance with Section 5-1.04, "Submittals," of the Special Provisions.

C. Caulking and Sealant Materials

Caulking and Sealant Compounds

Exterior Applications. One-part, nonsag, moisture-curing polyurethane joint sealant conforming to ASTM C 920, Type S, Grade NS, Class 25. Use Pecora Corporation "Dynatrol I," Bostik's "Chem-Caulk 900," Sonneborn's "Sonolastic NP-1," or equal. Color of caulking and sealant shall match color of adjacent work.

Mastic

Where mastic is shown or noted on drawings, it shall be the general purpose butyl-based caulking compound specified, except that it shall be knife or trowel consistency. Exterior applications exposed to weather shall be the polyurethane sealant hereinbefore specified in knife or trowel consistency.

Primers

Primers shall be quick-drying, colorless, non-staining sealer of type and consistency as recommended by the manufacturer of the caulking material for the particular surfaces to be caulked or sealed.

Packing

Sealant backup or packing and packing for caulking compounds shall be non-staining resilient material, such as glass fiber roving, neoprene, butyl, polyurethane, or other closed cell foams, compatible with the caulking compound used.

D. Installation of Caulking and Sealants

Surface Preparation

1. Clean joints and spaces of dirt, dust, mortar, oil, and other foreign materials, which might adversely affect the caulking work. Degrease with solvent or commercial degreasing agent. Surfaces shall be thoroughly dry before application of caulking compounds.
2. If recommended by manufacturer, remove paint and other protective coating from surfaces to be caulked prior to priming and caulking application.
3. Enclose joints on three sides. Where grooves for adequate caulking have not been provided, clean out grooves to the depth required or as indicated on drawings and grind to a minimum width of 1/4 inch (6 mm) without damage to the adjoining work. Do not grind on metal surfaces.
4. Preparation of surfaces to receive caulking compound shall conform to the caulking manufacturer's specifications. Use air pressure or other methods approved by the manufacturer to achieve required results. Use masking tape to keep caulking compound off surfaces that will be exposed in the finished work.

Application

Exterior

Caulk and seal around architectural openings in exterior walls and roofs of buildings and structures, including penetrations for piping; conduits; ductwork; window, door, and louver frames; vents; and other locations shown in the drawings or required for waterproofing the building and structure.

Priming

Prime concrete, masonry, and other porous surfaces and other surfaces, if recommended by the manufacturer, before applying caulking and sealants. Apply primer with a brush that will reach all parts of joints to be filled with caulking compound.

Packing

Fill joints and spaces deeper than 1/2 inch (13 mm) with packing to within 1/2 inch (13 mm) of the surface. Then fill the joints with caulking compound. Provide a minimum of 3/8 inch (10 mm) of caulking compound in joints 1/2 inch (13 mm) in depth or deeper.

Storage of Caulking and Sealant Compounds

Store caulking and sealants at temperatures below 150°F (66°C). Do not use compounds when they become too jelled to be discharged in a continuous flow from the gun. Do not modify compounds by addition of liquids, solvents, or powders.

Workmanship

Fill voids and joints solid. In caulking around openings, include entire perimeter of each opening, unless shown or specified otherwise. Where the use of a gun is impracticable, use handtools.

Finishing

Point caulked and sealed joints on flush surfaces with beading tool, and internal corners with eaving tool. Remove excess material. Exposed caulking shall be free of wrinkles and uniformly smooth. Caulking and sealing shall be complete before final coats of paint are applied.

Cleaning

Clean surfaces of materials adjoining caulked and sealed joints of smears of compound or other soiling due to caulking application.

Miscellaneous Caulking and Sealing Work

Provide caulking wherever required to prevent light leakage as well as moisture leakage. Refer to drawings for conditions and related parts of the work.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for architectural caulking and sealants shall be considered as included in the contract unit prices paid for the various items of work requiring caulking and sealants and no additional compensation will be allowed therefore.

10-13.14 PAINTING AND COATING ANCILLARY ARCHITECTURAL STRUCTURES

A. General - Description of Work

1. Paint and coating work consists of furnishing and applying high performance coating systems (paints) and other coatings where shown on the Plans or required by the specifications. This section includes surface preparation and application of high-performance coating systems on the following substrates:
 - a. Steel
 - b. Stainless Steel
 - c. Galvanized Steel
2. Painting and coating products shall conform to San Diego Air Pollution Control District Rule 67.0, which stipulates that products shall not contain more than 420 grams per liter or 3.50 pounds of volatile organic material per gallon of coating product as applied.

B. General - Submittals

1. Product Data for Review: For each type of product indicated. Include preparation requirements and application instructions.
2. Samples for Initial Selection for Review: For each type of topcoat product indicated.
3. Samples for Verification for Review: For each type of coating system and in each color and gloss of topcoat indicated.
 - a. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - b. Step coats on Samples to show each coat required for system.
 - c. Label each coat of each Sample.
 - d. Label each Sample for location and application area.
4. Product List for Review: For each product indicated, include the following:
 - a. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - b. VOC content.
5. Submit required Certifications for information.

C. General - Maintenance Materials Submittal

1. Transport and store maintenance materials attic stock to an environmentally controlled location as approved by the Engineer.

2. Submit paint and coating manufacturers' technical and material safety data sheets for the products to be applied. Data sheets shall show the following information:
 - a. Percent solids by volume.
 - b. Minimum and maximum recommended dry-film thickness per coat per prime, intermediate, and finish coats.
 - c. Recommended surface preparation.
 - d. Recommended thinners
3. Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.
4. Application instructions including recommended equipment and temperature limitations.
5. Curing requirements and instructions.
6. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Furnish five (5) percent, but not less than 1 gal. (3.8L) of each material and color applied.

D. General - Delivery, Storage and Handling

1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - a. Maintain containers in clean condition, free of foreign materials and residue.
 - b. Remove rags and waste from storage areas daily.

E. General - Field Conditions

1. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F (10 and 35 deg C), or as recommended by system manufacturer.
2. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces, or as recommended by system manufacturer.
3. Do not apply exterior coatings in snow, rain, fog, or mist.

F. General - Mockups

1. Painting Mockups – Initial Applications: After each coating system indicated is applied to the mockup, the Contractor shall allow the Engineer to inspect mockups to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - a. Engineer will select one surface to represent surfaces and conditions for application of each coating system specified.
 - b. Install one mockup at the location determined by Engineer
 - c. Final review and acceptance of color selections will be based on mockups.

- d. If preliminary color selections and luster of finish are not accepted, apply additional mockups of additional colors selected by Engineer at no added cost.
 - e. Acceptance of mockups does not constitute approval of deviations from the Contract Documents.
 - f. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
2. Painting Mockups – Touchup Application: After architecturally exposed structural steel framing has been set and prior to starting Painting Work at all Station sites, damage the mockup as directed by the Engineer. Demonstrate aesthetic effects, procedures and standards for materials and execution in touch up work by repairing the damaged mockup.
 - a. Color selections shall be based on the colors accepted as part of the initial painting of the mockup.
 - b. If color and luster of finish are not accepted, repeat application with additional colors selected by Engineer at no added cost.
 3. Certification: Contractor and manufacturer shall submit for information written certification that products used comply with the provisions of this Section.

G. Products – Painting General

1. Basis of Design.
 - a. Products listed are based on products and systems by: Tnemec Company Inc.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ICI Paints.
 - b. PPG Architectural Finishes, Inc.
 - c. Sherwin-Williams Company (The).
 - d. Tnemec Company Inc.
3. Material Compatibility:
 - a. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - b. For each coat in a coating system, provide products recommended in writing by manufactures of topcoat for use in coating system and on substrate indicated.
 - c. Provide products of same manufacturer for each coat in a coating system.
4. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
 - a. Flat Paints and Coatings: 50 g/L.
 - b. Nonflat Paints and Coatings: 150 g/L.
 - c. Primers, Sealers, and Undercoaters: 200 g/L.
 - d. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: 250 g/L.
 - e. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 - f. Pre-Treatment Wash Primers: 420 g/L.
 - g. Floor Coatings: 100 g/L.
 - h. Shellacs, Clear: 730 g/L.
 - i. Shellacs, Pigmented: 550 g/L.

5. Colors: As indicated on Drawings.

H. Products - Painting Ferrous Metals

1. First Coat: Aromatic Urethane, Zinc Rich Primer
 - a. Series 90-97 Tneme-Zinc
 - b. Dry film thickness: 2.5 – 3.5 mils
 - c. Shop application required, application method per manufacturer's written instructions and recommendations.
2. Second Coat: Polyamidoamine Epoxy
 - a. Series N69 Epoxoline
 - b. Dry Film Thickness: 2.0-3.0 mils
 - c. Shop application required; application method per manufacturer's written instructions and recommendations.
3. Third Coat: Aliphatic Acrylic Polyurethane
 - a. Series 73 Endura-Shield
 - b. Dry Film Thickness: 2.0-3.0 mils
 - c. Shop application recommended, application method per manufacturer's written instructions and recommendations.
4. Fourth Coat: High Solids Fluoropolymer
 - a. Series 1072 Tnemec Fluoronar
 - b. Dry Film Thickness: 2.0-3.0 mils
 - c. Semi-Gloss Finish
 - d. Shop application recommended application method per manufacturer's written instructions and recommendations.
5. Finish Touch-up: High Solids Fluoropolymer
 - a. Series 1072 Tnemec Flyoronar
 - b. Dry Film Thickness: 2.0-3.0 mils
 - c. Semi-Gloss Finish
 - d. Color: Within 0.25 DED CMC color units of original
 - e. Application method per manufacturer's written instructions and recommendations.

I. Products - Painting Non-Ferrous Metals (Galvanized Steel, Stainless Steel, Epoxy Coated Bolts and Washers).

1. First Coat: Modified Polyamidoamine Epoxy
 - a. Series 135 Chembuild
 - b. Dry Film Thickness: 2.0-3.0 mils
2. Second Coat: High Solids Fluoropolymer
 - a. Series 1072 Tnemec Fluoronar
 - b. Dry Film Thickness: 2.0-3.0 mils
3. Semi-Gloss Finish

J. Products - Source Quality Control

1. For the testing of High Performance Coating Materials, the Engineer reserves the right to invoke the following procedure:
 - a. Contractor will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - b. Testing agency will perform tests for compliance with product requirements.
 - c. Engineer may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

K. Execution - General

1. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - a. After each coating system indicated is applied, whether in the shop or field, the Contractor shall allow the Engineer to inspect and verify that the coating application has met the accepted quality standards for materials and execution.
 - b. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
 - c. Contractor is responsible to protect all shop-applied coatings from damage during transport and installation. Materials delivered to the site with damage will be rejected by the Engineer. At the direction of the Engineer, the Contractor shall either repair the damage in the field or transport the materials back to the shop and provide recoatings.

L. Execution - Preparation

1. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.
2. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
3. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - a. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

4. Formula Attic Stock: High Performance Contractor and Manufacturer shall store chemical formula and at least one (1) vial of actual paint used for each finish color of high performance coating accepted by the Engineer in the mockup at each Station site.
 - a. High Performance Contractor shall review with the Engineer the size of storage vial and conditions under which they are stored at the manufacturer's plant.
 - b. At Final Completion, turn over written chemical formula and paint vial to the Engineer for record purposes.
5. Shop Surface Preparations for Steel Substrates
 - a. SSPC-SP6/NACE No. 3, "Commercial Blast Cleaning" with a minimum angular profile of 2.0 mils
6. Field Surface Preparation for Steel Substrates:
 - a. Clean field welds, bolted connection, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming. Grind off weld fins and spatter.
 - b. SSPC-SP11, "Power Tool Cleaning to Bare Metal" with minimum 1.0 mil profile
7. Shop and Field Preparation for Galvanized-Metal Substrates:
 - a. SSPC-SP1 Solvent Cleaning to remove soluble contaminants. Thoroughly roughen entire surface to be coated using compressed air nozzle brush-off blast cleaning with a fine abrasive to achieve a uniform anchor profile of 1.5 to 2.0 mils (Reference ASTM D6386-99, Section 5.4.1)
8. Field Surface Preparation for Stainless Steel Substrates
 - a. SSPC-SP1 Solvent Cleaning to remove soluble contaminants. Uniformly and thoroughly mechanically abrade surfaces to achieve a minimum anchor profile of 1.0 mils.
9. Field Surface Preparation for Epoxy Coated Metal Components
 - a. SSPC-SP2 or SP3 Hand or Power Tool Cleaning.

M. Execution – Application

1. Apply high-performance coatings according to manufacturer's written instructions.
2. Use applicators and techniques suited for coating and substrate indicated.
3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.
4. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only
5. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
6. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
7. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple

coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

8. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
9. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
10. Match color of finish high performance coatings applied to substrates in the manufacturer's shop to coatings applied in the field, and to attic stock material furnished as directed by the Engineer.
11. Where a film coating terminates on a surface which will receive one or more top coats of additional coatings, feather out edges to a smooth transition where coating stops. Abrupt edge terminations that telescope through subsequent applied coatings will not be accepted.
12. Coat individual components separately such as hand hole covers, bearing plates, and miscellaneous plates when not shop welded to metal substrate.
13. Exposed Conduit, Junction Boxes and Other Electrical Components: Surface prepare exposed metal as recommended by manufacturer of high performance coatings, and as approved by Electrical Contractor. Preparation may vary from manufacturer's specified standards and systems contained in this Section. Review with the Engineer prior to starting Work.
 - a. As recommended by high performance coating manufacturer and approved by Electrical Contractor, provide primer and finish coats after Electrical Contractor has completed all connections, attachment rings or clips, and Work has been reviewed and accepted by the Engineer
 - b. Prior to starting Work, remove grease, compounds, and dirt from exposed surfaces provided by Electrical Contractor suitable for surfaces to receive high performance coating.
14. Apply touch up Work to conform to entire system coatings in mil thicknesses indicated.
 - a. Touchup Work shall match color and luster of surrounding finish.
 - b. Prior to Final Completion at each Station site, review with the Engineer areas requiring touchup Work prior to performing touchup Work.
 - c. After touchup Work is completed at each Station site, review with the Engineer to obtain final acceptance at each Station site.
15. Avoid contact between zinc based coatings and concrete or concrete unit masonry. Provide manufacturer's standard epoxy coating over areas that will be in contact with concrete or concrete masonry units.

N. Execution – Cleaning and Protection

1. At end of each workday, remove rubbish, empty cans, rags, and other discarded

materials from the Project site.

2. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
3. Protect Work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as reviewed and accepted by the Engineer, and leave in an undamaged condition.
4. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for Painting and Coating Ancillary Architectural Structures shall be considered as included in the contract unit prices paid for the various items of work requiring Painting and Coating Ancillary Architectural Structures and no additional compensation will be allowed therefore.

10-13.15 VENDING MACHINES AND PUBLIC TELEPHONES

Vending machines and public telephones include refreshment vending machines, and pay telephones located within the limits of, and anchored to, LRT station platforms.

Vending machines and telephones, so indicated on plans, shall be removed by the owner of equipment.

The Contractor shall contact Coca Cola Bottling Company (Charles Simpson at 619-266-6306) a minimum of two weeks in advance of the need for removal of the refreshment vending machines and request that Coca Cola remove the machine. Coca Cola shall remove the vending machines and shelters. Contractor shall notify Coca Cola when work has been completed at each LRT station so Coca Cola can replace the machines and shelters in the original location or a new location as indicated on the plans or as directed by the Engineer. Contractor shall provide a new electrical service to each new vending machine location in an underground rigid conduit according to the provisions of Section 13, "Electrical and Communications" of the Special Provisions, unless otherwise directed by the Engineer.

The Contractor shall contact Westcom Communications Inc. SBC (Pacific Bell) a minimum of two weeks in advance of the need for removal of the Westcom Communications Inc. SBC (Pacific Bell) public telephones. Westcom Communications Inc. SBC (Pacific Bell) will remove the public telephones and Contractor shall coordinate with Westcom Communications Inc. SBC (Pacific Bell) to maintain at least one pay phone in operation per platform and at least one TDD (Telecommunication Devices for the Deaf) text pay phone per station in conformance with the requirements of 28 CFR Pt. 36, Appendix A, Section 10.3 (12). For temporary phone service during construction, the Contractor shall coordinate with Westcom Communications Inc. SBC (Pacific Bell) so that the phones are relocated to areas that are accessible to the public and the Contractor shall provide temporary power and phone lines in conduit to that location. For permanent phone service, the Contractor shall provide new electrical service and phone lines to connect to each new public telephone location in underground rigid conduits according to the provisions of Section 13, "Electrical and Communications" of the Special Provisions,

unless otherwise directed by the Engineer. The contractor shall notify Westcom Communications Inc. SBC (Pacific Bell) when work has been completed at each LRT station so Westcom Communications Inc. SBC (Pacific Bell) can replace the public telephones in the new location as indicated on the plans or as directed by the Engineer.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for coordination with vending machines and public telephone removal and reinstallation shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed therefor.

10-13.16 TICKET VENDING MACHINES AND PCID

Ticket vending machines and Passenger Card Interface Device (PCID) are located within the limits of, and are anchored to, LRT station platforms. Contractor shall contact SDTI Operations as described below prior to beginning work within the vicinity of the existing ticket vending machines and PCID's. Removal and reinstallation of ticket vending machines and PCID's will be performed by SDTI forces. The Contractor shall contact SDTI a minimum of two weeks in advance of the removal of the ticket vending machines and PCID's and inform SDTI of the removal date and time. The Contractor shall coordinate the removal of the ticket vending machines and PCID's as needed to maintain at least one ticket vending machine per station and at least one PCID per station. The Contractor shall temporarily relocate the ticket vending machines and PCID's to areas that are indicated in the Construction Phasing Plans and are accessible to the public and provide temporary power and phone lines in conduit to that location.

Contractor shall notify SDTI 15 business days in advance of requesting acceptance of Station Substantial Completion at each LRT station so SDTI can install the ticket vending machines and PCIDs in the permanent locations as indicated on the plans or as directed by the Engineer. Contractor shall provide a new electrical and communication service to each device in an underground rigid conduit according to the provisions of Section 13, "Electrical and Communications" of the Special Provisions, unless otherwise directed by the Engineer.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for coordination with SDTI for removal and reinstallation of ticket vending machines and PCIDs shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefore.

10-13.17 VARIABLE MESSAGE SIGN UNITS AND PUBLIC ADDRESS SPEAKERS

Variable Message Sign Units and Public Address Speakers are located within the limits of, and are anchored to, LRT station platforms. Stations with existing Variable Message Sign Units include (H Street and San Ysidro). Contractor shall contact SDTI Operations as described below prior to beginning work within the vicinity of the variable message sign units and the public address speakers.

Removal of variable message sign units and public address speakers shall be performed by SDTI forces. The Contractor shall contact SDTI a minimum of two weeks in advance of the removal of the variable message sign units and public address speakers and inform SDTI of the removal date and time.

Contractor shall notify SDTI 15 business days in advance of requesting acceptance of Station Substantial Completion at each LRT station so SDTI can install the variable message sign units and public address speakers in the permanent locations as indicated on the plans or as directed by the Engineer. Contractor shall provide a new electrical and communication service to each device in an underground rigid conduit according to the provisions of Section 13, "Electrical and Communications" of the Special Provisions, unless otherwise directed by the Engineer.

Measurement and Payment

No separate measurement will be made for the requirements of this section.

Full compensation for coordination with SDTI for removal of variable message sign units and public address speakers shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefore.

10-13.18 TREE GRATE

Work under this section includes the installation of tree grates at locations and to the spacing as shown on the plans.

Refer to 15-03300 "Cast-In-Place Concrete" of these Special Provisions for other related work.

Provide new tree grates that match the material, design, size, color and method of attachment, of the existing tree grates at the specific station site where new grates are required. If unable to determine manufacturer or match, the Basis of Design tree grate shall be Ironsmith #4804 – 48 inch square Olympian grate with frame – natural unfinished gray iron, or approved equal. All components of the tree grate shall be corrosion resistant and factory finished. Steel frame and all attachments for setting in concrete shall be hot-dipped galvanized.

Submit the manufacturer's product data (including finish data) and installation specifications and other data required to demonstrate compliance with the specified item as indicated on the plans. The manufacturer shall review the installation details indicated on the plans and provide recommendations for any adjustments or adaptations of the connections to conform the tree grate to the specific requirements of the installation. The manufacturer's recommended method of installation, when approved by the Engineer, will become the basis for inspecting and accepting work.

Delivery, store, and handle tree grate to prevent damage and deterioration, and protect finish from damage, abrasion or discoloration.

Install tree grates in coordination with concrete, landscape and irrigation installation work

Install tree grate frames integral with adjacent concrete and coordinate installation with installers of adjacent materials.

Protect frame finish from damage after installation.

Examine subgrades, finished surfaces, and installation conditions. Do not start tree grate installation work until unsatisfactory conditions are corrected.

Trees grates sections shall be installed per manufacturer's recommendations. Plumb and secure as indicated in the plans and manufacturer's instructions. The tree grate shall be installed flush with adjacent paving on all sides and shall be secured per manufacturer's recommendations. Tree trunk to fit within the center opening of the tree grate with a 1" clearance. If less, remove circular sections of tree grate as necessary to provide 1" clearance.

Component parts of the tree grate assembly shall fit together plumb and secure in a manner satisfactory to the Engineer, with the grates firmly secured to the steel frame to eliminate loose "rocking" of the grate or protruding edges.

Each section of the tree grates shall be securely bolted down to the frame using pilfer-proof stainless steel bolts through holes provided by the manufacturer. All portions of grates shall be flush. Vertical displacement exceeding $\frac{1}{4}$ " shall not be acceptable.

Each grate shall be tested to eliminate all displacement or other movement of the grate.

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from tree grate installation work.

Protect the tree grates and frames from damage throughout construction.

Measurement and Payment

Tree Grate assembly shall be measured for payment by the unit (one complete Tree Grate, frame, supports and fasteners).

The contract unit price paid per each "Tree Grate" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing Tree Grates, complete in place, including frame, anti-pilfer hardware, and spare tools as shown on the Plans, and as specified in these Special Provisions, and as directed by the Engineer.

10-13.19 VMS SIGN STRUCTURE

Work under this section includes furnishing and constructing VMS sign structures at LRT stations shown on the plans and as specified in these Special Provisions. The VMS sign will be furnished by others and installed by the contractor. The contractor shall coordinate with the VMS manufacturer to develop details for attachment of the VMS sign to the VMS sign structure. Connection details shall be submitted as part of the shop drawings for review and approval by the Engineer.

Attention is directed to Sections "Cast-in-Drilled-Hole Concrete Piles," "Miscellaneous Metal," "Painting and Coating Ancillary Architectural Structures," and "Electrical and Communications" of these Special Provisions for related work required in the construction of VMS sign structures.

Measurement and Payment

VMS Sign Structure will be measured and paid for by the unit Each for based on the various VMS sign structure types designated in the Bid Schedule and shown on the Plans.

The contract unit price paid for each "VMS Sign Structure" shall include full compensation for furnishing all labor, materials, tools, equipment. and incidentals and for doing all the work involved in constructing VMS sign structure, including miscellaneous metals, painting, and electrical system, including base plate inserts, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

10-13.20 BOLLARDS/PROTECTION POSTS

Bollards/Protection Posts shall be constructed and installed in accordance with the San Diego Regional Standard Drawings, Detail WM-04.

Measurement and Payment

Bollards/Protection Posts will be measured and paid for by the unit each.

The contract unit price paid per each for "Bollards/Protection Posts" at locations designated in the construction plans shall include full compensation for furnishing all labor, materials, tools, equipment. and incidentals and for doing all the work involved in constructing bollards/protection posts, including miscellaneous painting and foundations, as shown on the plans, and specified in these Special Provisions, and as directed by the Engineer.

10-13.21 BIKE LOCKER

Work under this section includes reinstallation and mounting of Bike Locker units, removed and salvaged as specified in Section 10-4.06.2 of these Special Provisions, at locations designated in the construction plans, or as directed by the Engineer. Bike Lockers shall be mounted to pavement using stainless steel anchor.

Measurement and Payment

Installation of Bike Locker will be measured and paid for by the each unit installed.

The contract unit price paid per each for "Install Bike Locker" at locations designated in the construction plans, or as directed by the Engineer, shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in installing bike lockers, including mounting to pavement, as shown on the plans, and specified in these Special Provisions, and as directed by the Engineer.

10-14 SITE DRAINAGE FACILITIES

10-14.01 DESCRIPTION

Site drainage facilities consist of trenching and bedding, export of trenched materials, dewatering as needed, shoring as needed, PVC pipe, RCP, import of bedding and backfill materials, trench drains,

furnishing and installing pre-cast and cast in place concrete drainage facilities, modifying existing drainage facility structures, connecting to existing drainage facilities, together with all appurtenances necessary for construction of a complete storm drainage system.

10-14.02 TRENCHING AND BEDDING

Trenching and bedding for drainage pipe shall conform to the details shown on the Contract Drawings and Section 306-1.2.1, "Bedding," of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC).

Installation of Pipe shall conform to Section 306-1.2, "Installation of Pipe," of the SSPWC.

Trench backfill above the pipe bedding (pipe zone) shall conform to Section 306-1.3, "Backfill and Densification," of the SSPWC, except water densified backfill will not be permitted under the track bed, and minimum relative compaction of trench backfill shall be not less than 95 percent. Trench backfill shall be not less than 95 percent under the track bed. Refer to Section 10-5.05, "Trench Excavation and Backfill," of these Special provisions for additional requirements.

Trench resurfacing in paved areas is specified in Section 10-11.09, "Trench Resurfacing," in these Special Provisions.

10-14.03 REINFORCED CONCRETE PIPE

Reinforced concrete pipe (RCP) shall conform to the provisions in Section 207-2, "Reinforced Concrete Pipe (RCP)," of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC). Size, type and class shall be as shown on the Contract Drawings. All RCP shall have rubber gasketed joints.

10-14.04 NOT USED

10-14.05 PVC UNDERDRAINS

PVC Underdrains shall consist of furnishing all labor, materials and equipment necessary and incidental to providing trench drain connection piping, track ballast drain piping, stormwater treatment vault piping, cleanout sump piping, other drainage piping, and subsurface drainage materials including permeable material and filter fabric, in conformance with Caltrans Standard Specifications Section 68-1, "Underdrains," of the Standard Specifications. The work includes connecting system to existing or new storm drains as required by the Contract Drawings.

A. Perforated and Non-Perforated Drain Pipe

1. Plastic smooth interior to conform to Section 68-1.02K, "Perforated Plastic Pipe," of the Caltrans Standard Specifications and shall be Schedule 40 and conform to AASHTO Designation: M278. Perforation pattern shall be as shown on the Contract Drawings.
2. Fittings for plastic pipe shall be of the same material and from the same manufacturer as the plastic pipe.

B. Outlet Risers and Cleanouts

1. Outlets, risers and cleanouts shall be of the same materials as the perforated pipe and shall be supplied from the same manufacturer. Riser covers shall be as detailed on the Contract Drawings.
2. Cleanouts shall be placed at intervals as shown on the Contract Drawings., and at the ends of all dead end runs.

C. Connections to Trunk Drains

1. Underdrain connections to trunk drains shall consist of a gasketed hub connection (Inserta-Tee) or approved equivalent. Hole in trunk drain shall be made to the size according to the manufacturer's recommendations for installation. Debris from cutting into the trunk drain shall be removed. Hole shall be neat and smooth. Connection shall be installed in accordance with manufacturer's recommendations.

D. Filter Fabric

Filter fabric shall conform to Caltrans Standard Specifications Section 88-1.03.

E. Permeable Material

Permeable aggregate shall conform to Caltrans Class 1 per Standard Specifications Section 68-1.025 and the details shown on the Contract Drawings.

F. Installation

Perforated Pipe Installation

Place the filter fabric where indicated on the Contract Drawings. Long axis of the fabric to be parallel with long axis of the pipe. Filter fabric sections to be overlapped a minimum of 12 inches. Place permeable rock on the filter fabric up to the flowline of the pipe. Grade the rock to the line and grade indicated for the perforated drain pipe. Place the perforated or slotted drain pipe with the perforations or slots facing down in a semi-circular seat prepared in the permeable rock. Connect sections of pipe in accordance with the manufacturer's instructions. Continue placing permeable rock in 4 inch layers on the sides and to the spring line of the pipe. Tamp material to provide thorough compaction under and on each side of the pipe. Succeeding layers of permeable rock may be placed in 8 inch layers and be thoroughly compacted to the indicated depth shown on the Contract Drawings. Exercise caution not to damage the filter fabric. Torn or punctured areas of filter fabric shall be repaired by placing a piece of fabric that is large enough to cover the damaged area plus 12 inches of overlap on all sides. Complete permeable rock backfill as indicated and close the filter fabric at the top of this backfill with an overlap across the full width of the underdrain.

Non-Perforated Pipe Installation

Place drain in conformance with the trench detail shown on the Contract Drawings. Place bedding up to the flowline of the pipe. Grade the bedding to the line and grade indicated for the drain pipe. Place the drain pipe in a semi-circular seat prepared in the bedding. Connect

sections of pipe in accordance with the manufacturer's instructions. Continue placing backfill in 4 inch layers on the sides and to the spring line of the pipe. Tamp material to provide thorough compaction under and on each side of the pipe. Succeeding layers of backfill may be placed in 8 inch layers and be thoroughly compacted to the indicated depth shown on the Contract Drawings.

10-14.06 STEEL CASING

Steel casing shall consist of furnishing all labor, materials and equipment necessary and incidental to providing sleeves under the track bed at utility crossings. Steel casing shall conform to the provisions of the AREMA Manual for Railway Engineering and the details shown on the Contract Drawings.

10-14.07 TRENCH DRAIN

Trench drain shall consist of furnishing all labor, materials and equipment necessary and incidental to providing a trench drain, stainless steel grate, in-line trench drain catch basins, catch basin trash bucket at the locations shown on the drawings. Installation shall conform to the manufacturer recommendations for installation and shall conform to the details shown on the Contract Drawings.

A. Trench Drain

1. Trench Drain shall consist of ACO (or approved equivalent) K100s Klassik Drain with K030 neutral and sloped channels as indicated on the Contract Drawings.
2. Trench Drain Grates shall be stainless steel locking type and shall be ADA compliant and Heel proof with a slot size of ¼ inch. ACO (or approved equivalent) Class C Stainless Steel grates shall be used.
3. Concrete for trench drains shall be per the details on the contract Drawings.
4. Trench Catch Basins shall be ACO (or approved equivalent) K900.
5. Trench trash bucket shall be ACO (or approved equivalent) Series 900.

B. Concrete

1. Trench Drain Concrete shall conform to Section 10-12, "Miscellaneous Concrete Construction" of these Specifications.

10-14.08 CONCRETE DRAINAGE STRUCTURES

Concrete drainage facility structures include; curb inlets, catch basins, cleanouts, cleanouts/inlets with sump valves, headwalls, pipe to channel connections, concrete collars and concrete lugs. Drainage structures shall be minor concrete (minor structure) and shall conform to the 2006 City of San Diego Standard Drawings in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.08A. CONCRETE DRAINAGE STRUCTURE – SAN YSIDRO

The concrete drainage facility structure – San Ysidro shall include the cleanout with sump valve, removal of existing pipe in conflict with structure, connecting existing pipe to structure, roadway excavation, temporary removal and reinstallation of site furniture, in conflict with the work, saw-cutting and removal of existing concrete along the score joints, installation of new concrete pavement to match the existing thickness and color and other incidental work required to install the drainage structure as shown in the Construction Plans. The drainage structure shall be minor concrete (minor structure) per Section 10-14.08 of these Special Provisions.

10-14.09 LEVER ACTUATED GATE VALVE

A lever actuated gate valve shall be constructed in the sump cleanouts/inlets where shown on the Contract Drawings. Lever actuated gate valve shall be a 6 inch ANSI flanged valve with a lever for operation. Valve shall be Betts Stock # SV966MSM or approved equivalent. Ductile iron pipe spools shall be installed on each end of the valve with anchor straps as shown on the Contract Drawings.

10-14.10 STORMWATER TREATMENT VAULT (SAND FILTER)

Stormwater treatment vaults include precast concrete vaults including; traffic rated hatches, sand filter layer, crushed rock layer within vault, perforated underdrain, connection piping including fittings and bends, rock energy dissipation pad, filter fabric and crushed rock base course in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.11 DIVERSION MANHOLE

Diversion manhole structure shall consist of a San Diego Regional Standard Drawing Type "A-6" Cleanout with a concrete weir, trash/debris rack, perforated riser pipes and pipe outlet in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.12 HIGH RATE MEDIA FILTER BOX

High Rate Media Filter Box shall consist of a precast concrete box sized to the dimensions shown on the plans that contains landscaping, soil and an underdrain pipe. Installation shall be in accordance with manufacturer's recommendations and the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.13 GRATE INLET SKIMMER BOX

Grate inlet skimmer box includes a trash and debris removal system to be installed at the locations as shown on the contract drawings. Grate inlet skimmer boxes shall be Bioclean (or approved equivalent).

10-14.14 STORM DRAIN INLET STENCILING

Curb inlets and catch basins shall be stenciled with the following language “No Dumping – Drains to Bay” or approved equivalent. Stenciling shall consist of a round medallion attached to the curb inlet or catch basin per the manufacturer’s recommendations. No stenciling is required for cleanouts, headwalls or trench drains.

10-14.15 METAL FRAMES, COVERS, AND GRATES

Metal frames, covers, and grates shall conform to the provisions and shall conform to the 2006 City of San Diego Standard Drawings and the 2009 Edition of the “Greenbook,” Standard Specifications for Public Works Construction (SSPWC) Section 206 and the details shown on the Contract Drawings.

10-14.16 IMPERMEABLE FABRIC AND ATTACHMENT HARDWARE

Impermeable Fabric (Water Stop) shall be a 30-mil single-ply construction Polyvinyl Chloride (PVC) geomembrane material made with virgin resins and meeting the requirements of ASTM D7176. Attachment hardware shall consist of an aluminum bar with stainless steel anchor bolts per the dimensions shown on the contract drawings.

10-14.17 RIP RAP

Rip Rap shall consist of providing rock and fabric, in conformance with Caltrans Standard Specifications Section 72, “Slope Protection,” of the Standard Specifications. The work includes constructing Rip Rap energy dissipators including filter fabric as required by the Contract Drawings.

10-14.18 SIDEWALK UNDERDRAIN

Sidewalk Underdrain shall consist of a San Diego Regional Standard Drawing D-27 Underdrain in accordance with the provisions of the 2009 Edition of the “Greenbook,” Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.19 BIORETENTION SOIL

Bioretention soil shall consist of an imported clean soil without trash or debris. Soil shall be classified as a sandy loam, loamy sand or loam that consists of 75% sandy loam, 10% max clay, and 20% organic matter (exclude animal waste). The pH of the soil should range between 5.5 and 6.5. The soil should include a 1.5 to 3 percent organic content and a maximum 500 ppm concentration of soluble salts. The soil shall be constructed in accordance with the provisions of the planting specifications and the 2009 Edition of the “Greenbook,” Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.20 ¾ INCH CRUSHED ROCK

¾ inch crushed rock shall consist of providing rock in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.21 1 1/2 INCH CRUSHED ROCK

1 1/2 inch crushed rock shall consist of providing rock in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.22 DOWN DRAIN

Down Drain shall consist of a cast in place concrete drain in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

10-14.23 CONCRETE DITCH

Concrete Ditch shall consist of a cast in place concrete ditch in accordance with the provisions of the 2009 Edition of the "Greenbook," Standard Specifications for Public Works Construction (SSPWC) and the details shown on the Contract Drawings.

MEASUREMENT AND PAYMENT

Measurement

Reinforced Concrete Pipe shall be measured for payment by the linear foot, by size, type, and class placed complete in place, horizontally over the centerline of the pipe from interior face of structure to end of pipe as the case may be, without regard to the lengths of pipe cut off to match the inside dimensions of drainage structures..

PVC Underdrains will be measured by the linear foot, by size, type and class placed complete in place, horizontally over the centerline of the pipe from interior face of structure to end of pipe as the case may be, without regard to the lengths of pipe cut off to match the inside dimensions of drainage structures. Underdrains less than 3 feet in length are considered incidental to the other items of work and shall not be measured.

Steel Casing will be measured by the linear foot, by size, and type placed complete in place, horizontally over the centerline of the pipe.

Trench Drain will be measured by the linear foot of grate placed complete in place.

Concrete Drainage structures will be measured for payment by each curb inlet, catch basin, cleanout, cleanout with sump valve, headwall, pipe to channel connection, concrete collar and concrete lug, by type and size provided, as a unit determined by actual count.

Improvements to the Concrete Drainage structures at San Ysdiro Station will be measured as a lump sum for all work indicated on the Plans.

Lever Actuated Gate Valve will not be measured for payment and shall be incidental to the cleanout/inlet with sump valve.

Stormwater Treatment Vault will be measured for payment by each vault by size as a unit determined by actual count.

Diversion Manhole will be measured for payment as a unit determined by actual count.

High Rate Media Filter Box will be measured for payment as a unit determined by actual count.

Grate Inlet Skimmer Box will be measured for payment by actual count.

Storm Drain Inlet Stencil will not be measured for payment and shall be incidental to the inlet and catch basin.

Metal Frames, Covers and Grates will not be measured for payment and shall be incidental to Concrete Drainage structures.

Impermeable Fabric (Water Stop) will be measured by the square yard placed complete in place.

Attachment Hardware will not be measured for payment and shall be incidental to the impermeable fabric.

Rip Rap will be measured by the cubic yard.

Filter Fabric under Riprap will not be measured for payment and shall be incidental to the Rip Rap.

Sidewalk Underdrain will be measured for payment by actual count.

Bioretention Soil will be measured for payment by the cubic yard.

$\frac{3}{4}$ inch Crushed Rock will be measured by the cubic yard.

1 $\frac{1}{2}$ inch Crushed Rock will be measured by the cubic yard.

Down Drain will be measured by the linear foot of down drain placed complete in place.

Concrete Ditch will be measured by the linear foot of concrete ditch placed complete in place.

Payment

Full compensation for trench excavation and backfill, structure excavation, bedding and backfill, pipe bedding, shoring and trench resurfacing shall be considered included in the Contract prices paid for the various related items of drainage work and therefore, no separate payment will be allowed.

The Contract price paid per linear foot of "Reinforced Concrete Pipe," by size, shall include full compensation for furnishing labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing or constructing reinforced concrete pipe, complete in place, including structure connections not otherwise paid for, , trench excavation, bedding and backfill, connecting pipes, and resurfacing, and as shown on the Plans, and as specified in these Special Provisions , and as directed by the Engineer.

The Contract price paid per linear foot of “PVC Underdrains,” by size, shall include full compensation for furnishing labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing or constructing PVC Underdrains, complete in place, including structure connections not otherwise paid for, trench excavation, bedding and backfill, filter fabric, permeable material, connecting pipes, and resurfacing, and as shown on the Plans, and as specified in these Special Provisions, and as directed by the Engineer.

The contract price paid per linear foot for “Steel Casing,” by size and type, shall include full compensation for furnishing labor, materials, tools, equipment, supplies, supervision, and incidentals necessary for steel casing including backfill, bedding material, end seals, pipe spacers as specified in these Special Provisions, and as directed by the Engineer.

The contract price paid per linear foot for “Trench Drain” shall include full compensation for furnishing labor, materials, tools, equipment, supplies, supervision, and incidentals necessary for Trench Drain including trench drain channel, frame, grate, catch basin, trash bucket, inlet/outlet caps, connection piping and pipe sweeps, concrete, fittings and bends not otherwise paid for as specified in these Special Provisions, and as directed by the Engineer.

The contract unit price paid for each “Concrete Drainage Structure,” by type provided, shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the drainage structures including concrete, reinforcing, frames, grates, covers, complete in place, including structure excavation and backfill, removal and/or abandonment of existing storm drain pipe, cleaning and removal of debris necessary to connect to existing pipe, pipe and structure connections, storm drain inlet stenciling, sump valves, spools and weirs (where shown) all as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for each “Stormwater Treatment Vault (Sand Filter) – Type A” shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the stormwater treatment vault including concrete, reinforcing, frames, hatches, sand, crushed rock layer, geotextile, underdrain, connection piping incidental to the vault not otherwise paid for, fittings and bends, crushed rock base, rock dissipater complete in place, including structure excavation and backfill, as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for each “Diversion Manhole,” shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing diversion manhole including concrete, reinforcing, frames, covers, weir, perforated riser, connection piping, fittings and bends, trash/debris rack complete in place, including structure excavation and backfill, as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for each “High Rate Media Filter Box (6’x4’),” shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the High Rate Media Filter Box including box, landscaping, soil, underdrain, connection piping, fittings and bends complete in place, including structure excavation and backfill, as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for each “Grate Inlet Skimmer Box,” shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Grate

Inlet Skimmer Box complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "Impermeable Fabric (Water Stop)," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Impermeable Fabric complete in place including attachment hardware as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "Rip Rap," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Rip Rap including RSP fabric complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for each "Sidewalk Underdrain," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Sidewalk Underdrain complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "Bioretention Soil," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Bioretention Soil complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "3/4 inch Crushed Rock," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the 3/4 inch Crushed Rock complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "1 1/2 inch Crushed Rock," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the 1 1/2 inch Crushed Rock complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "Down Drain," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Down Drain complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

The contract unit price paid for "Concrete Ditch," shall include full compensation for all labor, materials, tools, equipment, incidentals, and for doing all work involved in providing the Concrete Ditch complete in place as shown on the Plans and as specified in these Special Provisions and as directed by the Engineer.

10-15 STORM WATER POLLUTION PREVENTION PROGRAM

10-15.01 DESCRIPTION

Contractor shall conform to local, state and federal water pollution control regulations. Contractor shall utilize Best Management Practices to control storm water pollution as shown in the contract drawings, in conformance with local, state and federal water pollution control regulations, according to Section 7-1.01G, "Water Pollution Control" of these Special Provisions, and as directed by the Engineer.

The Contractor shall perform water pollution control work during construction in conformance with the requirements documented in the conceptual *Storm Water Pollution Prevention Plan, Blue Line Trolley Station Improvements Project*, dated April 2012, prepared by Kimley-Horn and Associates, Inc., which is available as described in Supplemental Project Information of these Special Provisions. The Contractor shall evaluate, maintain, amend, and update the SWPPP prior to commencing work and on an ongoing basis to document any changes required to accommodate the progression of construction activities throughout the life of the project.

This item shall consist of preparation, implementation and maintenance of a Storm Water Pollution Prevention Plan (SWPPP) and implementation and maintenance of storm water pollution prevention Best Management Practices (BMPs) required to prevent and control discharges of dust, soil, sediment, debris, and other pollutants from the project site onto adjacent areas and/or into the storm water conveyance system from construction activities shown on the project drawings and as specified, in compliance with all applicable laws and regulations of authorities having jurisdiction.

The Contractor shall perform water pollution control work in conformance with the requirements in the "California Stormwater Quality Association Construction Stormwater Best Management Practices Handbook" and the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and addenda in effect on the day the Notice to Contractors is dated. These manuals are referred to as the "Preparation Manual" and can be obtained from:

<http://www.casqa.org/>

or

<http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>

10-15.02 REGULATIONS

The Contractor must comply with the following Permits:

- a. State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002, General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), as adopted, amended, and/or modified (see http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml); and
- b. Regional Water Quality Control Board (RWQCB) Order No. R9-2007-0001, NPDES Permit No. CAS0108758, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego

County Regional Airport Authority (Municipal Permit) as amended, and/or modified (see http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/stormwater/sd_stormwater.shtml).

10-15.03 START OF WORK

Construction work shall not start until:

1. The SWPPP is accepted by the Engineer.
2. WDID is issued by SWRCB in response to a Notice of Intent (NOI).
3. SWPPP review requirements have been fulfilled. If the RWQCB requires time for SWPPP review, allow 30 days for the RWQCB to review the SWPPP as specified under "Submittals" of these Special Provisions.

10-15.04 SWPPP PREPARATION

Contractor shall prepare on behalf of SANDAG the SWPPP covering the work under this Contract required of SANDAG under General Permit No. CAS000002.

10-15.05 SWPPP IMPLEMENTATION

Prior to the start of any clearing, grading, excavating, filling, construction, paving, and/or the installation of structures, the Contractor shall implement the SWPPP. In addition to the Erosion Control Plans provided in the Construction Drawings, the Contractor shall implement additional or modified BMP's as per the Contractor's approved Construction Staging Plans. The Contractor shall continually monitor BMPs for proper implementation and repair to ensure effectiveness. Any required modifications to BMPs shall be documented in the SWPPP itself and on site plans as necessary when changes occur, including recordation of the date of each such modification/amendment. The Contractor is responsible for conducting sampling of stormwater and other discharges and for training employees relevant to stormwater pollution control and implementation of the SWPPP, as appropriate. The Owner may regularly inspect the project site and may request that Contractor modify and/or amend the SWPPP and/or the BMPs therein as necessary during construction to prevent and/or eliminate unauthorized discharges off the jobsite and/or to the storm water conveyance system.

10-15.06 QUALIFICATIONS OF THE CONTRACTOR

Developing, revising, and amending the SWPPP must be performed by a Qualified SWPPP Developer (QSD) as defined in the Construction General Permit. Installation, monitoring, maintenance, and repair of BMPs shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) as defined in the Construction General Permit. Stormwater sampling, as required by the Construction General Permit and/or the SWPPP shall be performed or supervised by a QSP as defined in the Construction General Permit. Section VII (page 33 of the Construction General Permit) details the training qualifications and certification requirements used in defining a QSP. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

10-15.07 BEST MANAGEMENT PRACTICES

BMPs shall be maintained continuously throughout the duration of construction and until each work area has been accepted for use by the Owner. Damaged, displaced, or non-functional BMPs shall be replaced immediately upon identification or when directed by the Engineer or Owner.

The Contractor, as recommended by the QSP, with the approval of the Engineer, may modify the working details, as necessary, to adapt the BMPs for site conditions and the Contractor's approved Construction Staging Plans (see specification 10-01) to meet the pollution control objectives. There shall be no additional costs to the Owner resulting from the Contractor's modification to BMPs to achieve the pollution prevention objectives.

In the event of a conflict between these requirements and pollution control laws, rules, regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

Details and working drawings for BMPs are provided in the SWPPP. The Contractor shall implement an effective combination of erosion and sediment control BMPs, wind erosion control BMPs, tracking control BMPs, non-storm water management BMPs, and materials and waste management BMPs. Erosion control BMPs include but are not limited to: scheduling, slope roughening, hydraulic mulches, soil stabilizers and binders, bonded fiber matrix (BFM), erosion control blankets, and plastic covers. Temporary sediment control BMPs include but are not limited to linear sediment barriers (e.g., silt fence, fiber rolls, and gravel bag berms), sediment traps, storm drain inlet protection. Wind erosion control BMPs include covering and/or the application of water or dust palliatives to exposed soil and stockpiles. Tracking control BMPs include street sweeping, stabilized construction entrance and roadways, and site entrance/exit tire washing. Non-storm water management BMPs include but are not limited to: pavement cutting, vehicle and equipment cleaning, vehicle and equipment fueling and maintenance. Materials and Waste Management BMPs include but are not limited to: material storage, stockpiles, spill prevention and control, clean up, and concrete waste management.

A copy of the SWPPP and NOI must be kept on site and updated as necessary.

The regulations listed above prohibit degradation of water quality and require prevention or control of discharges from construction sites and construction activities for all projects. The Contractor shall implement the BMPs described in the SWPPP to prevent and/or control potential discharges of dust, soil, sediment, debris, and other pollutant from the project site on to adjacent areas and/or into storm water conveyance system from any and all activities with the potential to release such pollutants directly or indirectly.

If the Owner or Engineer or the QSP or the Contractor determine that a BMP is in need of repair or replacement, or has other shortcomings in preventing stormwater pollution, the Contractor shall begin implementing repairs or modifications to the BMP within 72 hours of identification and complete the changes as soon as possible or as soon as it is safe to do so. The Contractor shall perform such work at the Contractor's expense. Such modifications will be documented in the copy of the SWPPP being maintained on site.

10-15.08 MATERIALS

Materials shall be as shown on the plans and as specified in the publications listed above in the SWPPP. All materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

The Contractor shall have adequate materials on site to quickly deploy BMPs, as necessary, to protect

the exposed portions of the site and to prevent sediment and pollutant discharges from the site.

10-15.09 TRAINING

Contractor shall ensure that training on stormwater pollution prevention in general and implementation of the SWPPP prepared for the project is given to all employees and subcontractors involved in construction activities. This training shall include but not be limited to the location of the storm drains on the job site; the direct link between the storm drain system and the bay; potential pollutants; and BMP installation, inspection, maintenance and repair. All training shall be documented in the SWPPP.

10-15.10 UNAUTHORIZED DISCHARGES

No unauthorized discharges of any material, debris, or pollutant may leave the project site and/or enter the storm water conveyance system including process and wash waters, dust, petroleum products, soil or debris. The Contractor shall be responsible for clean-up, mitigation, and penalties resulting from failure to implement and maintain appropriate BMPs for pollution prevention. Any penalties assessed to the Owner as a result of unauthorized discharges will be withheld from the Contractor's progress payments.

10-15.11 NOTIFICATION

The Contractor shall notify the Engineer immediately of any unauthorized releases to the storm drain. The Contractor shall immediately document all unauthorized releases including but not limited to the time, date and duration, material released, and action taken to stop discharge and prevent future discharges. Documentation shall be provided to the Engineer and included in the copy of the SWPPP being maintained on site.

10-15.12 CLEAN UP

All unsalvageable materials used in the storm water pollution prevention program shall be properly disposed of outside of the Owner's property at the completion of work.

10-15.13 SCHEDULE

Prior to the start of construction, the Contractor shall submit schedules for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads, plant sites and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the Engineer.

10-15.14 CONSTRUCTION DETAILS

The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices including phasing of construction, but are not associated with permanent control features on the project.

Where erosion is likely to be a problem, clearing and grubbing operations should be scheduled and performed so that grading operations and permanent erosion control features can follow immediately

thereafter if the project conditions permit; otherwise, temporary erosion control measures may be required between successive construction stages.

The Engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, and other such permanent control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or are ordered by the Engineer, such work shall be performed by the Contractor at his/her own expense.

The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the construction period.

Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into or near rivers, streams, storm drains and impoundments or into natural or manmade channels leading thereto.

10-15.15 MEASUREMENT AND PAYMENT

During each estimate period the Contractor fails to conform to the provisions in this section, "Storm Water Pollution Prevention Program," or fails to implement the water pollution control practices shown on the plans or specified elsewhere in these special provisions as items of work, the owner may withhold 25 percent of the progress payment.

Failure to implement practices may include, but are not limited to, the following:

- Observation of non-storm water discharges without proper BMP implementation
- Observation of erosion due to missing or improperly implemented soil stabilization and sediment control BMPs
- Failure to submit an updated SWPPP for a new phase or stage
- Failure to amend the SWPPP when a change in project conditions occurs or when BMP deficiencies are identified
- Failure to implement required erosion and sediment control BMPs on active and/or inactive disturbed soil areas.
- Failure to maintain a stockpile of BMPs for installation prior to a rain event.
- Failure to maintain BMPs in the field
- Failure to perform appropriate site inspections
- Failure to implement the project's Sampling and Analysis Plan
- Failure to install or maintain BMPs as described in the SWPPP and in the Construction Site Maintenance section of these Special Provisions

Withholds for failure to perform water pollution control work will be in addition to all other withholds provided for in the contract. The owner will return performance-failure withholds in the progress payment following the correction of noncompliance.

“Prepare SWPPP” shall be measured as a lump sum.

The contract lump sum price paid for “Prepare SWPPP” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining approval of, and amending the SWPPP, preparing a Construction Site Monitoring Plan, and Sample Analysis Plan, monitoring and inspecting water pollution control practices at the job site, Stormwater Annual Report, and Rain Event Action Plan as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for prepare storm water pollution prevention plan will be made as follows:

- A. After the SWPPP has been approved by the Engineer, 50 percent of the contract item price for Storm Water Pollution Prevention Plan will be included in the monthly progress estimate.
- B. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining percentage of the contract item price for prepare storm water pollution prevention plan will be made in conformance with the provisions in Section 9-1.07A, "Payment Prior to Proposed Final Estimate."

Storm water sampling and analysis will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. No payment will be made for the preparation, collection, analysis, and reporting of storm water samples where appropriate water pollution control practices are not implemented before precipitation or if a failure of a water pollution control practice is not corrected before precipitation.

“Water Pollution Control” shall be measured as a lump sum.

The contract lump sum price paid for “Water Pollution Control” control shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing, constructing, removing, and disposing of water pollution control practices, including non-storm water management, and waste management and materials pollution water pollution control practices, except those for which there is a contract item of work as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Storm water sampling and analysis will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. No payment will be made for the preparation, collection, analysis, and reporting of storm water samples required where appropriate BMPs are not implemented prior to a rain event, or if a failure of a BMP is not corrected prior to a rain event.

For items identified on the approved Water Pollution Control Cost Break-Down, the cost of maintaining the temporary water pollution control practices shall be divided equally by SANDAG and the Contractor as follows:

Soil Stabilization

Temporary water pollution control practices except:

- SS-1 Scheduling
- SS-2 Preservation of Existing Vegetation

Sediment Control

Temporary water pollution control

Wind Erosion Control

No sharing of maintenance costs will be allowed.

Non-Storm Water Management

No sharing of maintenance costs will be allowed.

Waste Management & Materials Pollution Control

No sharing of maintenance costs will be allowed.

The division of cost will be made by determining the cost of maintaining water pollution control practices in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost. Cleanup, repair, removal, disposal, improper installation, and replacement of water pollution control practices damaged by the Contractor's negligence, shall not be considered as included in the cost for performing maintenance.

The provisions for sharing maintenance costs shall not relieve the Contractor from the responsibility for providing appropriate maintenance on items with no shared maintenance costs.

Full compensation for non-shared maintenance costs of water pollution control practices, as specified in this section, "Storm Water Pollution Prevention Program," shall be considered as included in the contract lump sum price paid for water pollution control and no additional compensation will be allowed therefore.

Implementation of water pollution control practices in areas outside the highway right of way not specifically provided for in the SWPPP or in these special provisions will not be paid for.

Water pollution control practices for which there are separate contract items of work will be measured and paid for as those contract items of work.

COST BREAK-DOWN

The Contractor shall include a Water Pollution Control Cost Break-Down in the SWPPP which itemizes the contract lump sum for water pollution control work. The Contractor shall use the Water Pollution Control Cost Break-Down provided in this section as the basis for the cost break-down submitted with the SWPPP. The Contractor shall use the Water Pollution Control Cost Break-Down to identify items, quantities and values for water pollution control work, excluding Temporary Water Pollution Control Practices for which there are separate bid items. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted with the SWPPP. Partial payment for the item of water pollution control will not be made until the Water Pollution Control Cost Break-Down is approved by the Engineer.

Line items indicated in the Water Pollution Control Cost Break-Down in this section with a specified Estimated Quantity shall be considered "Project-Specific Minimum Requirements." The Contractor shall incorporate Project-Specific Minimum Requirements with Contractor-designated quantities and values into the Water Pollution Control Cost Break-Down submitted with the SWPPP.

Line items indicated in the Water Pollution Control Cost Break-Down in this section without a specified Estimated Quantity shall be considered by the Contractor for selection to meet the applicable "Minimum Requirements" as defined in the Manuals, or for other water pollution control work as identified in the "Construction Site BMPs Consideration Checklist" presented in the Preparation Manual. In the Water Pollution Control Cost Break-Down submitted with the SWPPP, the Contractor shall list only those water pollution control practices selected for the project, including quantities and values required to complete the work for those items.

The sum of the amounts for the items of work listed in the Water Pollution Control Cost Break-Down shall be equal to the contract lump sum price bid for water pollution control. Overhead and profit, except for time-related overhead, shall be included in the individual items listed in the cost break-down.

WATER POLLUTION CONTROL COST BREAK-DOWN

CIP 1210030

SAMPLE FOR FORMAT ONLY

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
SS-5	Soil Binders	M2			
SS-6	Straw Mulch	M2			
SS-7	Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	M2			
SS-9	Earth Dikes/Drainage Swales & Lined Ditches	M			
SS-10	Outlet Protection/Velocity Dissipation Devices	EA			
SS-11	Slope Drains	EA			
SC-1	Silt Fence				
SC-6	Gravel Bag Barrier				
SC-8	Sandbag Barrier				
SC-9	Straw Bale Barrier				
WE-1	Wind Erosion Control				
TC-2	Stabilized Construction Roadway	EA			
NS-1	Water Conservation Practices	LS			
NS-3	Paving and Grinding Operations	LS			
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting	LS			
NS-7	Potable Water/Irrigation	LS			
NS-9	Vehicle and Equipment Fueling	LS			
NS-10	Vehicle and Equipment Maintenance	LS			
NS-12	Concrete Curing	LS			
NS-14	Concrete Finishing	LS			
WM-1	Material Delivery and Storage	LS			
WM-2	Material Use	LS			
WM-3	Stockpile Management	LS			
WM-4	Spill Prevention and Control	LS			

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
WM-5	Solid Waste Management	LS			
WM-6	Hazardous Waste Management	LS			
WM-7	Contaminated Soil Management	LS			
WM-8	Concrete Waste Management	LS			
WM-9	Sanitary/Septic Waste Management	LS			
WM-10	Liquid Waste Management	LS			

TOTAL _____

SAMPLE FOR FORMAT ONLY

Adjustments in the items of work and quantities listed in the approved cost break-down shall be made when required to address amendments to the SWPPP, except when the adjusted items are paid for as extra work.

No adjustment in compensation will be made to the contract lump sum price paid for water pollution control due to differences between the quantities shown in the approved cost break-down and the quantities required to complete the work as shown on the approved SWPPP. No adjustment in compensation will be made for ordered changes to correct SWPPP work resulting from the Contractor's own operations or from the Contractor's negligence.

The approved cost break-down will be used to determine partial payments during the progress of the work and as the basis for calculating the adjustment in compensation for the item of water pollution control due to increases or decreases of quantities ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down item, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications. If an ordered change requires a new item which is not on the approved cost break-down, the adjustment in compensation will be determined in the same manner specified for extra work in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

If requested by the Contractor and approved by the Engineer, changes to the water pollution control practices listed in the approved cost break-down, including addition of new water pollution control practices, will be allowed. Changes shall be included in the approved amendment of the SWPPP. If the requested changes result in a net cost increase to the lump sum price for water pollution control, an adjustment in compensation will be made without change to the water pollution control item. The net cost increase to the water pollution control item will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

This project lies within the boundaries of the San Diego Regional Water Quality Control Board (RWQCB).

This project is subject to the requirements of the current Statewide General Permit issued by the SWRCB entitled "Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity," which regulates discharges of storm water and non-storm water from construction activities disturbing 0.4-hectare {one acre} or more of soil in a common plan of development. Sampling and analysis requirements as specified in SWRCB Resolution No. 2001-46 are added to the Statewide General Permit. Copies of the Statewide General Permit and modifications thereto are available for review from the SWRCB, Storm Water Permit Unit, 1001 "I" Street, P.O. Box 1977, Sacramento, California 95812-1977, Telephone: (916) 341-5254 and may also be obtained from the SWRCB internet website at:

<http://www.swrcb.ca.gov/stormwtr/construction.html>.

The Notice of Intent (NOI) and applicable fee will be filed by the Owner of this project. Copies of the NOI and Waste Discharge Identification Number can be obtained from the Engineer.

WORK WITHIN CITY RIGHT OF WAY

The State Water Resources Control Board (SWRCB) has issued a permit to the County of San Diego, the Incorporated Cities of San Diego, The San Diego Unified Port District, and the San Diego County Regional Airport Authority which governs storm water and non-storm water discharges from its properties, facilities and activities. The Municipal Permit is entitled: California Regional Water Quality Control Board, San Diego Region, Order No. R9-2007-0001, NPDES No. CAS0108758, Waste Discharge Requirements For Discharges of Urban Runoff From the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, The Incorporated Cities of San Diego County, The San Diego Unified Port District, and the San Diego County Regional Airport Authority. Copies of the Permit are available for review from SWRCB, Region 9, 9174 Sky Park Court, Suite 100, San Diego, CA 92123-4340, and may also be obtained from the SWRCB internet website at: <http://www.swrcb.ca.gov/rwqcb9>. This project may be subject to local ordinances issued by permittees and co-permittees to comply with Order No. R9-2007-0001.

This project shall conform to the permits and modifications thereto. The Contractor shall maintain copies of the permits at the project site and shall make them available during construction.

The Contractor shall know and comply with provisions of Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from the project site and areas of disturbance outside the project limits during construction. Attention is directed to Sections 7-1.01, "Laws to be Observed," 7-1.11, "Preservation of Property," and 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

The Contractor shall be responsible for penalties assessed on the Contractor or the owner as a result of the Contractor's failure to comply with the provisions in "Storm Water Pollution Prevention Program" of these special provisions or with the applicable provisions of the Federal, State, and local regulations and requirements. If project documentation, including but not limited to site inspection checklists and correspondence to the contractor, shows that the contractor is in compliance with the project SWPPP, the Engineer may waive contractor responsibility for penalties.

Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the owner or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

WITHHOLDS

The Engineer will withhold money due the Contractor, in an amount determined by the Engineer, up to and including the entire amount of penalties proposed, assessed, or levied as a result of the Contractor's violation of the permits, or Federal or State law, regulations, or requirements. Funds will be withheld by the owner until final disposition of penalties has been made. The Contractor shall remain liable for the full amount of penalties until they are finally resolved with the entity seeking the penalties.

If a regulatory agency identifies a failure to comply with the permits and modifications thereto, or other Federal, State, or local requirements, the Engineer will withhold money due the Contractor, subject to the following:

- A. The Engineer will give the Contractor 30 days' notice of the Engineer 's intention to withhold funds from payments, which may become due to the Contractor before acceptance of the contract. Funds withheld after acceptance of the contract will be made without prior notice to the Contractor.
- B. No withholds of additional amounts out of payments will be made if the amount to be withheld does not exceed the amount being withheld from partial payments in accordance with Section 9-1.06, "Partial Payments," of the Standard Specifications.
- C. If the Engineer has withheld funds, and it is subsequently determined that the State is not subject to the entire amount of the costs and liabilities assessed or proposed in connection with the matter for which the withhold was made, the Engineer will be liable for interest on the amount withheld for the period of the withhold. The interest rate payable shall be 6 percent per annum.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the owner shall provide copies of correspondence, notices of violation, enforcement actions, or proposed fines by regulatory agencies to the requesting regulatory agency.

10-15.16 TEMPORARY CHECK DAM

Temporary check dam shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan in conformance with "Storm Water Pollution Prevention Program" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary check dam shall be one of the water pollution control practices for sediment control. The Storm Water Pollution Prevention Plan shall include the use of temporary check dam.

Fiber roll or gravel bag temporary check dam shall be placed as shown on the plans.

MATERIALS

Fiber Roll

Fiber roll materials shall conform to the provisions specified for fiber roll materials in "Temporary Fiber Roll" of these special provisions.

Gravel-filled Bag

Gravel-filled bag shall conform to the provisions specified for gravel bag in "Temporary Drainage Inlet Protection" of these special provisions.

INSTALLATION

Temporary check dam shall be installed as follows:

- A. Temporary check dam (Fiber Roll): Rope and notched stakes shall be used to restrain the fiber rolls against the surface of the unlined ditch or swale. Stakes shall be driven into the slope until the notch is even with the top of the fiber roll. Rope shall be knotted

at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the fiber roll tightly to the slope. Furrows will not be required. If metal stakes are used, the rope may be laced and knotted on the bend at the top of the metal stakes.

- B. Temporary check dam (Gravel Bag): A single layer of gravel bags shall be placed in lined or unlined ditches with ends abutted tightly and not overlapped.
- C. The bedding area for the temporary check dam shall be cleared of obstructions including, but not limited to, rocks, clods, and debris greater than 25 mm (1 in.) in diameter prior to installation.
- D. Temporary check dam shall be installed across and approximately perpendicular to the centerline of ditch or drainage line.
- E. Temporary check dam shall be installed with sufficient spillway depth to prevent flanking of concentrated flow around the ends of the check dams.
- F. Temporary check dam shall be installed in an unlined ditch or swale prior to the application of other temporary erosion control or soil stabilization materials in the same unlined ditch or swale.

Details for an alternative temporary check dam shall be submitted to the Engineer for approval at least 7 days prior to installation.

When the temporary check dam is no longer required, as determined by the Engineer, temporary check dam shall become the property of the Contractor and be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbances, including holes and depressions caused by the installation and removal of the temporary check dam shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary check dam shall be maintained to provide sediment holding capacity and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping fiber rolls shall be repaired with additional stakes or replaced. Gravel bags shall be replaced when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out. Locations where rills and other evidence of concentrated runoff have occurred beneath the check dams shall be corrected.

When sediment exceeds one-third the height of the check dam above ground, or when directed by the Qualified SWPPP Practitioner (QSP), sediment shall be removed. The removed sediment shall be deposited within the project limits in such a way that the sediment is not subject to erosion by wind or by water.

Temporary check dam shall be repaired or replaced on the same day the damage occurs. Washouts or scour beneath the temporary check dam shall be repaired. Temporary check dam damaged during the progress of work or resulting from the Contractor's vehicles, equipment, or operations shall be repaired or replaced at the Contractor's expense.

Measurement and Payment

The quantity of temporary check dam to be paid for will be measured by the linear foot along the centerline of the installed check dam.

The contract price paid per linear foot for "Temporary Check Dam" shall include full compensation for furnishing all labor (except maintenance), materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary check dam, complete in place, including removal of temporary check dam, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No adjustment of compensation will be made for any increases or decreases in the quantities of temporary check dam, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the item of temporary check dam.

The cost of maintaining the temporary check dam will be borne equally by SANDAG and the Contractor.

The division of cost will be made by determining the cost of maintaining temporary check dam in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost. Clean-up, repair, removal, disposal, replacement because of improper installation, and replacement of temporary construction check dam damaged as a result of the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-15.17 TEMPORARY FIBER ROLL

Temporary fiber roll shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan in conformance with "Storm Water Pollution Prevention Program" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Attention is directed to "Storm Water Pollution Prevention Program" of these special provisions.

Temporary fiber roll shall be one of the water pollution control practices for sediment control. The Storm Water Pollution Prevention Plan shall include the use of temporary fiber roll.

At the option of the Contractor, temporary fiber roll shall be Type 1 or Type 2.

MATERIALS

Fiber Roll

Fiber roll shall be one of the following:

- A. Fiber roll shall be constructed with a pre-manufactured blanket consisting of one material or a combination of materials consisting of wood excelsior, rice or wheat straw, or coconut fibers. The blanket shall be between 2.0 m (6.6 ft.) and 2.4 m (8 ft.) in width and between 20 m (66 ft.) and 29 m (95 ft.) in length. Wood excelsior shall be individual

fibers, of which 80 percent shall be 150 mm (6 in.) or longer in length. The blanket shall have a photodegradable plastic netting or biodegradable jute, sisal or coir fiber netting on at least one side. The blanket shall be rolled along the width and secured with jute twine spaced 2 m (6.6 ft.) apart along the full length of the roll and placed 150 mm (6 in.) from the ends of each roll. The finished roll shall be between 200 mm (8 in.) and 250 mm (10 in.) in diameter, between 3 m (10 ft.) and 6 m (20 ft.) in length and shall weigh at least 0.81-kg/m (0.5 lb/ft.). More than one blanket may be required to achieve the finished roll diameter. When more than one blanket is required, blankets shall be jointed longitudinally with an overlap of 150 mm (6 in.) along the length of the blanket.

- B. Fiber roll shall be a pre-manufactured roll of rice or wheat straw, wood excelsior or coconut fiber encapsulated within a photodegradable plastic or biodegradable jute, sisal or coir fiber netting. Rolls shall be between 200 mm (8 in.) and 250 mm (10 in.) in diameter, between 3 m (10 ft.) and 6 m (20 ft.) in length and shall weigh at least 1.6 kg/m (1.0 lb/ft.). The netting shall have a minimum durability of one year after installation. The netting shall be secured tightly at each end of the rolls.

Stakes

Wood stakes shall be a minimum of 19 mm (0.75 in.) x 19 mm (0.75 in.) in size for Type 1 installation, or shall be a minimum of 19 mm (0.75 in.) x 38 mm (1.5 in.) in size for Type 2 installation, and sufficient length as shown on detail. Stakes shall be driven to a maximum of 50 mm above, or flush with the top of the roll. Wood stakes shall be untreated fir, redwood, cedar, or pine, shall be cut from sound timber, and shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes may be used as an alternative. The Contractor shall submit a sample of the metal stake for Engineer's approval prior to installation. The tops of the metal stakes shall be bent at a 90-degree angle.

Rope

Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 6.35 mm.

INSTALLATION

Temporary fiber roll shall be installed as follows:

- A. Temporary fiber roll (Type 1): Furrows shall be constructed to a depth between 50 mm (2 in.) and 100 mm (4 in.) , and to a sufficient width to hold the fiber rolls. Stakes shall be installed 600 mm (24 in.) apart along the length of the fiber rolls and stopped at 300 mm from each end of the rolls. Stakes shall be driven to a maximum of 50 mm (2 in.) above, or flush with, the top of the roll.
- B. Temporary fiber roll (Type 2): Rope and notched stakes shall be used to restrain the fiber rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the fiber roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the fiber roll tightly to the slope. Furrows will not be required. If metal stakes are used, the rope may be laced and knotted on the bend at the top of the metal stakes.

- C. Temporary fiber roll shall be installed as shown on the plans.
- D. The bedding area for the fiber roll shall be cleared of obstructions including, but not limited to, rocks, clods, and debris greater than 25 mm (1.0 in.) in diameter prior to installation.
- E. Temporary fiber roll shall be installed approximately parallel to the slope contour.
- F. Temporary fiber roll shall be installed prior to the application of other temporary erosion control or soil stabilization materials in the same area.

When no longer required, as determined by the Engineer, temporary fiber roll shall become the property of the Contractor, and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbances, including holes and depressions, caused by the installation and removal of the temporary fiber roll shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary fiber roll shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping fiber rolls shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected.

Temporary fiber roll shall be repaired or replaced on the same day when the damage occurs. Damage to the temporary fiber rolls resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

Measurement and Payment

The quantity of temporary fiber roll to be paid for will be measured by the linear foot, along the centerline of the installed roll. Where temporary fiber rolls are joined and overlapped, the joint will be measured as a single installed roll.

The contract price paid per linear foot for "Temporary Fiber Roll" shall include full compensation for furnishing all labor, (except maintenance), materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary fiber roll, complete in place, including furrow excavation and backfill, and removal of temporary fiber roll, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary fiber roll required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to temporary fiber roll.

The cost of maintaining the temporary fiber roll will be borne equally by SANDAG and the Contractor.

The division of cost will be made by determining the cost of maintaining temporary fiber roll in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost. Clean-up, repair, removal, disposal, replacement because of improper installation, and replacement of temporary fiber roll damaged as a result of the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-15.18 TEMPORARY DRAINAGE INLET PROTECTION

Temporary drainage inlet protection shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan in conformance with "Storm Water Pollution Prevention Program" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary drainage inlet protection shall be one of the water pollution control practices for sediment control. The Storm Water Pollution Prevention Plan shall include the use of temporary drainage inlet protection.

MATERIALS

Geotextile

Geotextile blanket for temporary drainage inlet protection shall conform to the provisions in Section 88-1.04, "Rock Slope Protection Fabric," of the Standard Specifications for rock slope protection fabric (Type A).

Gravel Bag

Gravel bag fabric for temporary drainage inlet protection shall be non-woven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:

Specification	Requirements
Mass per unit area, grams per square meter, min. ASTM Designation: D 5261	270 g/M ² (0.05 lb/sf)
Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632*	0.89 kN (200 lbf)
Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method	70%

* or appropriate test method for specific polymer

Gravel bags shall be between 600 mm (24 in.) and 800 mm (32 in.) in length, and between 400 mm (16 in.) and 500 mm (20 in.) in width.

Yarn used for binding gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color.

Gravel shall be between 10 mm (0.40 in.) and 20 mm (0.80 in.) in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg (29 lb.) and 22 kg (48 lb.) in mass.

INSTALLATION

Temporary drainage inlet protection shall be installed at drain inlets in paved and unpaved areas as follows:

- A. Temporary drainage inlet protection shall be installed such that ponded runoff does not encroach into the traveled way or overtop the curb or dike. Gravel-filled bags shall be placed to control ponding and prevent runoff from overtopping the curb or dike.
- B. The bedding area for the temporary drainage inlet protection shall be cleared of obstructions including, but not limited to, rocks, clods, and debris greater than 25 mm (1 in.) in diameter prior to installation.
- C. Temporary drainage inlet protection: Erosion control blanket or geotextile fabric shall be secured with staples and embedded into a trench adjacent to the drainage inlet. Gravel-filled bags shall be staked in rows two layers high in a pyramid configuration to form a gravel bag barrier centered over the perimeter of the erosion control blanket or geotextile fabric. The gravel-filled bags shall be placed so that the bags are tightly abutted and overlap the joints in adjacent rows. A spillway shall be created by removing one or more gravel-filled bags from the upper layer of the gravel bag barrier.

The Contractor shall select the appropriate drainage inlet protection in conformance with the details to meet the field condition around the drainage inlet. For all other drainage inlets within the project limits that do not conform to the details shown on the plans, the Contractor shall submit to the QSP for approval, provisions for providing temporary drainage inlet protection.

Details for an alternative temporary drainage inlet protection shall be submitted to the QSP for approval at least 7 days prior to installation.

Throughout the duration of the Contract, the Contractor shall be required to provide protection to meet the changing condition of the drainage inlet.

When the temporary drainage inlet protections are no longer required, temporary drainage inlet protection materials shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Holes, depressions or other ground disturbance caused by the removal of the temporary drainage inlet protection shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary drainage inlet protection shall be maintained to provide sediment holding capacity and to reduce runoff velocities and as follows:

- A. Gravel-filled bags shall be replaced when the bag material ruptures and allows the contents to spill out, or when the geotextile fails and allows the bag contents to spill out.
- B. Locations where rills and other evidence of concentrated runoff have occurred beneath the gravel bag barriers shall be corrected.

- C. Sediment deposits, trash and debris shall be removed from temporary drainage inlet as described in this special provision or as directed by the QSP. Removed sediment shall be deposited within the project limits in such a way that the sediment is not subject to erosion by wind or by water. Trash and debris shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.
- D. Temporary drainage inlet protection: Sediment deposits shall be removed when the deposit reaches one-third the height of the gravel bag barrier or one-half the height of the spillway; whichever is less. Sediment in excess of 50 mm above the surface of the erosion control blanket or geotextile fabric shall be removed.

Temporary drainage inlet protection shall be repaired or replaced on the same day when the damage occurs. Damage to the temporary drainage inlet protection resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

Measurement and Payment

The quantity of temporary drainage inlet protection to be paid for will be measured by the unit as determined from actual count in place. The protection is measured one time only and no additional measurement is recognized and no additional compensation made if the temporary drainage inlet protection changes during the course of construction.

The contract unit price paid for "Temporary Drainage Inlet Protection" shall include full compensation for furnishing all labor, (except maintenance), materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the temporary drainage inlet protection, complete in place, including removal of materials, and backfilling and repairing holes, depressions and other ground disturbance, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary drainage inlet protection required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to temporary drainage inlet protection.

The cost of maintaining the temporary drainage inlet protection will be borne equally by SANDAG and the Contractor. The division of cost will be made by determining the cost of maintaining temporary drainage inlet protection in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost. Clean-up, repair, removal, disposal, replacement because of improper installation, and replacement of temporary drainage inlet protection damaged as a result of the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-16 STRUCTURES (SOLDIER PILE WALL)

10-16.01 DESCRIPTION OF WORK

The structures work to be done consist, in general, of constructing the following structure types:

Soldier Pile and Lagging Wall PS3

10-16.02 EARTHWORK

10-16.02.1 GENERAL

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Surplus excavated material shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

If the Contractor elects to use the "Weep Hole and Geocomposite Drain" alternative where permitted on the plans, the geocomposite drain shall conform to the details shown on the plans and the following:

- A. Geocomposite wall drain shall consist of a manufactured core not less than 0.25 inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate through the drainage void of at least 2.0 gallons per minute per foot of width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 psf.
- B. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates for externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.
- C. Filter fabric for geocomposite wall drain shall conform to the provisions in Section 88-1.02, "Filtration," of the Standard Specifications. Filter fabric shall be Class A.
- D. The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.
- E. The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.
- F. The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.
- G. Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a minimum 6-inch overlap.
- H. Plastic pipe shall conform to the provisions for edge drain pipe and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.
- I. Treated permeable base to be placed around the slotted plastic pipe at the bottom of the geocomposite drain shall be cement treated permeable base conforming to the

provisions for cement treated permeable base in Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

- J. The treated permeable base shall be enclosed with a high density polyethylene sheet or PVC geomembrane, not less than 10 mils thick, that is bonded with a suitable adhesive to the concrete and geocomposite drain. Surfaces to receive the polyethylene sheet shall be cleaned before applying the adhesive. The treated permeable base shall be compacted with a vibrating shoe type compactor.

10-16.02.2 SOLDIER PILE WALL EARTHWORK

10-16.02.2.1 GENERAL

The Contractor shall submit to the Engineer working drawings, including design calculations, and a construction sequence for the proposed method of soldier pile wall construction for the site in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The drawings and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. One set of the drawings and construction sequence, and one copy of the design calculations, shall be furnished to the Engineer. The working drawings and construction sequence shall include, but not be limited to, defining order of work, traffic control, method of installation of soldier piles, method of placing lagging, limits of structure excavation lifts, and type of drilling and excavation equipment to be used. The Contractor shall allow 10 days after complete drawings and support data are submitted for the review and approval of the proposed method of soldier pile wall construction.

10-16.02.2.2 STRUCTURE EXCAVATION (SOLDIER PILE WALL)

Excavation and construction of the soldier pile wall shall proceed in lifts from the top of existing grade at the wall location down.

Care shall be taken in performing structure excavation (soldier pile wall) for placement of lagging such that a minimal void behind the lagging is required to be backfilled.

At the end of the work shift, lagging shall be in place the full height of the exposed excavation face.

10-16.02.2.3 STRUCTURE BACKFILL (SOLDIER PILE WALL)

Material for structure backfill behind lagging shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications. Structure backfill behind lagging shall be compacted by hand tamping, mechanical compaction, or other means approved by the Engineer.

Structure backfill in fill areas behind the lagging shall be keyed into the existing or excavated back slope.

Lean Concrete Backfill

Lean concrete backfill shall conform to the provisions for slurry cement backfill in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications, except that aggregate shall be sand suitable for making commercial quality concrete.

Lean concrete backfill in the portions of the drilled holes occupied by lagging and in front of the soldier pile flanges shall be removed as necessary to install lagging.

Concrete Backfill

Concrete backfill encasing the steel soldier piles below the lagging shall be Class 2 and shall contain not less than 505 pounds of cementitious material per cubic yard and shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

10-16.02.3 MEASUREMENT AND PAYMENT

Excavation and backfill made for soldier pile wall construction will be measured and paid for as "Structure Excavation (Soldier Pile Wall)" and "Structure Backfill (Soldier Pile Wall)," as specified for structure excavation and structure backfill in Section 19-3.07, "Measurement," and Section 19-3.08, "Payment," of the Standard Specifications.

"Lean Concrete Backfill" will be measured and paid for by the cubic yard as lean concrete backfill in the same manner specified for structure backfill in Section 19-3.07, "Measurement," and Section 19-3.08, "Payment," of the Standard Specifications.

Concrete backfill encasing steel soldier piles below the lagging shall be Class 2 and will be measured and paid for by the cubic yard as "Concrete Backfill" in the same manner specified for structure backfill in Section 19-3.07, "Measurement," and Section 19-3.08, "Payment," of the Standard Specifications.

Full compensation for removing lean concrete backfill shall be considered as included in the contract price paid per cubic yard for "Structure Excavation (Soldier Pile Wall)" and no additional compensation will be allowed therefore.

Full compensation for working drawings and construction sequence, and temporary supports and shoring, if required, for soldier pile wall construction shall be considered as included in the contract price paid per cubic yard for "Structure Excavation (Soldier Pile Wall)" and no additional compensation will be allowed therefore.

Full compensation for filter fabric shall be considered as included in the contract price paid per cubic yard for "Structure Backfill (Soldier Pile Wall)" and no additional compensation will be allowed therefore.

10-16.03 PILING

10-16.03.1 GENERAL

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Unless otherwise specified, welding of any work performed in conformance with the provisions in Section 49, "Piling," of the Standard Specifications, shall be in conformance with the requirements in AWS D1.1.

10-16.03.2 STEEL SOLDIER PILING

10-16.03.2.1 GENERAL

This work at retaining wall PS3 shall consist of furnishing and installing steel piling; securing the piling prior to and during concrete encasement; and shaping the tops of the piles in accordance with the details shown on the plans, and these special provisions.

10-16.03.2.2 CONSTRUCTION

Steel soldier piles shall be placed in a drilled hole and shall be plumbed and aligned before placing concrete backfill and lean concrete backfill. Alignment shall be maintained while placing backfill material in the drilled holes.

10-16.03.3 MEASUREMENT AND PAYMENT

Measurement and payment for steel soldier piles as shown on the plans shall conform to the provisions in Sections 49-6.01, "Measurement," and 49-6.02, "Payment," of the Standard Specifications and these special provisions.

The contract price paid per linear foot for "Steel Soldier Pile (W12x53)" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the steel soldier piles at the site to the required depth, including securing the piling to maintain accurate alignment prior to and during encasing the pile with concrete, shaping pile tops, and cutting holes for pile anchors, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-16.04 DRILLED HOLES

10-16.04.1 GENERAL

Holes for steel soldier piles shall be drilled into natural foundation materials at the location shown on the plans and shall conform to Section 49, "Piling," of the Standard Specifications and these special provisions.

Drilled holes shall be accurately located and shall be straight and true. When the piles are plumbed and aligned, the steel piles shall be at least one inch clear of the sides of the hole for the full length of the hole to be filled with concrete backfill and lean concrete backfill. Holes that do not provide the clearance around steel piles shall be reamed or enlarged at the Contractor's expense.

Temporary casings or tremie seals shall be furnished and placed where necessary to control water or to prevent caving of the hole.

Difficult drilling is anticipated due to the presence of caving soils, hazardous and contaminated materials, high ground water, cobbles and boulders, subsurface concrete debris, underground utilities, overhead utilities, and traffic control.

Loose materials existing at the bottom of the hole after drilling operations have been completed shall be removed before placing the pile.

Materials resulting from drilling holes shall be disposed of in conformance with the provisions in Section 19-2.06, "Surplus Material," of the Standard Specifications.

Surface water shall not be permitted to enter the hole and all water in the hole shall be removed before placing concrete therein.

Casing, if used in drilling operations, shall be removed from the hole as concrete is placed therein. The bottom of the casing shall be maintained not more than 5 feet nor less than one foot below the top of the concrete during casing withdrawal and concrete placing operations. Separation of the concrete during withdrawal operations shall be avoided by hammering or otherwise vibrating the casing. The methods used to withdraw temporary casings shall preclude contamination of the concrete and commingling of the soil and concrete or of any ground water and concrete.

If piles with larger diagonal dimensions are substituted for the piles shown on the plans, the Contractor shall, at the Contractor's expense, ream or enlarge the drilled hole to provide a hole diameter at least 4 inches larger than the diagonal dimension of the pile.

10-16.04.2 MEASUREMENT AND PAYMENT

Drilled holes shall be measured by linear foot for drilled hole of the diameter shown on the plans.

The contract price paid per linear foot of "Drilled Hole" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in drilling holes for soldier piles, including disposing of the material resulting from drilled holes, dewatering, casing holes and removing casing, and providing tremie seals, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-16.05 CONCRETE STRUCTURES

10-16.05.1 GENERAL

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Precast Concrete Quality Control" of these special provisions.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

Plastic pipe located at vertical drains used behind retaining walls, including horizontal or sloping drains down slopes and across sidewalk areas, shall be polyvinyl chloride (PVC) plastic pipe, Schedule 80, conforming to the provisions for pipe for edge drains and edge drain outlets in Section 68-3.02, "Materials," of the Standard Specifications. The vertical drain pipe shall be rigidly supported in place during backfilling operations.

10-16.05.2 PRECAST CONCRETE LAGGING

Precast concrete lagging (precast panels), consisting of reinforced concrete panels, shall conform to the details shown on the plans, the provisions in Sections 51, "Concrete Structures," 52,

"Reinforcement," and 90, "Portland Cement Concrete," of the Standard Specifications, and these special provisions.

Concrete for precast panels shall be minor concrete with concrete compressive strength as shown on the plans.

The precast panels shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," of the Standard Specifications or, at the option of the Contractor, the precast panels may be cured with a curing compound conforming to the requirements in ASTM Designation: C 309 Type 1, Class B.

Precast panels for soldier pile retaining wall are to be placed level.

10-16.05.3 MEASUREMENT AND PAYMENT

Precast concrete lagging shall be measured by square foot.

The contract price paid per square foot for "Precast Concrete Lagging" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and erecting precast concrete lagging for the soldier pile retaining wall, complete in place, including reinforcement, felt spacers, and expansion joint material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Concrete coping shall be measured by cubic yard.

The contract price paid per cubic yard for "Concrete Coping" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing minor concrete of concrete compressive strength shown on the plans for the concrete coping on Retaining Wall PS3, complete in place, including reinforcement, and expansion joint material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-16.06 REINFORCEMENT

10-16.06.1 GENERAL

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The provisions in "Welding Quality Control" of these special provisions do not apply to resistance butt welding.

10-16.06.2 MEASUREMENT AND PAYMENT

No separate measurement will be made for the requirements of this section.

Full compensation for reinforcement in structures shall be considered as included in the various items for Retaining Wall PS3 and no additional compensation will be allowed therefor.

10-16.07 TIMBER LAGGING

10-16.07.1 GENERAL

Timber lagging shall conform to the details shown on the plans and the provisions in Sections 57, "Timber Structures," and 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications and these special provisions.

All timber members shall be preservative treated Douglas fir of the grades shown on the plans. Timber members shall be full sawn to the dimensions shown on the plans.

Preservative treatment shall conform to AWWA Use Category System: UC4B, Commodity Specification A, except that chromated copper arsenate shall not be used.

Timbers 4 inches thick or less shall be installed with a 3/8-inch gap between lagging members except where shown on the plans. Timbers greater than 4 inches thick shall be installed with a 1/2-inch gap between lagging members except where shown on the plans.

10-16.07.2 MEASUREMENT AND PAYMENT

No separate measurement will be made for the requirements of this section.

Full compensation for timber lagging including furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the timber lagging, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be considered as included in the various items for Retaining Wall PS3 and no additional compensation will be allowed therefor.

10-16.08 CLEAN AND PAINT STEEL SOLDIER PILING

Steel piling surfaces shall be cleaned and painted in conformance with the provisions in Sections 59-2, "Painting Structural Steel," and 91, "Paint," of the Standard Specifications and these special provisions. Limits of the steel piling surfaces to be dry blast cleaned and shop primed with the inorganic zinc coating shall be as shown on the plans.

Clean and paint steel soldier piling shall consist of dry blast cleaning and painting steel soldier piles with an inorganic zinc undercoat prior to pile installation and field painting with final finish coats after pile installation and soldier pile wall excavation.

10-16.08.1 GENERAL

Proof of certification under the SSPC QP Certification Program must be submitted with your bid. Required certifications are as follows:

1. SSPC-QP 3, Enclosed Shop Facility or AISC Sophisticated Paint Endorsement Quality Program, P1-Enclosed.

Prior to performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

1. The name of each Contractor or subcontractor to be used.
2. One copy each of all current "SSPC: The Society for Protective Coatings" specifications or qualification procedures applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
3. A copy of the coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel, including testing methods and maximum allowable levels for soluble salts.
4. Proposed methods and equipment to be used.
5. Proof of each of any required certifications, SSPC-QP 1 and SSPC-QP 3.
 - a. In lieu of certification in conformance with the requirements in SSPC-QP 1 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.
6. Proposed methods to control environmental conditions in accordance with the manufacturer's recommendations and these special provisions.
7. Proposed methods to protect the coating during curing, shipping, handling, and storage.
8. Proposed rinse water collection plan.
9. A detailed paint repair plan for the repair of damaged areas.
10. Procedures for containing blast media and water during application of coatings and coating repair of erected steel.
11. Examples of proposed daily reports for all testing to be performed, including type of testing, location, lot size, time, weather conditions, test personnel, and results.

The Engineer shall have 20 days to review the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is reviewed by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The Engineer's review of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications.

The Contractor shall provide enclosures to permit cleaning and painting during inclement weather. Provisions shall be made to control atmospheric conditions inside the enclosures within suitable limits during cleaning and painting operations, drying to solvent insolubility, and throughout the curing period in accordance with the manufacturer's recommendations and these special provisions. Full compensation for providing and maintaining such enclosures shall be considered as included in the prices paid for the various contract items of work requiring paint and no additional compensation will be allowed therefor.

Fresh, potable water with a maximum chloride content of 75 ppm and a maximum sulfate content of 200 ppm shall be used for water rinsing or pressure washing operations. No continuous recycling of rinse water will be permitted. If rinse water is collected into a tank and subsequent testing determines

the collected water conforms to the specified requirements, reuse may be permitted by the Engineer if no collected water is added to the tank after sample collection for determination of conformance to specified requirements.

Open joints between concrete and painted or galvanized metal surfaces shall be caulked with a non-sag polysulfide or polyurethane sealing compound conforming to the requirements in ASTM Designation: C 920 or other approved material. The sealing compound shall be applied no sooner than 24 hours after the high pressure cleaning has been applied. The sealing compound shall be allowed to cure as recommended by the manufacturer prior to the water rinsing and application of the first finish coat. When no finish coats are applied, the sealing compound shall be gray in color.

10-16.08.2 CLEANING

All designated piling surfaces to be blast cleaned shall be dry blast cleaned in conformance with the requirements of SSPC-SP 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave all surfaces with a dense, uniform, angular, anchor pattern of not less than 1.6 mils nor more than 3.5 mils as measured in conformance with the requirements in ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning steel surfaces shall conform to the requirements for Class A, Grade 2 to 3 abrasives contained in SSPC-AB 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings," and shall not contain hazardous material.

Steel abrasives used for blast cleaning steel surfaces shall comply with the requirements in SSPC-AB 3, "Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings." If steel abrasive is recycled through shop or field abrasive blast cleaning units, the recycled abrasive shall conform to the requirements of SSPC-AB 2, "Specification for Cleanliness of Recycled Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings."

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material to be used on steel.

Abrasive blast cleaned surfaces shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the coating manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of abrasive blast cleaned steel shall be tested at the rate of 3 tests for the first 1000 square feet prepared per day, and one test for each additional 1000 square feet or portion thereof, at locations selected by the Engineer. When less than 1000 square feet of surface area is prepared in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.

10-16.08.3 PAINTING

Blast cleaned surfaces shall receive a single undercoat of an inorganic zinc coating and a minimum of 2 finish coats of an exterior grade latex paint supplied by the manufacturer of the inorganic zinc coating.

The single undercoat shall consist of an inorganic zinc coating conforming to the requirements in AASHTO Designation: M 300, Type I or Type II.

Type I primers selected for use shall meet the current applicable volatile organic compound limits for the air district in which the project is located.

Inorganic zinc rich primer shall be selected from the Department's Pre-Qualified Products List. The color of the final application of inorganic zinc coating shall match color no. 36373 of FTD-STD-595. Inorganic zinc coating shall be used within 12 hours of initial mixing.

Application of inorganic zinc coating shall conform to the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 8 hours of the start of blast cleaning. Abrasive blast cleaned steel shall not be exposed to relative humidity exceeding 85 percent prior to application of the inorganic zinc coating.

The total dry film thickness of all applications of the single undercoat of inorganic zinc coating shall be not less than 4 mils nor more than 8 mils.

Areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Steel surfaces coated with Type II inorganic zinc coating shall be protected from conditions that may cause the coating film to dissolve. The Contractor, at the Contractor's expense, shall repair areas where the coating has dissolved by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The Contractor shall test the inorganic zinc coating prior to application of finish final coats. The locations of the tests will be determined by the Engineer. The sequence of the testing operations shall be determined by the Contractor. The testing for adhesion and hardness will be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. Satisfactory access shall be provided to allow the Engineer to determine the location of the tests.

The inorganic zinc coating shall pass the following tests:

1. The inorganic zinc coating shall have a minimum adhesion to steel of 600 psi when measured at no more than 3 locations on each pile using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. If 2 or more of the locations tested fail to meet adhesion requirements, the entire area represented by the tests will be rejected. If one of the locations tested fails to meet adhesion requirements, an additional 3 locations shall be tested. Should any of the additional locations fail to meet adhesion requirements, the entire area represented by the tests will be rejected.

The Contractor, at the Contractor's expense, shall repair the rejected area by blast cleaning and repainting with inorganic zinc to the specified thickness. Test locations for areas of inorganic zinc meeting adhesion testing requirements shall be repaired by application of organic zinc primer as specified in Section 91-1.04, "Materials," of the Standard Specifications to the specified minimum dry film thickness.

2. Areas of inorganic zinc coating where finish coats are to be applied shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of inorganic zinc coating shall be tested at the rate of 3 tests for the first 1000 square feet to be painted per day and one test for each additional 1000 square feet or portion thereof at locations selected by the Engineer. When less than 1000 square feet of surface area is painted in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.
3. Prior to application of final finish coats, the inorganic zinc coating shall exhibit a solid, hard, and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft, or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Water Borne Inorganic Zinc Primers

1. The surface pH of the inorganic zinc primer shall be tested by wetting the surface with deionized water for a minimum of 15 minutes but no longer than 30 minutes and applying pH paper with a capability of measuring in increments of 0.5 pH units. At least 2 surface pH readings shall be taken for every 500 square feet or portion thereof. If less than 500 square feet of steel is coated in a single shift or day, at least 2 surface pH readings shall be taken for primer applied during that period. Application of finish coats will not be permitted until the surface pH is less than or equal to 7.
2. Dry to solvent insolubility for water borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752, except that water shall be the solvent. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 500 square feet or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Solvent Borne Inorganic Zinc Primers

1. Dry to solvent insolubility for solvent borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 500 square feet or portion thereof. Inorganic zinc

coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

2. Surface hardness of solvent borne inorganic zinc shall be a minimum 2H when measured in conformance with the requirements in ASTM Designation: D 3363. Areas of inorganic zinc coating shall be tested at the rate of one test per 500 square feet or portion thereof. Inorganic zinc coating that fails to meet the surface hardness requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The Contractor, at the Contractor's expense, shall retest all rejected areas of inorganic zinc coating after repairs have been completed.

Exposed areas of inorganic zinc coating at locations to receive finish coats, as shown on the plans, shall be pressure rinsed in conformance with the requirements in Section 59-1.03, "Application," of the Standard Specifications and these special provisions. Areas of the coating that are removed by the pressure rinsing shall be reapplied in conformance with the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications and these special provisions. Except as approved by the Engineer, a minimum time of 72 hours shall be allowed between applications of inorganic zinc coating and pressure rinsing.

After installation of the piling, surfaces of steel piling shall receive a minimum of 2 finish coats of an exterior grade latex paint supplied by the manufacturer of the inorganic zinc coating at the locations and to the limits shown on the plans.

The first finish coat shall be applied within 48 hours following water rinsing and passing the soluble salt testing requirements herein.

The finish coat paint shall be formulated for application to inorganic zinc coating, shall meet the requirements for SSPC-Paint 24, "Latex Semi-Gloss Exterior Topcoat," of the "SSPC: The Society for Protective Coatings," and shall conform to the following:

1. No visible color change in the finish coats shall occur when tested for 800 hours in conformance with the requirements in ASTM Designation: D 4587, Test Cycle 2.
2. The vehicle shall be an acrylic or modified acrylic copolymer with a minimum of necessary additives.

The first finish coat shall be applied in 2 applications. The first application shall consist of a spray applied mist application. The second application shall be applied after the mist application has dried to a set to touch condition as determined by the procedure described in Section 7 of ASTM Designation: D 1640. The first finish coat color shall match color no. 36628 of FTD-STD-595. The total dry film thickness of both applications of the first finish coat shall be not less than 2 mils.

Except as approved by the Engineer, a minimum drying time of 12 hours shall be allowed between finish coats.

The second finish coat color shall match color no. 26408 of FTD-STD-595. The total dry film thickness of the applications of the second finish coat shall be not less than 2 mils.

The 2 finish coats shall be applied in 3 or more applications to a total dry film thickness of not less than 4 mils nor more than 8 mils.

The total dry film thickness of all applications of inorganic zinc coating and finish coat paint shall be not less than 8 mils nor more than 14 mils.

10-16.08.4 REPAIR

For damaged areas of the undercoat, the following apply:

1. If the Engineer determines the damaged area is more than 2 percent of the total undercoated surface, the Contractor shall blast clean and repaint damaged areas with inorganic zinc to the specified thickness before erection.
2. If the Engineer determines the damaged area is 2 percent or less of the total undercoated surface, the Contractor may wire brush the damaged surfaces to remove loose or cracked coating and apply 2 coats of organic zinc-rich primer before erection.

The Contractor shall take precautions in order to protect the exposed exterior flange and flange edges of the soldier piles from the lean concrete and other surface contamination in order to minimize the work required to prepare the surface for the finish coats.

After pile installation and after the removal of lean concrete from the exposed surfaces, areas where the inorganic zinc coating has been damaged or has deteriorated shall be thoroughly cleaned, foreign substances shall be removed, and surfaces shall be spot painted with the same inorganic zinc coating to the specified thickness. Damaged areas of inorganic zinc coating shall be blast cleaned and painted as specified in these special provisions.

10-16.08.5 MEASUREMENT AND PAYMENT

Clean and paint steel soldier piling shall be measured by lump sum.

The contract lump sum price paid for "Clean and Paint Steel Soldier Piling" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in cleaning and painting piling, complete in place, including water rinsing, testing of inorganic zinc coating, and the protecting, cleaning and repair of surfaces prior to and after pile installation, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-17 SITE WATER FACILITIES

10-17.01 TRENCH EXCAVATION, PIPE BEDDING, AND TRENCH BACKFILL

Excavation and backfill for water mains shall conform to Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications and these Special Provisions, Sweetwater Authority Water Agency Standards (WAS) 2008 and the details shown on the plans.

MEASUREMENT AND PAYMENT

Full compensation for trench excavation and backfill, pipe bedding, and trench backfill shall be considered included in the contract prices paid for the various related items of water work and no separate payment will be allowed therefore.

10-17.02 RELOCATE EXISTING FIRE HYDRANT

MATERIALS

The Contractor shall unbolt, remove and salvage the existing fire hydrant, remove existing piping and thrust blocks up to the gate valve, protect the existing valve in place and adjust the valve cover to the proposed grade. The contractor shall construct new piping, spool, riser, thrust blocks, flanges and other appurtenances as needed to relocate the fire hydrant to the new location shown on the plans. The fire hydrant and other components shall be re-installed in accordance with the Sweetwater Authority Water Agency Standards (WAS) 2008 and these Special Provisions. The contractor shall coordinate the fire hydrant relocation with the Sweetwater Authority and the National City Fire Department. Pipe size for the lateral shall match the existing pipe size. A copy of the WAS is available at www.sdwas.com.

MEASUREMENT AND PAYMENT

“Relocate Existing Fire Hydrant” will be measured per each.

The contract unit price paid for “Relocate Existing Fire Hydrant” shall include full compensation for furnishing all labor, materials, tools, equipment, disposal of excess material and incidentals, and for doing all the work involved in installing the fire hydrant, complete in place, including thrust and support blocks, vertical piping, flanges, protection bollards and testing as shown in the plans and as specified by these Special Provisions and the Water Agency Standards and as directed by the Engineer.

END OF SECTION 10

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See Section 10, Attachment A
(Download this attachment separately. It is posted on www.sandag.org/contracts with the other documents for this IFB.)