

SECTION F
DOWNTOWN IMPROVEMENT PROJECT – PHASE II, BID NO. 16-01
IN THE CITY OF LAKEPORT, CALIFORNIA

SPECIAL PROVISIONS - 700 SERIES

SPECIAL PROVISIONS
DOWNTOWN IMPROVEMENT PROJECT – PHASE II, BID NO. 16-01

700 RESPONSIBILITIES OF THE CONTRACTOR

700-1 STAFFING AND RESOURCES

1. The Contractor commits to providing the manpower and equipment necessary to accomplish the work in the designated contract schedule and time frame. Unless it can be demonstrated prior to starting work that the Contractor can accomplish the work in fewer work hours, the Contractor’s workforce shall work a minimum 10 hour day between Sunday night and Thursday night. Work shifts up to 12 hours (6 AM) are permitted.
2. If the Contractor falls behind in the work schedule accomplishment, additional resources shall be provided to return the work to schedule.

700-2 PROJECT SCHEDULE

The following dates/milestones shall be incorporated into the CONTRACTOR’S schedule.

Activity	Tentative Date
Potholing and Preparation Work	April 20-April 28
West Side – 2 nd to 3 rd Street	May 1-May 12
West Side – 3 rd to End of Project past 4 th	May 15-May 27
East Side – End of Project past 4 th to 3 rd	May 30-June 9(Except Memorial Day – i.e. Sunday Night)
East Side – 3 rd to 2 nd	June 12-June 24
East Side – 2 nd to End of Project past 1 st	June 26-June 30 & July 5 – July 8
West Side – End of Project past 1 st to 2 nd	June 19 through June 30
July 4 th Break – No Work	July 3 through July 8th
Paving Work	July 10 through July 17
Tree Planting and Irrigation	July 10 through July 28
Pavement Markings	July 29 through August
Project Completion	August 8

Contractor shall provide a work schedule to the ENGINEER, in accordance with Section 6-1.2, demonstrating how they will accomplish this schedule.

700-3 EMERGENCY INFORMATION

The Contractor shall provide the following information in writing and submit it with the signed contract, contract bonds and certificates of insurance. Failure to comply may result in delays in the processing of the contract documents.

1. Name of authorized representative at the job site.
2. Address and telephone number where the above person can be reached 24 hours a day.
3. Address of the nearest office of the Contractor and the name and telephone number of a person at that office who is familiar with the project.
4. Address and telephone number of the Contractor’s main office and the name and telephone number of the person at that office familiar with the project.

700-3 SUBMITTALS

The Contractor shall provide the following submittals prior to the preconstruction meeting.

Traffic Control Plan
Emergency Contact List
Project Superintendent
Project Manager
Daytime Project Monitor
Night Time Public Safety Person
SWPPP
Subcontractor Request List
Contractor's Equipment List
Submittals included in Technical Sections

700-4 ORDER OF WORK

The Contractor shall phase the Work according to the following:

1. GENERAL
 - a. The purpose of the order of work is to provide a predictable sequence of construction to the community and business owners in or near the project area.
 - b. Unless unknown conditions arise which prevents compliance with the order of work and designated project phasing, the order of work shall be followed as outlined.
2. CONCRETE TEST PANEL
 - a. Construct concrete test panel in accordance with 704-1.4.G
3. POTHOLING OF BUILDING SEWER AND WATER SERVICES and OTHER UTILITIES
 - a. The existing water service and sewer laterals shall be located at the building walls as the first priority of work. Location information shall include horizontal and vertical information.
 - b. Building service and other potholing information shall immediately be recorded on a set of Record Drawing in red pen to be kept continuously at the project site and available to City staff.
 - c. No demolition work for concrete replacement shall occur on any block until all of the building services on that block are located.
 - d. All of the building service locations shall be completed 7 calendar days prior to demolition and be completed for all phases within 30 working days.
4. SIDEWALK DEMOLITION AND REPLACEMENT
 - a. The new curb, gutter and sidewalk shall be demolished and replaced in the following phasing sequence;
 - i. West Side – 2nd to 3rd Street
 - ii. West Side – 3rd to End of Project past 4th
 - iii. East Side – End of Project past 4th to 3rd
 - iv. East Side – 3rd to 2nd
 - v. East Side – 2nd to End of Project past 1st
 - vi. West Side – End of Project past 1st to 2nd
 - b. Parking within the project limits shall be eliminated and pedestrian access provided from the nearest parking spaces to the business while each phase is in progress, from demolition of concrete until the sidewalks are complete and open to foot traffic.
 - c. Sidewalk opened to foot traffic shall be protected with a cardboard product such

as RAM board if the time between placement and opening is less than 72 hours. The open sidewalk along the buildings may be limited to a 5 foot width until 72 hours after placement.

5. UTILITY WORK

- a. Utility Work under the new curb, gutter and sidewalk shall be completed prior to or in conjunction with demolition and replacement of the sidewalk.
- b. All building service replacement shall be coordinated with the property owner, tenant and City staff at least 24 hours prior to disconnection of sewer or water service.
- c. All building services shall be operational between 8 AM and 6 PM each day. If necessary, the Contractor shall provide temporary services acceptable to the business tenants and the City. The restaurants and bars will need service later, up to 2 AM.
- d. Utility work is not constrained by the concrete work phasing. Work may occur anywhere within the project limits provided the required traffic control is in place.

6. IRRIGATION SYSTEM

- a. The existing irrigation may be shut off until the entirety of the new irrigation system is tested and commissioned.

7. STREET LIGHTS

- a. The existing street light system shall be maintained in operation as provided herein.
- b. While the contractor has working lighting in place at night, the street lights maybe turned off.
- c. One block on one side may be turned off during nights when no work is to be performed (Friday, Saturday and Holiday nights).
- d. If the required lighting is not available, the Contractor shall provide temporary lighting.

8. COLD PLANING AND PAVING

- a. The cold planing shall not occur until all of the concrete and utility work is complete.
- b. Additional pavement removals shall be marked after the cold planning is complete. Markings shall not be performed until the next day after grinding is complete.
- c. Additional milled areas shall be repaved the same night as removed.

9. TREE PLANTING

- a. If trees are planted after paving, both the surrounding concrete and paving shall be protected from mechanical damage and staining by covering with a physical barrier sufficient to protect from damage. Damaged concrete shall be replaced.

700-5 BID ITEM DESCRIPTIONS

700-5.1 BID ITEM 1 – MOBILIZATION

- A. Scope of Work
 - 1. Costs associated to mobilize crew and equipment
 - 2. Set up storage yard, fencing, security, etc.
 - 3. Provide Construction Water
 - 4. Other initial costs not covered by other items
- B. Payment
 - 1. Lump Sum
 - 2. If lump sum bid item is less than 5% of the total bid:

- a. 75% paid on first progress payment
- b. 25% on second pay estimate
- 3. If lump sum bid item is more than 5% of total bid:
 - a. 3.75% of bid paid on first pay estimate
 - b. 1.25% on second pay estimate
 - c. Remainder at final payment

700-5.2

BID ITEM 2 – TRAFFIC & PEDESTRIAN CONTROL (TPCP)

A. Scope of Work

- 1. Preparation of Traffic & Pedestrian Control Plan by Civil Engineer based on conceptual drawings included in plans.
- 2. Installation and maintenance of TPCP
- 3. **Night Time** - Full-time dedicated “Public Safety” person during work shift to perform the following tasks:
 - a. Assure that all features of the TPCP are in place and working at all times during work.
 - b. Monitor pedestrian traffic, particularly business on Main Street while open during work hours. Assist pedestrian safe access from businesses to out of work area.
 - c. Provide guidance and assistances to any emergency vehicles or personnel.
 - d. Person shall wear a reflective vest or coat with both the Contractor logo and “Public Safety” on back and first name on front at all times.
 - e. Have authority and capacity to make any correction deemed necessary immediately.
- 4. **Day Time** – Full time person on or around work site on each day after a night shift where work performed or site changed for any reason. The following shall be minimum responsibilities:
 - a. Assure safe access of pedestrians to stores within project area from parking or side streets. This includes assuring that any obstruction in the sidewalk area are clearly and safely delineated. Also assure minimum 5 foot walkway maintained on all sidewalks where replacement work is either completed or yet not started. Assure that plywood covers over trenches are secured.
 - b. Assure that street is open and safe for traffic. This includes temporary signage, plating over uncompleted trenches.
 - c. Take daily photographs and prepare a daily report to document site conditions during non-working hours.
 - d. Coordinate with night shift safety person to rectify any problems noted or changes which need to be made.
 - e. Coordinate work schedule daily with business owners to be affected by work.
 - f. Coordinate with City staff regarding any issues encountered during previous work shift and requests for assistance, information necessary for upcoming work shift.
 - g. Person shall wear a reflective vest or coat with both the Contractor logo and “Public Information” on back and first name on front at all times.
 - h. Have authority and capacity to immediately correct any problems with public safety or access.
 - i. Person may have other duties which do not interfere with completion of the above tasks.
- 5. The Main Streets and Armstrong through 5th streets shall be swept after the completion of the work shift and prior to 8 AM each day after a shift

is worked. All streets shall be swept to at least a block past project limits. If any spillage is noted, all spillage shall be immediately swept and removed.

6. Immediately remove from street or sidewalk unused or no longer required.
7. Signs and barricades used to close off work area may be stored on sidewalk or in a parking stall at each closure location as designated by the City.

B. Payment

1. Lump Sum
2. 20% of item on first pay estimate not to exceed \$15,000
3. Remainder based percentage of completion by contract time.
4. If time extensions granted, prorated daily amount will be added from traffic control to cover additional traffic control costs.

705-5.3

BID ITEM 3 - POTHOLE EXISTING UTILITIES

A. Scope of Work

1. Locate existing sewer laterals and water services at each building wall to determine necessary tie-in work.
2. Obtain details of City potholing prior to performing work.
3. Pothole other utility work as necessary to assure that work can be completed as designed or to reveal conflicts.

B. Payment

1. Lump Sum
2. Payment based on percentage work completed on a block by block basis.

705-5.4

BID ITEM 4 - EROSION CONTROL AND SWPPP

A. Scope of Work

1. Prepare SWPPP by QSD
2. Implement by QSP
3. Provide monitoring reports on a weekly basis
4. Removal of BMP's at catchbasins shall be under City supervision

B. Payment

1. Lump Sum
2. 15% on Implementation
3. Remainder based percentage of completion by contract time.

705-5.5

BID ITEM 5 - CONSTRUCTION STAKING

A. Scope of Work

1. All surveying as outlined in these Special Provisions
2. Copy of all cut sheets to be provided to City prior to work
3. Maintain/Restore as necessary.
4. Provide restoration of all permanent survey markers as required by California Law.

B. Payment

1. Lump Sum
2. 75% on Initial Completion of Staking
3. 25% upon completion of all Concrete Work

705-5.6

BID ITEM 6 - SHEETING, SHORING AND BRACING

A. Scope of Work

1. Provide trench safety plan for all excavations exceeding 5 foot in depth in accordance with applicable laws and requirements
2. Implement trench safety plan
3. Provide safe access for inspection personnel at all times.

B. Payment

1. Lump Sum

2. Prorated based on percentage of completion of work with 5 feet or greater depth.

705-5.7 BID ITEM 7 - REMOVE, SALVAGE, STORE AND REPLACE BUS SHELTER

A. Scope of Work

1. Remove, salvage, store and replace bus shelter as indicated on the plans
2. Remove immediately prior to concrete replacement work in front of Museum Park.
3. Replace upon completion of concrete replacement in front of Museum Park.

B. Payment

1. Paid for by unit price per each
2. 100% upon reinstallation.

705-5.8 BID ITEM 8 – REMOVE, SALVAGE, STORE AND REPLACE MEMORIAL PLAQUES

A. Scope of Work

1. Remove, salvage, clean and store plaques by light poles. See demolition plan
2. Reinstall plaque near original location adjacent to light pole with concrete sidewalk replacement. Clean.

B. Payment

1. Paid for by unit price per each
2. Paid on reinstallation.

705-5.9 BID ITEM 9 - REMOVE AND SALVAGE SIGNS AND STREET FURNITURE

A. Scope of Work

1. Remove and salvage all street furniture including benches and trash receptacles.
2. Clean and remove all concrete from Furniture.
3. Transport and unload at City Corporation Yard as directed by City staff.

B. Payment

1. Lump Sum
2. Payment on completion

705-5.10 BID ITEM 10 – ALL OTHER DEMOLITION

A. Scope of Work

1. Excludes all demolition activities related to existing concrete or pavement removal necessary for reconstruction of new concrete facilities.
2. Excludes all demolition relating to other pavement removal items including cold planning.
3. Includes all other demolition work not included in the above items of work.
4. Includes protection of existing buildings and facilities during demolition work.

B. Payment

1. Lump Sum
2. Same limitations as Bid Item 1 – Section 705-5.1.B

705-5.11 BID ITEM 11 – CONCRETE SIDEWALK – STANDARD GREY

A. Scope of Work

1. Includes demolition of existing sidewalk, curb and gutter and other facilities within the sidewalk including utility boxes, etc., except for PGE facilities.

2. Includes protection of existing facilities to remain in place, underground utilities and adjacent buildings.
3. Includes removal of existing concrete entrances to adjacent buildings entry ways where applicable.
4. Includes trimming existing wooden trim and concrete as necessary to complete the work in place.
5. Includes placement of expansion joint and caulking as indicated on the plans.
6. Includes all ramping and sloping of sidewalk at curb ramps.
7. Excludes curb and gutter fronting streets.
8. Excludes providing or installing truncated domes.
9. Includes adjustment of utility boxes to grade, except for PGE.
10. Includes excavation necessary to provide a minimum of 4 inches of aggregate base under the sidewalk.
11. Includes protecting existing building finishes as provided in the special provisions.
12. Includes protecting finish with RAM board or other suitable covering immediately after finishing to provide access to businesses for a minimum of 3 days.
13. Area includes all sidewalk areas including ADA ramps, etc.
14. Excludes 6 inch curb face of either curb or curb and gutter.
15. Excludes surface area of PG&E vaults
16. Includes areas of miscellaneous boxes such as water meter, PRV boxes, monument plaques, etc.
17. Includes installation of flagpole inserts. Flag insert acquisition in other item.
18. Excludes area of raised sidewalk to doorway landings and adjacent doorway landing areas.
- 19.

B. Payment

1. Paid by square foot unit price, based on plan dimensions.
2. Includes all necessary incidental work to complete in place.

705-5.12 BID ITEM 12 – STAMPED AND COLORED CONCRETE

A. Scope of Work

1. Any applicable demolition.
2. Submittal of colored and stamped concrete in place.
3. Preparation of subgrade and installation of aggregate base
4. Installation of colored and stamped concrete
5. Protection of surrounding concrete and pavement from staining.
6. Protection of completed sidewalk after placement for 7 calendar days using RAM board or suitable covering.
7. Installation and maintenance of plywood pedestrian walkway surface in time between standard sidewalk and colored concrete.
8. Includes all necessary incidental work to complete in place.

B. Payment

1. Paid by the square foot unit price, based on plan dimensions.
2. Includes all incidental work

705-5.13 BIND ITEM 13 – RAISED CONCRETE SIDEWALK

A. Scope of Work

1. Placement of raised concrete sidewalk to building entrances per plan.
2. Any applicable demolition.
3. Forming and finishing (integral) exposed curb face.

4. Includes sidewalk edge warning inserts where applicable
 5. Includes handrail inserts where applicable
 6. Includes steps where applicable (1 location) Includes protecting finish with RAM board or other suitable covering immediately after finishing to provide access to businesses for a minimum of 3 days.
 7. Includes adjacent doorway entries where shown to be replaced.
 8. Joint and finish at buildings
 9. Excludes vent boxes.
 10. Excludes handrails
- B. Payment
1. Paid by the horizontal square foot unit price, based on plan dimensions.
 2. Includes all incidentals necessary to complete in place.

705-5.14 BID ITEM 14 – TRUNCATED DOMES

- A. Scope of Work
1. Providing and installing truncated domes
- B. Payment
1. Paid by the square foot unit price, measured in place.
 2. Includes all incidentals necessary to complete in place.

705-5.15 BID ITEM 15 – CONCRETE VERTICAL CURB – TYPE A1-6”

- A. Scope of Work
1. Associated demolition work
 2. Preparing subgrade and aggregate base beneath curb.
 3. Joint and finish at buildings
 4. Forming, placement and finishing of concrete vertical curb
 5. Backfill of CLSM between new curb and existing pavement.
- B. Payment
1. Paid by the lineal foot unit price measured at curb face, as dimensioned in plans.
 2. Includes all incidentals necessary to complete in place.

705-5.16 BID ITEM 16 – CONCRETE CURB AND GUTTER– TYPE A2-18”

- B. Scope of Work
1. Associated demolition work
 2. Preparing subgrade and aggregate base.
 3. Forming, placement and finishing of concrete curb and gutter
 4. Backfill of CLSM between new gutter and existing pavement.
- B. Payment
1. Paid by the lineal foot unit price measured at curb face, as dimensioned in plans.
 2. Includes all incidentals necessary to complete in place.

705-5.17 BID ITEM 17 – SIDEWALK DRAIN

- A. Scope of Work
1. Install sidewalk drain per plans including attachment at building.
 2. Includes all work to modify/attach the building drainage facility to the new sidewalk drain.
- B. Payment
1. Paid for by unit price per each
 2. Includes all incidentals necessary to complete in place.

705-5.18 BID ITEM 18 – 3” COLD PLANE

- A. Scope of Work

1. Includes cost of providing surveying/grade checking necessary to provide painted cuts prior to cold planning below finished grade
 2. Cold plane to grade to an average depth not to exceed 3 inches
 3. Transport grinding to City storage site as indicated on the plans.
- B. Payment
1. Paid by the square foot of cold plane, at unit price, as dimensioned on plan.
 2. Includes all incidentals necessary to complete in place.

705-5.19 BID ITEM 19 – 6” REMOVE AND REPLACE HMA IN TRAVEL LANES

- A. Scope of Work
1. Removal of existing pavement and subgrade
 2. Transporting to City storage site as indicate on the plans
 3. Provide and install HMA per plans and special provisions
- B. Payment
1. Paid by square foot of surface area, as measured in field, at unit price.
 2. Includes all work including cold planning and HMA placement

705-5.20 BID ITEM 20 – 6” REMOVE AND REPLACE HMA IN TRENCH PATCHES

- B. Scope of Work
1. Removal of existing pavement and subgrade only in area of existing full depth HMA.
 2. Transporting to City storage site as indicate on the plans
 3. Provide and install HMA per plans and special provisions
 4. At trenches parallel to the travel way which encroach into full depth HMA, the minimum width for payment shall be 4 feet. This may require special grinder or sawcutting and mechanical removal.
- B. Payment
1. Paid by the square foot of surface area, based on dimensions on plan, at unit price.
 2. Payment for this item is limited to 6” beyond the planned limits of the trenching and no additional compensation will be provided.
 2. Includes all work including cold planning and HMA placement

705-5.21 BID ITEM 21 – 3” REMOVE AND REPLACE HMA IN MISCELLANEOUS LOCATIONS

- A. Scope of Work
1. Removal of existing pavement and subgrade only in area of existing full depth HMA.
 2. Transporting to City storage site as indicate on the plans
 3. Provide and install HMA per plans and special provisions
- B. Payment
1. Paid by the square foot of surface area at unit price
 2. Includes all work including cold planning and HMA placement

705-5.22 BID ITEM 22 – NO. 4 HMA (leveling)

- A. Scope of Work
1. Includes cost of providing surveying/grade checking necessary to provide painted cuts prior to and after placement of leveling course.
 2. Placement of leveling course to grade
 3. Correction of leveling course surface if necessary
- B. Payment
1. Paid at the unit cost per ton installed.
 2. Paid on delivery tickets turned over at end of shift
 3. Deduction based on estimated unused material

705-5.23 BID ITEM 23 – ½” HMA (surface)

- A. Scope of Work
 - 1. Placement of surface course per plans and specifications
- B. Payment
 - 1. Paid at the unit cost per ton installed.
 - 2. Paid on delivery tickets turned over at end of shift
 - 3. Deduction based on estimated unused material

705-5.24 BID ITEM 24 – PAVEMENT INTERLAYER

- A. Scope of Work
 - 1. Tack Coat
 - 2. Pavement Interlayer per plans and specification
- B. Payment
 - 1. Paid by the square foot of installed area at unit price.
 - 2. No payment for required joints or overlaps or replacement if required.

705-5.25 BID ITEM 25 – STREET PRINT HMA STAMP AND COLOR

- A. Scope of Work
 - 1. Install Street Print per plans and specifications
 - 2. Includes sample submittal(s).
- B. Payment
 - 1. Paid by the square foot of installed area at unit price.
 - 2. Includes all incidentals necessary to complete in place.

705-5.26 BID ITEM 26 – CONSTRUCT SIDEWALK VENT BOX

- A. Scope of Work
 - 1. Provide box, extension and grate per plans
 - 2. Install and fit into place and connect to existing opening.
 - 3. Work includes all incidental work necessary to complete in place.
 - 4. Includes any associated demolition.
- B. Payment
 - 1. Paid for by unit price per each
 - 2. Includes all incidentals necessary to complete in place.

705-2.27 BID ITEM 27 – TREE FRAME AND GRATE

- A. Scope of Work
 - 1. Provide and Install Tree Frame and Grate
 - 2. Includes connections to sidewalk, curb and gutter and modified sidewalk edge.
 - 3. Includes any associated demolition
- B. Payment
 - 1. Paid for by unit price per each
 - 2. Includes all incidentals necessary to complete in place.

705-2.28 BID ITEM 28 – PROVIDE FLAGPOLE MOUNT

- A. Scope of Work
 - 1. Fabricate and provide flag pole insert
 - 2. Install included under sidewalk item
- B. Payment
 - 1. Paid for by unit price per each
 - 2. Includes all incidentals necessary to complete in place.

705-5.29 BID ITEM 29 – REMOVE, SALVAGE, STORE AND RESET TRASH RECEPTACLE

- A. Scope of Work
 - 1. Purchase new trash receptacles
 - 2. Transport and Install New Trash Receptacle
 - 3. Includes installing receptacle in accordance with manufacturer's instruction in the new sidewalk, in locations shown on plans.
- B. Payment
 - 1. Paid for by unit price per each
 - 2. Includes all incidentals necessary to complete in place.

705-5.30 BID ITEM 30 – INSTALL TRASH RECEPTACLE

- A. Scope of Work
 - 1. Transport and Install New Trash Receptacle
 - 2. Includes removal, cleaning, restoring and replacing receptacle in accordance with manufacturer's instruction in the new sidewalk, in locations shown on plans.
- B. Payment
 - 1. Paid for by unit price per each
 - 2. Includes all incidentals necessary to complete in place.

705-5.31 BID ITEM 31 – HANDRAIL

- A. Scope of Work
 - 1. Manufacture and install handrails in accordance with the Plans and these specifications in raised walk areas.
 - 2. Inserts covered under raised walks.
- B. Payment
 - 1. Paid for by unit price per lineal foot, measured in place.
 - 2. Includes all incidentals necessary to complete in place.

705-5.32 BID ITEM 32 – THERMOPLASTIC TRAFFIC STRIPE (4")

- A. Scope of Work
 - 1. Install thermoplastic traffic stripe (4") as shown on plans.
 - 2. Includes any removal of existing stripe where necessary.
 - 3. Does not include any pavement markings, only stripe.
- B. Payment
 - 1. Paid for by unit price per lineal foot, measured in place.
 - 2. Measurement does not include gaps in striping.
 - 3. Includes all incidentals necessary to complete in place.

705-5.33 BID ITEM 33– THERMOPLASTIC PAVEMENT MARKINGS.

- A. Scope of Work
 - 1. Install thermoplastic traffic stripe (4") as shown on plans.
 - 2. Includes any removal of existing stripe where necessary.
- B. Payment
 - 1. Paid for by unit price per square foot, measurement based on square footage of the item as noted in the standard plans for all but stop bars and cross walks which will be measured in place.
 - 2. Includes all incidentals necessary to complete in place.

705-5.34 BID ITEM 34– New Single Post Sign with Panel

- A. Scope of Work
 - 1. Install new sign post, sign panel and all footing and hardware necessary to install in accordance with plans and specifications.
 - 2. Includes any associated demolition not included elsewhere.
- B. Payment
 - 1. Paid for by unit price per each.

2. Includes all incidentals necessary to complete in place.

705-5.35 BID ITEM 35– 72” Storm Drain Manhole

A. Scope of Work

1. Install concentric storm drain manhole in accordance with City Standards and Specifications.
2. Includes frame and grate
3. Includes connections to storm drains where not covered in other items.
4. Excludes demolition of Manhole covered in other items.
5. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.36 BID ITEM 36– Curb Inlet, Type GOL-10 DI

A. Scope of Work

1. Install Curb Inlet, Type GOL-10 DI in accordance with Plans and Caltrans Standard Plans and Specifications.
2. Includes frame and grate
3. Includes associated Gutter Depressions in conformance with Caltrans Standard Plan D78A
4. Includes connections to storm drains where not covered in other items.
5. Includes demolition of existing storm drain inlet and associated gutter pan.
6. Includes all other associated demolition not included elsewhere.

B. Scope of Work

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.37 BID ITEM 37– Curb Inlet, Type GO DI

A. Scope of Work

1. Install Curb Inlet, Type GO DI in accordance with Plans and Caltrans Standard Plans and Specifications.
2. Includes frame and grate
3. Includes associated Gutter Depressions in conformance with Caltrans Standard Plan D78A
4. Includes connections to storm drains where not covered in other items.
5. Includes demolition of existing storm drain inlet and associated gutter pan.
6. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.38 BID ITEM 37– 36” x 36” Junction Box

A. Scope of Work

1. Install 36” x 36” Junction Box in accordance with Plans and Caltrans Standard Plans and Specifications.
2. Includes frame and grate
3. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

- 705-5.39 BID ITEM 39– 23” x 14” Class 5 Elliptical RCP
- A. Scope of Work
 - 1. Install 23” x 14” Class 5 Elliptical RCP in accordance with Plans and Caltrans Standard Plans and Specifications.
 - 2. Excludes connections to manholes, covered
 - 3. Includes all associated demolition of existing storm drains to and in the existing manholes.
 - 4. Includes connections to storm drain manholes and all modifications to connect to manhole.
 - 5. Includes all other associated demolition not included elsewhere.
 - B. Payment
 - 1. Paid for by the unit price per lineal foot, field measured.
 - 2. Includes all incidentals necessary to complete in place.
- 705-5.40 BID ITEM 40– Modify Storm Drain Manhole/Drainage Inlet (DI)
- A. Scope of Work
 - 1. Modify Storm Drain Manhole/Drainage Inlets in accordance with Plans and Caltrans Standard Plans and Specifications.
 - 2. Includes repair to existing manholes at existing connections that are being removed. Connections of new storm drain facilities to manholes are covered under Bid Item 39.
 - 3. Excludes resetting of manhole frame and grates, covered under Bid Item 42.
 - 4. Includes all other associated demolition not included elsewhere.
 - B. Payment
 - 1. Unit price per each, field measured.
- 705-5.41 BID ITEM 41– 6” Sanitary Sewer Drop Connection
- A. Scope of Work
 - 1. Install 6” Sanitary Storm Drop Connections in conformance with City Standards.
 - 2. Includes drilling into existing manholes and all other associated grouting and modifications to existing manhole.
 - 3. Excludes resetting of manhole frame and grates, covered under Bid Item 42.
 - 4. Includes all other associated demolition not included elsewhere.
 - B. Payment
 - 1. Paid for by the unit price per each.
 - 2. Includes all incidentals necessary to complete in place.
- 705-5.42 BID ITEM 42– Reset Manhole Frame and Grate
- A. Scope of Work
 - 1. Install 6” Sanitary Storm Drop Connections in conformance with the plans, City Standards and Plans.
 - 2. Includes drilling into existing manholes and all other associated grouting and modifications to existing manhole.
 - 3. Excludes resetting of manhole frame and grates, covered under Bid Item 42.
 - 4. Includes all other associated demolition not included elsewhere.
 - B. Payment
 - 1. Paid for by the unit price per each.
 - 2. Includes all incidentals necessary to complete in place.
- 705-5.43 BID ITEM 43– Reset 6” Sanitary Sewer Rodding Inlet
- A. Scope of Work

1. Reset Sanitary Sewer Rodding Inlet in conformance with the plans, City Standards and Plans.
 2. Includes all other associated demolition not included elsewhere.
- B. Payment
1. Paid for by the unit price per each.
 2. Includes all incidentals necessary to complete in place.

705-5.44 BID ITEM 44– 6” PVC Sanitary Sewer Main

- A. Scope of Work
1. Install 6” Sanitary Sewer Main in conformance with the plans, City Standards and Plans.
 2. Includes all other associated demolition of existing mains and other appurtenant items required and not included elsewhere.
- B. Payment
1. Paid for by the unit price per Lineal Foot, as measured.
 2. Includes all incidentals necessary to complete in place.

705-5.45 BID ITEM 45– Red Curb Markings

- A. Scope of Work
1. Prepare and apply red paint curb markings
- B. Payment
1. Paid for by the unit price per Lineal Foot, as measured.
 2. Includes all incidentals necessary to complete in place

705-5.46 BID ITEM 46– Remove 48” Sanitary Sewer Manhole

- A. Scope of Work
1. Remove and dispose 48” Sanitary Sewer Manhole
 2. Backfill full depth with CLSM.
 3. Includes all other associated demolition not included elsewhere.
- B. Payment
1. Paid for by the unit price per each.
 2. Includes all incidentals necessary to complete in place.

705-5.47 BID ITEM 47– 4” Sanitary Sewer Lateral (Shallow), Cleanout & Box

- A. Scope of Work
1. Remove and dispose of existing sanitary sewer lateral from main to building.
 2. Reconstruct new 4” sanitary sewer lateral in conformance with the plans, City Standards and Plans.
 3. These connections are from existing 6” sewer mains to existing services at building face.
 4. Includes all system parts from main to building, including any repairs to existing main at existing lateral and new cleanout box.
 5. Includes reconnecting to existing service at building face.
 6. Backfill all excavations full depth with CLSM.
 7. Includes all other associated demolition not included elsewhere.
- B. Payment
1. Paid for by the unit price per each.
 2. Includes all incidentals necessary to complete in place.

705-5.48 BID ITEM 48– 4” Sanitary Sewer Lateral (Deep), Cleanout & Box

- A. Scope of Work
1. Remove and dispose of existing sanitary sewer lateral from main to building.

2. Reconstruct new 4" sanitary sewer lateral in conformance with the plans, City Standards and Plans. These connections are from existing 12" sewer mains to existing services at building face.
 3. These connections are from existing sewer mains to existing services at building face.
 4. Includes all system parts from main to building, including any repairs to existing main at existing lateral and new cleanout box.
 5. Includes reconnecting to existing service at building face.
 6. Backfill all excavations full depth with CLSM.
 7. Includes all other associated demolition not included elsewhere.
- B. Payment
1. Paid for by the unit price per each.
 2. Includes all incidentals necessary to complete in place.

705-5.49

BID ITEM 49– 4" Sanitary Sewer Service Stubs, Cleanout & Box

A. Scope of Work

1. Reconstruct new 4" sanitary sewer service stub in conformance with the plans, City Standards and Plans. These connections are from existing 12" and 6" sanitary sewer mains to a new connection to and through the building foundation.
2. Includes all system parts from main to and through building foundation, including and new cleanout box.
3. Includes coring through existing foundation and capping.
4. Backfill all excavations full depth with CLSM.
5. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.50

BID ITEM 50– 2" Gate Valve & Box

A. Scope of Work

1. Construct 2" gate valve in conformance with the plans and City Standards and plans.
2. Includes all system parts from main to gate valve lid, including new gate valve and box with lid.
3. Backfill all excavations full depth with CLSM.
4. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.51

BID ITEM 51– 4" Gate Valve & Box

A. Scope of Work

1. Construct 4" gate valve in conformance with the plans and City Standards and plans.
2. Includes all system parts from main to gate valve lid, including new gate valve and box with lid.
3. Backfill all excavations full depth with CLSM.
4. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.52

BID ITEM 52– 6" Gate Valve & Box

A. Scope of Work

1. Construct 4" gate valve in conformance with the plans and City Standards and plans.
2. Includes all system parts from main to gate valve lid, including new gate valve and box with lid.
3. Backfill all excavations full depth with CLSM.
4. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.53

BID ITEM 53– 8" Gate Valve & Box

A. Scope of Work

1. Construct 4" gate valve in conformance with the plans and City Standards and plans.
2. Includes all system parts from main to gate valve lid, including new gate valve and box with lid.
3. Backfill all excavations full depth with CLSM.
4. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.54

BID ITEM 54– 1" Water Service (single) & Box

A. Scope of Work

1. Remove and dispose of existing water service lateral from main to building.
2. Reconstruct new 1" water service lateral in conformance with the plans, City Standards and Plans. These connections are from existing water mains to existing services at building face.
3. Includes resetting of new or salvaged water meters.
4. Includes all new system parts from main to building (except salvaged water meter).
5. Includes any repairs to existing main at existing lateral.
6. Includes reconnecting to existing service at building face.
7. Backfill all excavations full depth with CLSM.
8. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.55

BID ITEM 55– 2" Water Service (single) & Box

A. Scope of Work

1. Remove and dispose of existing water service lateral from main to building.
2. Reconstruct new 2" water service lateral in conformance with the plans, City Standards and Plans. These connections are from existing water mains to existing services at building face.
3. Includes resetting of new or salvaged water meters.
4. Includes all new system parts from main to building (except salvaged water meter).
5. Includes any repairs to existing main at existing lateral.
6. Includes reconnecting to existing service at building face.
7. Backfill all excavations full depth with CLSM.
8. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.56 BID ITEM 56– 2” Water Service (double) & Box

A. Scope of Work

1. Remove and dispose of existing associated water service lateral(s) from main to building.
1. Reconstruct new 2” water service lateral in conformance with the plans, City Standards and Plans. These connections are from existing water mains to existing services at building face.
2. Includes resetting two meters in a B24 Box and constructing and connecting separate 1” water laterals to existing services (2 total).
3. Includes resetting of 2 (new or salvaged) water meters.
4. Includes all new system parts from main to building (except salvaged water meter).
5. Includes any repairs to existing main at existing lateral.
6. Includes reconnecting to existing service at building face.
7. Backfill all excavations full depth with CLSM.
8. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.57 BID ITEM 57– 1” Pressure Reducing Valve & Box

A. Scope of Work

1. Remove and dispose of existing associated pressure reducing valve and boxes.
2. Reconstruct new 1” pressure reducing valve in conformance with the plans, City Standards and Plans.
3. Includes installing new B9 Box and connecting with the newly constructed laterals.
4. Excludes laterals outside of box, except for connection.
5. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.58 BID ITEM 58– Reset Fire Hydrant

A. Scope of Work

1. Reset Fire Hydrant in same plan location.
2. Includes all system parts necessary to raise fire hydrant and reconnect to main.
3. Backfill all excavations full depth with CLSM.
4. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.59 BID ITEM 59– Quad 1” Water Services with 2” lateral and 2 boxes

A. Scope of Work

1. Remove and dispose of existing associated water service lateral(s) from main to building.
2. Reconstruct a new 2” water service lateral from main to a manifold, and

installing two new double (B24) boxes with two meters (salvaged or new) in each box (total of four meters) and constructing four each 1" water service laterals to four existing services at building face. Work to be done in conformance with the plans, City Standards and Plans from Main to Box.

3. Where 3 meters are specified, the third meter shall be installed in a B9 box.
4. These connections are from existing water mains to existing services at building face.
5. Includes resetting of 2 (new or salvaged) water meters.
6. Includes all new system parts from main to building (except salvaged water meter).
7. Includes any repairs to existing main at existing lateral.
8. Includes reconnecting to existing service at building face.
9. Backfill all excavations full depth with CLSM.
10. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Payment includes all service installations (3 or 4) as one unit price.
3. Includes all incidentals necessary to complete in place.

705-5.60

BID ITEM 60– Double 1" Pressure Reducing Valve & Box

A. Scope of Work

1. Remove and dispose of existing associated pressure reducing valve(s) and boxes.
2. Reconstruct double 1" pressure reducing valve in conformance with the plans, City Standards and Plans.
3. Includes installing a new B9 Box and connecting with the newly constructed laterals.
4. Excludes laterals outside of box, except for connection.
5. Includes all other associated demolition not included elsewhere.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.
- 3.

705-5.61

BID ITEM 61– 1" Water Service Stubs & Box

B. Scope of Work

6. Reconstruct new 1" water service stub in conformance with the plans, City Standards and Plans. These connections are from existing 8" water mains to and through the building foundation. End to be capped. Location of connection as shown on plans.
7. Includes all system parts from main to and through building foundation, including and new cleanout box.
8. Includes coring through existing foundation and capping.
9. Backfill all excavations full depth with CLSM.
10. Includes all other associated demolition not included elsewhere.

B. Payment

3. Paid for by the unit price per each.
4. Includes all incidentals necessary to complete in place.

705-5.62

BID ITEM 62– Reconstruct Fire Hydrant

A. Scope of Work

1. Reconstruct Fire Hydrant at location shown on plans and in conformance with plans and City Standards and Plans.

2. Includes all system parts necessary to reconstruct firehydrant and reconnect to main.
3. Fire Hydrant shall be salvaged and reused.
4. Excludes gate valve paid for in separate item.
5. Backfill all excavations full depth with CLSM.
6. Includes all other associated demolition not included elsewhere.
7. Includes salvaging fire hydrant and removing existing hydrant lateral and repairing main.

B. Payment

1. Paid for by the unit price per each.
2. Includes all incidentals necessary to complete in place.

705-5.63 BID ITEM 63 – RELOCATE STREET LIGHS & INSTALL NEW BASES AND PULL BOXES

A. Scope of Work

1. Remove, Salvage, Protect Existing Street Lights
5. Install new light pole base per plan details
6. Demolish top off existing light pole base. The upper portion of the light pole base shall be removed to a depth a minimum of 12” below the proposed sidewalk finished grade, or where otherwise in conflict with proposed improvements.
7. Remove existing pull box and install new pull box as shown on drawings
8. Install new conduit and conductors from new pull box to relocated street light.
9. Revise irrigation system to serve new street light location
10. Reinstall light after completion of sidewalk work
11. Reinstall and energize street lights
12. Reinstall plumbing to baskets in light poles

B. Payment

C.

1. Unit price of per location including all work as described above and all other incidental work to assure operational street light with basket irrigation

705-5.64 BID ITEM 64 – MODIFY/EXTEND STREET LIGHT CONDUIT & INSTALL NEW CONDUCTORS

A. Scope of Work

1. Stage Work on a block by block basis to correspond with concrete work
2. Modify/extend existing conduits and install conductors
 - a. Remove existing conductors
 - b. Remove existing pull boxes and splice in new conduits
 - c. Place new conduit into new pull boxes supplied under the relocated street light or new street light items.
 - d. Pull new conductors and energize system
 - e. Includes connecting to new PG&E service

B. Payment

1. Lump Sum
1. Includes all work necessary to connect and energize relocated and new street lights and street light beyond new sidewalk and paving to the North as shown.

2.

705-5.65 BID ITEM 65—NEW SERVICE, PANELS, AND CONTROLS

A. Scope of Work

1. Remove existing service equipment, conduits and conductors not to be reused
2. Install equipment and enclosure as shown on the Service Riser Diagram
3. Install related conduit and wiring as shown
4. Arrange and schedule with PG&E for timely power transfer to assure continuous service to street lights at night.
5. Connect to PG&E service vault
6. Perform all work in accordance with plans and specifications and all applicable codes and ordinances.

B. Payment

1. Lump sum

705-5.66

BID ITEM 66—INSTALL NEW STREET LIGHTS, BASES AND PULL BOXES

A. Scope of Work

1. Install new light pole base per plan details
2. Install new pull box as shown on drawings
3. Install new conduit and conductors from new pull box to new street light

B. Payment

1. Unit price per location including all work as describe above and all other incidental work to assure operational street light with basket irrigation.

705-5.67

BID ITEM 67 –CONDUIT FOR TREE RECEPTACLE

A. Scope of Work

1. Install conduit system for energizing outlets at tree well locations as shown on the plans.
2. Install conduit for irrigation control valves to tree wells with irrigation control valves as shown on irrigation plans
3. Cap conduits above grade below grate in final locations for outlets.
4. Connect conduit to associated street light pull box.

B. Payment

1. Lump Sum
2. Includes all work to provide complete conduit system for tree light outlets and general use outlets ready for service except for outlets and conductor installation.

705-5.68

BID ITEM 68 – ELECTRICAL OUTLET & PIG TAILS AT TREE WELL

A. Scope of Work

1. Furnish and install electrical outlet and furnish pigtails per plans at tree well
2. Install conductors to nearest light pole pull box
3. Energize and test system
4. Supply 7 extra sets of pigtails of both colors.

B. Payment

1. Unit price per each tree well location
2. Cost of additional pigtails shall be included in the unit price.

705-5.69

BID ITEM 69 – INSTALL CONDUCTORS FOR TREE WELL OUTLETS

A. Scope of Work

1. Provide and install all conductors necessary to energize tree well outlets as described on the plans and in the contract documents.
2. Energize and test system.

- B. Payment
 - 1. Lump Sum
 - 2. Includes all work necessary to connect and energize tree well outlets

705-5.70 BID ITEM 70 – CONTROLLER, WALL MOUNT IN VANDAL RESISTANT ENCLOSURE

- A. Scope of Work
 - 1. Remove existing service panel, conduits and conductors not to be reused.
 - 2. Install new service panel, conduits and conductors to connect to PG&E service vault.
 - 3. Arrange and schedule with PG&E for timely power transfer to assure continuous service to street lights at night.
 - 4. Perform all work in accordance with plans and specifications and all applicable codes and ordinances.
- B. Payment
 - 1. Lump Sum

705-5.71 BID ITEM 71 – INSTALL TREE INCLUDING ALL FEATURES

- A. Scope of Work
 - 1. Excavate tree well
 - 2. Install Root Barrier
 - 3. Provide and prepare planting soil
 - 4. Furnish and install tree
 - 5. Install irrigation lines and bubblers
 - 6. Mulch and otherwise finish tree
 - 7. Install grate
 - 8. All incidental work necessary to install and provide irrigation to tree
- B. Payment
 - 1. Unit price per tree

705-5.72 BID ITEM 72 – MAINTENANCE PERIOD

- A. Scope of Work
 - 1. Work with City staff to adjust irrigation system as necessary
 - 2. Prune or otherwise provide necessary tree maintenance
 - 3. Replace tree or any other non-performing items
- B. Payment
 - 1. Unit price per month of maintenance
 - 2. Item not subject to increase or decrease of 25% rule regarding adjustment of unit price.

705-5.73 BID ITEM 73 – CONTROLLER, WALL MOUNT IN VANDAL-RESISTANT ENCLOSURE

- A. Scope of Work
 - 1. Provide and install controller
 - 2. Provide power supply wiring from power service to controller panel
 - 3. Terminate control wiring
 - 4. Program and test controller
 - 5. Provide vandal resistant enclosure (color choice by city).
 - 6. All incidental work necessary to complete functional controller
- B. Payment
 - 1. Lump Sum

705-5.74 BID ITEM 74 – BACKFLOW PREVENTER

- A. Scope of Work
 - 1. Provide and install backflow preventer
 - 2. Connect to water supply and irrigation piping system
 - 3. Perform testing
 - 4. Install enclosure
 - 5. All other incidental work
- B. Payment
 - 1. Lump Sum

705-5.75 BID ITEM 75 – IRRIGATION CONTROL WIRING

- A. Scope of Work
 - 1. Provide conduit and control wiring
 - 2. Make all terminations
 - 3. Test system
- B. Payment
 - 1. Lump Sum

705-5.76 BID ITEM 76 – IRRIGATION SYSTEM PIPING

- A. Scope of Work
 - 1. Furnish and install all irrigation piping including servicing street light locations.
 - 2. Pressure test system prior to backfill and concrete installation
 - 3. Pressure test system after installation of concrete features and prior to connecting to individual irrigation features.
- B. Payment
 - 1. Lump Sum

705-5.77 BID ITEM 77 – HANGING BASKETS

- A. Scope of Work
 - 1. Provide irrigation supply lines and planting medium
 - 2. Install plantings as indicated on drawings
- B. Payment
 - 1. Paid for by the unit price per each.
 - 2. Includes all incidentals necessary to complete in place.

705-5.78 BID ITEM 78 – RESET ATT VAULT

- A. Scope of Work
 - 1. Reset ATT vault manhole lids in compliance with ATT requirements.
 - 2. Coordinate with ATT personnel..
- B. Payment
 - 3. Paid for by the unit price per each.
 - 4. Includes all incidentals necessary to complete in place.

BID ALTERNATE 1 ITEMS

705-5.81 ITEM 81 – DEDUCT – CONCRETE SIDEWALK- STAMPED AND COLORED

- A. Scope of Work
 - 1. Deduction includes all work associated with Bid Item 12.
- B. Payment
 - 1. Deduction is by the square foot unit price, based on plan dimensions.
 - 2. Includes all incidental work

- 705-5.82 ITEM 82 – ADD – ADD-BRICK PAVERS ON SLAB (TREE WELLS)
- A. Scope of Work
 - 1. Any applicable demolition.
 - 2. Submittal of brick pavers for approval.
 - 3. Preparation of subgrade and installation of aggregate base
 - 4. Installation of Sand setting
 - 5. Installation of all associated fiber expansion joints.
 - 6. Installation of brick pavers in accordance with plans.
 - 7. Protection of surrounding concrete and pavement from chipping.
 - 8. Installation and maintenance of plywood pedestrian walkway surface until pavers are in place.
 - 9. Includes all necessary incidental work to complete in place.
 - B. Payment
 - 1. Paid by the square foot unit price, based on plan dimensions as identified for bid item 12.
 - 2. Includes all incidental work

- 705-5.83 ITEM 83 – ADD – CONCRETE BORDER
- A. Scope of Work
 - 1. Any applicable demolition.
 - 2. Preparation of subgrade and installation of aggregate base
 - 3. Installation of reinforcement.
 - 4. Protection of surrounding concrete and pavement from staining.
 - 5. Protection of completed sidewalk after placement for 7 calendar days using RAM board or suitable covering.
 - 6. Installation and maintenance of plywood pedestrian walkway surface in time between standard sidewalk and colored concrete.
 - 7. Includes all necessary incidental work to complete in place.
 - B. Payment
 - 1. Paid by the lineal foot unit price, based on plan dimensions.
 - 2. Includes all incidental work

701 TRAFFIC & PESTRIAN CONTOL

A schematic traffic control plan is provided in the plans. The contractor shall review this plan and amend as necessary for CA MUTCH compliance and have it reviewed by a qualified professional. The Contractor shall be responsible for all aspects of traffic control. The Contractor shall supply, place, and maintain all necessary traffic control devices during construction in accordance with the applicable requirements of the City of Lakeport, the California Manual of Uniform Traffic Control Devices, and the traffic control plans approved by the City.

It is the intent to completely close the street to all traffic and limited pedestrian access during work. The traffic will be detoured as indicated, depending on whether there is active work in the First Street intersection.

The complete street shall be open to traffic between 6 AM and 6 PM daily and 24 hours a day on Friday and Saturday.

Advance construction warning signs shall be placed on all streets leading into the construction area before any construction is started. The signs shall remain in place from the first date of work until the punch list is complete.

The Contractor shall submit traffic control plans to the Engineer for approval five (5) working days prior to the pre-construction meeting. Traffic control plans shall conform to the requirements below.

1. The street shall be swept at the end of each work shift prior to opening. A mobile street sweeper shall be used wherever practical and dust shall be suppressed to the satisfaction of the Engineer.
2. All excavations in pavement area shall be either backfilled to the surface or covered with steel plates secured against movement. Steel plates shall have 18 inches of temporary asphalt placed at the edges to soften the transition. The entire pavement shall be available for public use during non-working hours.
3. All excavations in sidewalks shall be either backfilled to the surface or covered with plywood per plan details. A minimum unencumbered sidewalk width of 5 feet minimum and access to each business shall be provided.
4. Access shall be provided to each business each day between 8 AM and 6 PM. Access shall be provided as shown on the plans.
5. As indicated in the plans, the Contractor shall have a full time person dedicated to traffic and pedestrian safety during the night and day when working and the day time after a work shift. Any unsafe conditions or complaints by businesses shall be corrected immediately.
6. The Contractor shall stockpile sufficient materials to assure that these provisions can be executed in a timely manner.
7. There shall be no stockpiling of material on the project site. In the block where sidewalk work is progressing, formwork and other temporary work features shall be protected from public access.

Payment for Traffic and Pedestrian Control shall be made under the lump sum item for "Traffic & Pedestrian Control". The payment for this item shall include all costs associated with providing traffic control and public safety including the night time and day time personnel as discussed above and indicated on the plans. Payment shall be made on a prorated percentage basis of the less percentage of time elapsed.

702 DEMOLITION, SITE PREPARATION AND GENERAL REQUIREMENTS

702-1 GENERAL

702.1.1 SUMMARY

- A. Includes But Not Limited To:
 1. Demolish and remove portions of existing site facilities as described in Contract Documents. Salvage as indicated on the plans. Backfill as indicated.
 - a. Street signs and poles (salvage)
 - b. Street furniture including benches and waste receptacles. (Salvage and clean)
 - c. Street lights and poles (relocate) Light Poles, Bases and Pull Boxes
 - d. Existing pavement, curb, gutter and sidewalk
 2. Protection of existing facilities
 3. Repair, cleaning and restoration

702.1.2 SUBMITTALS

- A. Utility Services at Buildings – provide a continuously updated record drawings per 704-1.3 above. Include as constructed information for installed sewer and water services as completed.
- B. Closeout - Identify abandoned utility and service lines and capping locations on record drawings.

702.1.3 SCHEDULING

- A. Include on Construction Schedule detailed sequence of individual site demolition operations including road closures.
- B. Coordinate with Owner for equipment and materials to be removed or reset by Owner or others, where necessary.

702-1.4 Test Methods

- A. Maximum Laboratory Density – either CT 216 or ASTM D1557.
- B. Nuclear Gauge – ASTM D6938

702-2 PRODUCTS

- A. Controlled Low Strength Material (CLSM) conforming to the following:
 - 1. Contains maximum of 94 lbs. of cement per yard.
 - 2. Compressive strength between 75 and 150 psi at 28 days.
 - 3. Fly ash is permitted.
 - 4. Air entrainment additives for workability
- B. All backfill in pavement areas including for storm drains; sewer lines and laterals; water lines and services; electrical lines, and in front of completed gutters shall be CLSM.
- C. Bedding - Sand bedding shall be used for all utility lines under the sidewalk. A minimum of 3 inches of sand bedding shall be used over the pipe or conduit.
- D. Class 2 Aggregate Base
 - 1. Shall conform to 2010 Caltrans Standard Specifications Section 26
 - 2. Shall have a minimum dry unit weight based on ASTM D 1557 of 135 pcf.
 - 3. Shall be used under all sidewalks, curbs and gutters per plan details.
 - 4. Shall be used in all other areas as specified.

702-3 EXECUTION

702-3.1 EXAMINATION

- A. Examine site to determine extent of work necessary to isolate work to be removed from work to remain. If separation procedure is unclear, request clarification from Owner's Agent at least 2 working days in advance of demolition.

702-3.2 PREPARATION

- A. Notify corporations, companies, individuals, and local authorities owning utilities within the project area.
- B. Disconnect electrical wires and feeds in such a manner that accidental re-energization cannot occur.
- C. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain.
- D. Contractor shall be responsible for protecting existing facilities.
- E. Protection – protect all buildings and existing features from damage.
- F. Spillage -
 - 1. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
 - 2. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
- G. Dust Control -
 - 1. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.
 - 2. Correct or repair damage caused by dust.
- H. Existing Plants and Features - Do not damage tops, trunks, and roots of existing trees and shrubs on site which are intended to remain. Do not use heavy equipment within branch spread. Interfering branches may be removed only with permission of Owner's Agent. Do not damage other plants and features which are to remain. Any damaged plants or features shall be replaced at the contractor's expense.
- I. If specified precautions are not taken or corrections and repairs made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of the Work.
- J. Contractor shall comply with all local, state, and federal storm water protection regulations.

- K. Obtain Construction Water
 - 1. Obtain Water Use Permit from City of Lakeport
 - 2. Rent hydrant or bridge meter
 - 3. Pay deposits, permits, fees and invoices.
 - 4. Other sources other than City water may be used only as authorized by Engineer.

702-3.3 NOISE CONTROL

- A. Complete saw cutting, jackhammering and demolition hammering prior to 10 PM each evening if noise level exceeds 70 cba.
- B. Use lowest available noise equipment designed for noise control
- C. Monitor noise to assure compliance with City of Lakeport Noise ordinance for project
- D. Minimize backup alarm use.
- E.

702-3.4 PERFORMANCE

- A. Execute work in an orderly and careful manner, with due consideration for businesses and the public.
- B. Carefully remove, disassemble, or dismantle as required, existing items to be reused in completed work, and store in approved location at storage yard or City corporation yard as determined by the Engineer, Concrete and Paving Removal
- C. Concrete and Paving removal
 - Full depth saw cut joints between material to be removed and material to remain. All sawcuts shall be to nearest score mark and perpendicular to travelled way in roadway.
- D. Existing concrete site elements or pavement damaged during demolition or work shall be re-saw cut and replaced in accordance with the plans and specifications at Contractor's expense. Replacement of damaged material shall be performed in accordance with the project plans and these specifications.
- E. Disposal
 - 1. Separate pipes and conduits from demolition material. Dispose of legally.
 - 2. Concrete, Aggregates, Native Soil and Pavement
 - a. Separated materials
 - b. Transport to City site indicated on the plans during the same work period as removed.
 - c. Provide loader to push up materials daily or more often if necessary to maintain clean and orderly stockpile at disposal site.
 - 3. If hazardous materials are encountered refer to the General Conditions.
- F. Backfill
 - 1. Backfill holes made due to removal with CLSM
 - 2. Alternative backfill methods may be used if approved by the Engineer in writing prior to work performance.
- G. Existing Street Light Pole Bases
 - 1. Remove concrete to allow a minimum clearance of 12 inches distance between concrete curb, gutter or sidewalk or any other improvements within 12" and top of removed base. Place Class 2 aggregate base over demolished base.
 - 2. Cut off any bolts or reinforcement flush with top of demolished concrete.
- H. Site Maintenance
 - 1. Broom clean all remaining surfaces immediately after demolition and removal of debris. Maintain broom clean condition.
 - 2. Maintain all storm water protection measures.

702-3.5 REPAIR/RESTORATION

- A. Adjust existing covers, boxes, and vaults to grade per plans
- B. Replace broken or damaged covers, boxes, and vaults.

- C. Site Cleaning Immediately Prior To Acceptance
 - 1. All surfaces shall be broom clean and free from any accumulation of debris.
 - 2. Clean tack coat on concrete surfaces. Tack coat within 1 inch of pavement on curbs or gutter is not required to be cleaned.
 - 3. Remove all traffic control devices, excess materials, debris and signage from site.
 - 4. Remove all debris and sediment from the existing storm drain structures.
 - 5. Replace any disturbed landscaping. Backfill planters with clean topsoil and replace surface dressing or mulch in kind.
 - 6. Remove all concrete debris and splatter.

702-4 PAYMENT

- A. All costs associated with demolition related to installation of water, sewer and storm drainage facilities shall be included in the unit price relating to that work.
- B. All costs associated with demolition of existing to installation of new curb, gutter, sidewalk, ramps, accessible ramps, etc. shall be included in the unit price for each of the work items.
- C. All costs related to cold milling of existing pavement shall be paid under those related bid items.
- D. All other remaining costs other than those outlined above shall be paid at the lump sum cost under "All Other Demolition" as outlined in the bid schedule. This includes all labor, equipment and materials necessary to complete the work in place including removal, disposal, protection, etc.

703 UTILITY WORK

703-1 STORM DRAINAGE

703-1.1 SUMMARY

- A. Includes but is not limited to;
 - 1. Demolishing existing storm drainage system to be replaced, including pipe and storm drain structures and gutter depressions.
 - 2. Installing storm drain pipe
 - 3. Installing storm drainage structures
 - 4. Installing gutter depressions
 - 5. All other relating work to construct storm drains as indicated on the plans and in these special provisions.

703-1.2 SUBMITTALS

- A. Certificates of Compliance for RCP
- B. Mix Design for cast in place concrete elements
- C. Product submittals for precast concrete structures and parts
- D. Certificates of Compliance for reinforcement

703-1.3 SCHEDUING

- A. After potholing to determine potential conflicts
- B. Prior to concrete work

703-1.2 PRODUCTS

- 703-1.2.1 Pipe
 - A. 23" x 14" inch elliptical Class 5 RCP
 - B. Complies with Section 52 and 65 of Standard Specifications
- 703-1.2.2 Structures
 - A. Precast or cast in place as indicated on the drawings
 - B. Includes gutter apron where shown
 - C. Complies with applicable sections of Section 51, 52 61, and 70 of Standard Specifications
- 703-1.2.3 Backfill
 - A. CLSM backfill for all structures
- 703-1.2.4 Under Sidewalk Drains
 - B. 3" or 4" size to match existing size
 - C. Cast Iron unless shown otherwise
 - D. No-hub fittings for cast iron
- 703-1.2.5 Pipe Grout
 - A. Non-shrink commercial grout
 - B. 3000 psi minimum strength
- 703-1.2.6 Frames and Grates & Reinforcing
 - A. Grates shall be Type 24 bicycle proof grates in conformance with Caltrans Standard Plan D77B
 - B. Frames shall be appropriate frames in accordance with Standard plan D74A, D74B or D77A.
 - C. All metal shall comply with Section 75, "Miscellaneous Metal" of the Standard Specifications.
 - D. Welded Wire Mesh or Rebar to be 10 gauge or #4, respectively and conform to Section 53 of the Standard Specifications.
- 703-1.3 EXECUTION
 - 703-1.3.1 PREPARATION
 - A. Demolish all drainage features as necessary to limits of replacement, backfill all areas in accordance with Section 19 of the Caltrans Specifications.
 - B. Modification to storm drain manholes area covered under a separate item.
 - C. Excavate to lines and grades for new drainage structures.
 - D. Prepare and compact subgrade for new structures/pipes. Compaction of subgrade for each item of work shall comply with the Section 19, "Earthwork", of the Standard Specifications.
 - E. Trenching for culverts shall comply with Caltrans Standard Plan A62D, except that all backfill shall be CLSM.
 - F. Cast in place structures shall be excavated to provide the designated wall depth. Maximum allowable over excavation shall be 3 inches. If over excavation exceeds 3 inches, exterior walls must be formed on all sides.
 - G. Holes for pipes into existing structures shall be constructed by first drilling holes space no more than 4 inches apart at the perimeter of the hole. The material to be removed shall be removed by means which do not damage existing structure. If the existing structure is damaged, it shall be repaired to the Engineer's satisfaction, up to, and potentially including replacement of the entire structure if damage is extensive.
 - 703-1.3.2 CONSTRUCTION

A. Structures

1. Construct inlets as indicated on the plans and as applicable.
2. Repair any damage to structure caused by form removal or placement
3. Backfill with CLSM
4. Pipe shall not extend into the drainage structure. Pipe may terminate a maximum of 1 -1/ 2 inches into wall. Provide even grout transition from pipe to structure.
5. All grout shall be formed neat and clean and all excess removed.

B. Pipe

1. Sawcut all pipe to length as required
2. Lay pipe in accordance with specifications
3. Grout RCP, mix and apply according to manufacturer's guidelines for consistency and water content.
4. Backfill to pavement surface with CLSM

C. Under Sidewalk Drains

1. Construct per plan detail 409.
2. Provide sheet metal fitting to provide positive connection to building drain pipe.

703-1.3 PAYMENT

- A. Payment shall be as indicated in bid schedule and Section 700-5 Bid Item Descriptions of these special provisions.

703-2. WATER MAIN AND SERVICE CONSTRUCTION

703-2.1 GENERAL

703-2.1.1 SUMMARY

A. Includes But Not Limited To:

1. Removing and replacing water main as required for connections and valve replacement.
2. Removing and replacing all gate valves and gate valve boxes.
3. Removing and reconstructing water services as indicated on the drawing (including connection at main, lateral, box, and water service to building, Salvaging water meter and marking for relocation to same service and reinstalling.
4. This work will include all other appurtenant work to reconstruct water service at location shown on plans.
5. All water mains and related appurtenances shall be constructed in accordance with the City Standard Plans and Specifications, the Plans and these Special Provisions.

705-2.1.2 SUBMITTALS

A. Provide product data sheets for the following:

1. C900 Pipe
2. Ductile Iron Fittings
3. Valves
4. Service Saddles
5. Service Piping
6. Necessary fittings to connect to existing service at building face in accordance with the Plumbing Code.

B. Shoring Plan

1. Submit Shoring Plan for excavations over 5 feet in depth at least 5 days in advance of work.

2. All bracing and shoring shall conform to Section 65-2, "Trench Bracing and Shoring" and the Division of Industrial Safety Construction Safety Orders, which are currently in use.
3. The Contractor shall take all necessary measures to protect the workers and adjacent areas and structures from the hazards of the trenching or excavation operations.

703-2.1.3 SCHEDULING

A. Water Mains and Valves

1. Schedule with Water Department staff 24 hours ahead of water main shutoff and openings. Scheduled shutoffs shall be shown on Schedule submitted to City under Section 6-1.2.
2. Only City personnel shall operate City water valves and fire hydrants.
3. Replacement of fire hydrants shall occur same day. Only one fire hydrant may be non-functional at any given time.

B. Services

1. Notify business owners at least 24 hours in advance of turning off water service.
2. Schedule with Water Department staff for support services 24 hours in advance.
3. Provide water service at the end of each work shift.

703-2.2 PRODUCTS

703-2.2.1 Pipe

A. Water Main

1. Pipe
 - a. Main Line - C900 per City Standard Plans
 - b. Water Services
 - 1" - HDPE CTS 200 class or better
 - 2"- Poly pipe tubing, gold label, 200 psi
2. Ductile Iron Pipe
 - a. Encased in 8 mil (minimum) polyethylene film in tube form.
 - b. Conform to ANSI/AWWA C105/A21.5-99 or most recent issue
3. Fittings
 - a. Ductile iron mechanical joint type.
 - 1) Conform to City Standards
 - 2) Other type as approved by Engineer
 - b. Flanged Fittings
 - 1) Above ground installations
 - 2) On tees when attached to a flange by mechanical joint valve or fitting.
 - 3) As approved by the Engineer.
 - c. Restrained Joint Fittings
 - 1) Conform to City Standards
 - 2) Required on all crosses, tees and anywhere a fitting is required to make a bend in alignment of the water main.
 - 3) Unless otherwise specified or shown on the Plans
 - d. Gate Valves – City Standard 501
 - 1) Mechanical joint type
 - 2) Resilient wedge type
 - 3) America 2500 Series, Clow C509 or 515 series, US Pipe USPO Series, or equal as approved by the Engineer.
 - e. Boxes and Vaults

- 1) Water Meter Boxes
 - i. Single – Christy B9 or equivalent
 - ii. Double – Christy B24G or equivalent
 - iii. As shown on plans
- 2) Water Valve Boxes
 - i. Christy G5 Traffic Rated
- f. Fire Hydrant Assemblies
 - 1) Per City Standard 502
- g. Pressure Reducing Valves
 - 1) Watts 25 AUB, 1” or 2” as applicable
- h. Pack Joint Couplings
 - 1) Fitting shall be made of brass
 - 2) Mueller Pack Joint Coupling
 - 3) Equal approved prior to bid
 - 4) Appropriate type to match domestic water service
- i. Bolt-on Hot Tap Service Saddles
 - 1) Smith Blair Style 239 Full Circle Double Band (1” or 2”)
 - 2) Or equal approved prior to bid.
- j. Manifolds
 - 1) Manifolds shall be constructed with threaded brass pipes and fittings from the end of the service lateral to the meter connection. No plastic pipe shall be used in constructing manifolds of any kind.
 - 2) Or equal approved prior to bid.

B. Bedding

1. Sand bedding shall be used for all water services. Bedding shall extend a minimum of 6 inches to 12 inches maximum above the service.

C. Backfill

1. Backfill under pavement shall be CLSM unless otherwise allowed by Engineer. If aggregate base is used, Contractor shall provide compaction testing results.
2. Backfill under sidewalk shall be ¾” Class 2 aggregate base compacted to 90% relative compaction.

703-2.3 EXECUTION

703-2.3.1 PREPARATION

- A. Locate water services per Section 700-4.3
- B. Contact each water service user to coordinate work and to determine any user issues.
- C. Determine location of water meter boxes relative to concrete tooling joints.
- D. Work shall not be initiated on disrupting a water service until all of the necessary parts are on site and immediately available.
- E. Provide plan for emergency connection to service in case of emergency or unknown condition.
- F. Make a determination prior to work based on the potholing information relative to the location of service connection, either outside at building foundation wall or beneath building.
- G. Perform coring work prior to 10 PM for water services.
- H. Make arrangements to have access to buildings during work shift affecting the building.

703-2.3.2 DEMOLITION, EXCAVATION AND BACKFILL

- A. Demolition of existing sidewalk, curb, gutter and pavement shall be performed prior to 10 PM.
- B. Removal of concrete debris, excavation and backfill shall use methods and equipment which minimize noise.
- C. Only disrupt services which can be reconnected during the same working shift.
- D. Prior to backfilling, each water line shall be sanitized as required and pressure tested.
- E. Relocated hydrants shall be out of service no longer than 24 hours.
- F. The new hydrant lateral and riser shall be swabbed with chlorine prior to installation. After installation, the hydrant shall be flushed to the satisfaction of the City Engineer.
- G. Bedding shall be placed a minimum of 6 inches and no more than 12 inches over the service lateral pipe. Bedding shall be mechanically compacted to 90% relative compaction. Jetting will not be allowed.
- H. Excavations that are not backfilled shall be either have plywood placed over them on sidewalks or steel plates in the roadway. No trench shall go more than 2 work shifts without being backfilled to the surface or the roadway or to the native subgrade elevation under the sidewalk.

703-2.3.3 LAYING AND HANDLING PIPE MATERIALS:

- A. All pipe shall be laid in accordance with the City Specifications, as specified on the Plans, and in accordance with these Special Provisions.
- B. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter. The engineer may reject stockpiled pipe with exposed ends. At times when pipe laying is not in progress, the open ends of installed pipe shall be closed by mechanical plug or other means approved by the Engineer.
- C. Prior to start of pipe laying, the Contractor shall expose the end(s) of existing main(s) to determine individual lines and grades. New mains shall begin eight (8) feet from and on the same line and grade as the existing main. New mains shall be installed at minimum standard cover conforming to the requirements of the City Water System Design Standards, or as shown on the Plans. Restrained fittings and ductile iron pipe shall be used to make grade transitions for tie-ins to existing mains that are at less than minimum standard cover.
- D. The Contractor shall completely expose the existing water main to verify lengths and OD's for the lowered section. The replacement water line shall be completely assembled on the surface and swabbed with chlorine before the existing line is shut down and cut. After installing the lowered section the line shall be flushed at the nearest hydrant to the satisfaction of the City Engineer.
- E. Thrust blocking shall conform the City Specifications and plans, the details on the Plans and these Special Provisions.
- F. Pipe between building and meter shall be the same piping used between the main and meter. Coupling at building shall be made using appropriate size pack joint coupling.
- G. Produce coupon from each hot tap.
- H. Supply and install 1 inch ball valve on customer side of meter.

703-2.3.4 WATER MAIN CONNECTION WORK

- A. Water main tie-ins shall conform to the City Standards and these Special Provisions.
- B. The Contractor shall schedule tie-in work with the City through the Inspector. The Contractor shall submit a separate request to the City to schedule each individual mainline shutdown required to facilitate a tie-in. The Contractor shall make shut down requests at least two working days before requested shutdown. The City will attempt to facilitate shutdowns within these timeframes; however, extenuating circumstances

may result in response times in excess of those mentioned above. Under such conditions, no claims related to tie-in delays will be considered. All shutdowns and valve turning operations shall be performed by authorized City personnel only. Authorized City personnel must be present during all tie-in operations. No tie-ins shall be performed without prior authorization by the Engineer.

- C. When a connection is required to an existing water line, the contractor shall provide all excavation, shoring, backfill and trench resurfacing in accordance with City Standards and the Plans.
- D. During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed shall be thoroughly swabbed with a strong liquid chlorine solution prior to installation.
- E. Tie-in or cut-in tee connections to cast iron, PVC, or ductile iron pipes shall be made with mechanical joint solid sleeves. Flexible connections shall only be used when connecting to asbestos cement and "over-sized" cast iron pipe.
- F. Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.

703-2.3.5 HYDROSTATIC TEST

- A. Hydrostatic testing of the water main and appurtenances installed under this contract shall be performed in accordance with of the City Specifications and these Special Provisions. The water main shall be filled at a rate not to exceed the limits of the air release valves.
- B. Hydrostatic testing of the water services shall consist of a full pressure test for a minimum of 30 minutes. The pressurized line shall be visually inspected prior to backfilling. After hydrostatic testing, the line shall be flushed from within the building until chlorine is no longer detected.

703-2.3.6 DISCHARGE OF CHLORINATED WATER

- A. Chlorinated water used to disinfect the new water mains is the property of the Contractor and its disposal is the responsibility of the Contractor. Chlorinated water used to disinfect the new mains shall be disposed of in accordance with all laws and regulations. Discharge to the storm drain system or a waterway is not permitted without a permit from the North Coast Regional Water Quality Control Board.
- B. Discharges may be allowed to be disposed of into the sanitary sewer system, but must first meet the following requirements:
 - 1. The pH of the water must be between 6.0 and 9.5.
 - 2. The Contractor shall maintain an **"air gap"** from the discharge conduit to the receiving sewer manhole frame with a minimum vertical distance of twice the diameter of the discharge conduit.

703-2.3.7 LOCATING AND ADJUSTING WATER VALVE BOXES

- A. After a street has been paved, mark the location of all water valve boxes in white paint before the close of that work day. Within 72 hours of paving, adjust all water valve boxes to grade.

703-2.4 PAYMENT

- A. Water Main and Services shall be paid as a combination of unit price and lump sum prices as follows:

1. Single and Dual Water Service Laterals will be paid for at the contract price for each which includes full compensation for furnishing all labor, materials, tools, equipment and doing all work involved in connecting service laterals from the new water main to the existing water service at or under the building including coring as shown on plans, including salvaging and reinstalling meters at correct locations. For new service locations (water service stubs) without a service pipe from the meter box to the building, the cost shall include the pipe sleeve and coring into the building.
2. Cluster Water Meter Service Laterals (3 and 4) will be paid for the contract price each which includes full compensation for furnishing all labor, materials, tools, equipment and doing all work involved in connecting service laterals from the new water main to the service tie ins at the building including all of the water services as shown on plans and all necessary manifolds.
3. Remove and Relocate Existing Fire Hydrant will be paid for at the contract price for each, which price shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved, including but not limited to: excavation and disposal of excavated materials, removal, salvage and relocation of existing hydrant, installation of riser, pipe and fittings, thrust blocking, backfill, sidewalk or other surface repair as required, and testing, as specified herein, and no additional allowance will be made therefor.
4. Water Main Installation will be paid for at the contract unit price each complete and in place. Full compensation for furnishing all labor, materials, tools, equipment, incidentals, and for doing all the work involved shall be considered as included in the contact unit price for water main lowering, regardless of size, as shown on the plans, as specified in these Special Provisions and as directed by the City, including but not limited to:
 - a. saw cutting,
 - b. excavation and disposal of excavated material, and repair of existing main where necessary to close existing connection where appropriate.
 - c. furnishing, placing and compacting all required bedding and backfill, including control density fill (where required),
 - d. furnishing and installing fittings as needed,
 - e. furnishing and installing restrained joints, thrust blocking, and harnesses as required,
 - f. furnishing and installing pipe,
 - g. testing,
 - h. chlorination,
 - i. polyethylene wrap,
 - j. connections to water mains,
 - k. dewatering trench
 - m. and any other work required for water main installation not specifically enumerated in the plans or specifications, and no additional compensation will be made therefor.

703-3. SEWER MAIN AND SERVICE LATERAL CONSTRUCTION

703-3.1 GENERAL

703-3.1.1 SUMMARY

A. Includes But Not Limited To:

1. Removing and replacing sewer main as indicated on the drawings.
2. Installing new sewer main as indicated on the drawings.
3. Installing new rodding inlets
4. Installing new drop connections into existing SSMH
3. Removing and reconstructing sewer service laterals as indicated on the drawing.
4. Connections to existing building sewer services in accordance with Building Codes.
5. Providing boxes and other appurtenant work to complete work in place.
6. All sewer mains, service laterals, and related appurtenances shall be constructed in accordance with the Standard Plans and Specifications, the City Standards, the Plans and these Special Provisions.

703-3.1.2 SUBMITTALS

A. Provide product data sheets for the following:

1. Pipe and Fittings, Covers

B. Shoring Plan

1. Submit Shoring Plan for excavations over 5 feet in depth at least 5 days in advance of work.
2. All bracing and shoring shall conform to Section 65-2, "Trench Bracing and Shoring" and the Division of Industrial Safety Construction Safety Orders, which are currently in use.
3. The Contractor shall take all necessary measures to protect the workers and adjacent areas and structures from the hazards of the trenching or excavation operations.

703-3.1.3 SCHEDULING

A. Sewer Mains and Manholes

1. Schedule with Sewer Department staff 24 hours ahead of sewer main shutoff and manhole work. Shutoffs shall be shown on the schedule as required in Section 6-1.2.

B. Services

1. Notify business owners at least 36 hours in advance of disrupting sewer service.
2. Schedule with Sewer Department staff for support services 24 hours in advance.
3. Provide sewer service at the end of each work shift.

703-3.2 PRODUCTS

A. All sewer pipe shall be PVC – SDR 26 piping

B. Fittings

1. Min. 20' Long Sweep unless otherwise approved
2. Elastomeric Fittings

C. Manholes, Frames and Grates

1. Comply with City Standards

D. Bedding

1. Sand bedding shall be used for all sewer mains and service laterals. Bedding shall extend a minimum of 6 inches to 12 inches maximum above the pipe.

E. Backfill

1. Backfill under pavement shall be CLSM unless otherwise allowed by Engineer. If aggregate base is used, Contractor shall provide compaction testing results.

2. Backfill under sidewalk shall be $\frac{3}{4}$ " Class 2 aggregate base compacted to 90% relative compaction.
- F. Sewer Cleanout Lids
 1. Cleanout lids shall be Christy F8 Box with F8D lid for non-traffic areas and F8C LID for traffic-rated areas.

703-3.3 EXECUTION

703-3.3.1 PREPARATION

- A. Locate sewer services at buildings per Section 700-4.3
- B. Contact each sewer service user to coordinate work and to determine any user issues.
- C. Determine location of water clean out boxes relative to concrete tooling marks per plan.
- D. Do not disrupt a sewer service until all of the necessary parts are on site and immediately available.
- E. Provide plan for emergency connection to sewer service in case of emergency or unknown condition.
- F. Make a determination prior to work based on the potholing information relative to the location of service lateral either outside at building foundation wall or beneath building.
- G. Perform coring work prior to 10 PM for water or sewer services.
- H. Make arrangements to have access to buildings during work shift affecting the building.

703-3.3.2 DEMOLITION, EXCAVATION AND BACKFILL

- A. Demolition of existing sidewalk, curb, gutter and pavement shall be performed prior to 10 PM.
- B. Removal of concrete debris, excavation and backfill shall use methods and equipment which minimize noise.
- C. Only disrupt services which can be reconnected during the same working shift.
- D. Bedding shall be placed a minimum of 6 inches and no more than 12 inches over the service lateral pipe. Bedding shall be mechanically compacted to 90% relative compaction. Jetting will not be allowed.
- E. Excavations that are not backfilled shall be either have plywood placed over them on sidewalks or steel plates in the roadway. No trench shall go more than 2 work shifts without being backfilled to the surface or the roadway or to the native subgrade elevation under the sidewalk.

703-3.3.3 LAYING AND HANDLING PIPE MATERIALS:

- A. All pipe shall be laid in accordance with the City Specifications, as specified on the Plans, and in accordance with these Special Provisions.
- B. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter. The engineer may reject stockpiled pipe with exposed ends. At times when pipe laying is not in progress, the open ends of installed pipe shall be closed by mechanical plug or other means approved by the Engineer.
- C. Prior to start of pipe laying, the Contractor shall expose the end(s) of existing main(s) to determine individual lines and grades.
- D. Sewer flow may be stopped at upstream manholes or other locations as approved by the Engineer. All blocked flows shall be cleared by 6 AM.
- E. Pipe coupling at building shall be made using appropriate sized caulder type coupling

703-3.3.4 SEWER MAIN CONNECTION WORK

- A. Sewer main tie-ins shall conform to the City Standards and these Special Provisions.

- B. When a connection is required to an existing sewer pipe, the contractor shall provide all excavation, shoring, backfill and trench resurfacing in accordance with City Standards and the Plans.
- C. During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the sewer main and shall conduct all operations in accordance with the most stringent sanitation practices. Tie-in or cut-in tee connections to cast iron, PVC, or ductile iron pipes shall be made with mechanical joint solid sleeves. Flexible connections shall only be used when connecting to asbestos cement and "over-sized" cast iron pipe.
- G. Pipe and fittings furnished for tie-ins shall be no smaller than the existing sewer main to which each tie-in is made.

703-3.3.5 TESTING

- A. After completion of the main and laterals in a block long segment, the system shall be air pressure tested at 6 psi for 30 minutes.
- B. Any main or lateral which does not pass the pressure test shall be replaced.
- C. Sewer main and lateral testing shall be completed prior to sidewalk placement.

703-3.3.7 LOCATING AND ADJUSTING MANHOLES AND CLEANOUTS

- A. After a street has been paved, mark the location of all manholes, cleanouts and rodding inlets in the pavement area prior to the close of that work day. Within 48 hours of paving, adjust all manholes, cleanouts and rodding inlets to grade.

703-3.4 PAYMENT

- A. Payment for sewer utility items shall be paid as follows:
 1. Sewer Mains shall be paid by the lineal foot.
 2. Sewer Service laterals shall be paid by the each per location. Payment includes all work associated with demolition of the existing main, installation of the lateral including connecting to the main, cleanout, connection to the building, cleanout box and any other appurtenant work necessary to complete the work in place.
 3. Manholes shall be paid by the each per location.
 4. Sewer drop connections shall be paid for by the each per location. Payment includes all work and materials associated with the installation of the connection including coring into the exiting manhole.
 5. Rodding Inlets and covers are paid for by the each per location.

703-4 UTILITY ADJUSTMENT

703-4.1 GENERAL

703-4.1.1 SUMMARY

- A. Includes But Not Limited To
 1. Adjusting Utility Covers and Boxes in Pavement Area
 2. Adjusting Utility Covers and Boxes in Sidewalk Area
 3. Lowering Utility Covers and Boxes prior to Cold Planning
- B. Work shall be governed by City of Lakeport Standard Plans

703-4.2 PRODUCTS

- A. Boxes, Valve Covers and Vaults

1. All new boxes shall be used in accordance with the applicable Special provision and project plans.
 2. All Manhole Frames and Grates shall be new
- B. Concrete
1. Concrete for adjusting utilities shall be as follows:
 - a. 7 sack mix
 - b. 1 Inch max aggregate
 - c. 1 lb. of lamp black color per cubic yard
 - d. 4 inch maximum slump
 - e. Commercially batched

703-4.3 EXECUTION

- A. Preparation
1. Prior to cold planning, all utilities will be lowered below grade including areas of additional pavement removal.
 2. Manholes and valves shall be protected with adequate coverings to prevent damage.
- B. Excavation
1. Location shall be identified at time of lowering paving.
 2. The completed cutout shall be circular in nature. The circle shall be concentric with the utility to be raised. The Contractor shall carefully layout the border of the excavation such that no residual markings will be evident after cutting.
 3. The concrete collar dimensions shall be as follows +/- 1 inch:
 - a. Manholes – 12 inches beyond edge for frame
 - b. Valve Boxes, Cleanouts and Rodding Inlets – 6 inches beyond edge of box.
 - c. All collars shall have a 12 inch depth.
 4. The variance from the surface of the completed work shall be 0.01 feet in the direction of travel and 0.02 feet traverse to the direction of travel.
 5. The completed concrete collar shall be protected until cured. If placed within 6 hours of street opening, the location shall be steel plated.
 6. Any markings, tire damage or other visual discontinuity shall be cause to have the work completely redone.
 7. During work on sewer and storm drain manholes, the manholes shall be protected from any debris entering the sewer and storm drain system by placing a false bottom made of plywood over the pipe. Over the plywood shall be placed a fabric catchment constructed such that any debris which enters the manhole may be removed with the removal of the catchment without spillage into to system.
 8. Failure to protect sewer and storm drain lines from debris will cause the City to clean the associated manholes and pipelines at the Contractor's expense. The minimum charge will be \$2,000.
- C. Collar Construction
1. The collar concrete shall be placed within 2 hours of concrete batching.
 2. The top of the collar shall be finished with a steel trowel and receive a medium broom finish. The brooming shall be circular in nature and follow the edges of the collar.
 3. Finish surface shall be within tolerances and protected per above.
 4. The interior of storm drain and sewer manholes shall have the space between the frame and cone grouted solid per Standard Details.
- D. Cleaning
1. After completion of adjusting and grouting of manholes, the protective measures required herein shall be removed.
 2. Any damaged portion of the interior of any manholes shall be repaired to the City's satisfaction.
 3. A cement, pavement or other contaminant shall be completely removed from frames, grates and lids.
 4. Water valve risers shall be cleaned such that the entire valve nut is exposed.

703-4.4 PAYMENT

- A. All manhole covers, valve boxes, rodding inlets adjusted as part of the work shall be paid at the contract unit cost per each locations. The unit cost includes the cost of lowering, adjusting, protecting and cleaning.

704 CONCRETE WORK

704-1 GENERAL

704-1.1 SUMMARY

- A. Includes But Not Limited To
 1. Removal of existing concrete and related materials.
 2. Compact subgrade for cast-in-place concrete site elements.
 3. Furnish and install base for cast-in-place concrete site elements.
 4. Provide and install inserts for flagpole and sign pole bases.
 5. Furnish and install nose tread inserts.
 6. Furnish and install handrails.
 7. Furnish and install tree frames and grates
 8. Furnish and install expansion joints and concrete joint sealant (caulking).
 9. Detectable Warning Surfaces
 10. Paint colors or handrails

704-1.2 REFERENCES

- A. 2010 Caltrans Standard Specifications
- B. Applicable ASTM Standards

704-1.3 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing steel shall be free of heavy rust scales and flakes, or other coating at time of delivery and placing. Properly protect rebar on site after delivery.

704-1.4 SUBMITTALS

- A. Concrete Mix Designs
- B. Quality Assurance/Control
 - Delivery Tickets - Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or representatives. Tickets shall show following:

Name of ready-mix plant
Serial number of ticket
Date and truck number
Name of Contractor
Name and location of Project
Specific class or designation of concrete in conformance with the specifications.
Class or designation shall match mix approved mix design.
Amount of concrete
Time loaded
Type, name, and amount of admixtures used.
Amount and type of cement
Total water content including water added on site
Sizes and weights of sand and aggregate
Fiber additive

C. CLSM

D. Safety Treads

E. Detectable Warning Surface

F. Colored/Textured Concrete

1. Cement color: Submit Davis color samples to City.
2. Patterns: Submit patterns to City
3. Allow 5 calendar days for submittal review of plain concrete.
4. Allow 15 calendar days for submittal review of colored concrete

G. Concrete Test Panel

1. The Contractor shall construct a minimum 10 foot by 12 foot test panel containing both stamped colored concrete (if chosen) and the normal medium broomed finish. The panel shall contain contraction joints, expansion joint, edge finishes, and intermediate tool joint.
2. The colored and stamped insert portion shall be placed no sooner than 7 calendar days after the normal concrete is placed.
3. The test panel will be constructed at a location near the project or the Contractor's storage yard as determined by the Engineer.
4. The test panel will be constructed at night in the same or similar conditions as the remainder of the concrete is to be placed.
5. The normal finish concrete will be accepted or rejected within 4 calendar days after construction. The colored concrete portion will be accepted after 14 calendar days
6. The concrete work shall be consistent in color and appearance.
7. The test panel shall set the standard of workmanship for the remainder of the project and used to judge the acceptability of the remainder of the work.

704-2 PRODUCTS

704-2.1 MATERIALS

A. Formwork

1. Material: Wood, metal or plastic
2. a. Size – as required.
 - b. Straight Runs - 2 inch nominal minimum thickness.
 - c. Curves - laminated to 3/4 inch minimum thickness.
 - d. Depth - Within 2 inches of specified depth.
3. Staking - 2 foot maximum spacing.

B. Aggregate Base -

1. 3/4 inch Class 2 Aggregate per Section 26 of Caltrans Standard Specifications.

- 2. Comply with 702-2.D
- C. Controlled Density Fill-
 - 1. Comply with 702-2.A
- D. Expansion Joints
 - 1. Manufactured commercial fiber type meeting requirements of ASTM D 1751 and 1/2 inch thick. Asphalt impregnated commercial fiber shall be provided against all buildings as noted in plans.
- E. Concrete Reinforcing Steel
 - 1. Grade 40 deformed bars.
- F. Concrete
 - 1. Type I/II Cement
 - 2. All concrete:
 - a. 1" maximum aggregate size.
 - b. 5 sack minimum.
 - c. 2,500 psi in 28 days.
 - d. 4 inch maximum slump.
- H. Safety Treads (edge warning) –
 - 1. Wooster Products Inc. Type 231 complying with latest addition of UBC for placement and color.
 - 2. Warning strip on top and bottom steps to differ in color from intermediate stair treads.
- G. Detectable Warning Surface -
 - 1. Tactile warning dots per Section 1133B.8.5 of the most recent edition of the California Building Code.
 - 2. 36” Minimum width.
 - 3. Durable, slip resistant material with a surface texture composed of raised, truncated domes in a staggered pattern with a diameter of nominal 0.9” at the base tapering to 0.45” at the top, a height of nominal 0.2”, and a center spacing of nominal 2.35”.
 - 4. Color as specified on plans. If no color is specified, color shall be Colonial Red.
 - 5. “Set-in-concrete” system required (No glued & screwed mat systems installed after finished concrete)
 - 6. Acceptable Products (in colonial red):
 - a. “Wet-Anchor Box” by Disability Devices, Inc.
http://www.disabilitydevices.com/Offset_Dome_Tactile_Warning_Mat.html
 - b. “Cast-in-Place System” by Armor-Tile.
<http://www.armor-tile.com/truncateddomes/surface-applied-systems.htm>
 - c. Approved equal by Owner’s Agent prior to bidding.
- I. Handrails
 - 1. Posts, Rails, and Handrails -1-1/4 inch (I.D.) - Sch. 40 galvanized pipe
 - 2. Sleeves – 2 inch diameter by 7 to 9 inches long galvanized steel pipe
 - 3. Mastic/Grout – Super Por-Rock Burke Stone or equal.
 - 4. Industrial Grade primer and enamel pain, color selected by City
- J. Tree Well Frames and Grates
 - 1. See Landscape Plans
- K. Joint Sealant
 - 1. Sika 2c SL Joint Sealant – Limestone Grey
 - 2. Deck of Seal Gun Grade Joint Sealant – Grey
 - 3. Or Equal approved prior to Bid

704-3 EXECUTION

704-3.1 PREPARATION

- A. Survey and stake concrete work to indicate location and elevations.
 - 1. Accurately locate tooled joint locations relative to utility box installation per concrete layout plans
 - 2. Locate handrail, sign post and flagpole sleeves.
- B. Subgrade
 - 1. Fine grade to elevations required by Contract Documents with allowances for required concrete and aggregate base thickness.
 - 3. Compact to 90 percent relative compaction at optimum moisture +/- 2 percent.
- C. Aggregate Base
 - 1. Place required thickness.
 - 2. Fine grade to elevations on drawings with allowances for required concrete thickness.
 - 3. Compact to 90 percent relative compaction at optimum moisture +/- 2 percent.
- D. Protection of Existing Facilities
 - 1. All vertical surfaces within 10 feet of the work shall be covered to a height of 3 feet with sheet plastic
 - 2. Existing hardscape surfaces shall be protected with tape and plastic sheeting.
 - 3. Any damage to adjacent finishes shall be repaired to the satisfaction of the owner. Repainting shall extend across the entire plane from corner to corner.
- E. Complete All Underground Work Prior to Sidewalk Installation
 - 1. Complete installation of all sewer laterals, water services, irrigation lines and electrical conduits.
 - 2. Test all lines as provided herein or as directed by the Engineer.

704-3.2 INSTALLATION

- A. Site Tolerances
 - 1. Vertical
 - a. Subgrade - 0.00 feet high.
 - b. Aggregate Base - 0.00 feet high.
 - c. Finish Concrete +/- 0.02 feet.
 - 2. Horizontal
 - b. General Finish Concrete - +/- 0.04 feet.
 - c. Required Widths - 0.00 to +0.04 feet.
 - 3. Layout
 - a. Horizontal dimensions shall be within +/- 0.04 feet.
 - 4. Exterior Accessible Travel Paths
 - a. Slopes shall be per plan.
 - b. Landings, Ramps, Crosswalks, Sidewalks, and other Pedestrian Travel Paths Cross slopes – As designated, generally 1.5% with 2 percent maximum.
 - c. Sidewalks – 5.0 percent or less longitudinal slope.
 - d. Ramps – As designed with maximum 8.33 percent or less longitudinal slope.
 - e. Maximum vertical distance between landings - 30 inches.
 - f. Variations in stairs

- 1) Consecutive steps-
 - Treads -1/4 inch, 11 inch minimum width.
 - Risers - 1/4 inch, 4 inch minimum, 7 inch maximum.
- 2) Flight of stairs -
 - Treads -3/8 inch.
 - Risers - 3/8 inch.
5. Landings at Doorways -
 - a. 1/4 inch maximum differential between top of threshold and surface of landing.
6. Forms
 - a. Vertical surfaces shall be formed to within 2 inches of subgrade.
 - b. Gaps between forms shall not exceed 1/4".
7. Joints
 - a. All joints shall be located per plan layout
 - b. Align joints of sidewalk and curb and gutter.
8. Expansion Joints with joint material
 - a. Spacing - as shown on plans
 - b. Full depth of sidewalk, curbs, gutters, pads, etc.
 - c. If reinforcement required, rebar to extend through expansion joint material.
 - d. Place at corner of curb and curb & gutter.
 - e. Install so top of expansion joint material is 3/8 to 1/2 inch below finished concrete surface.
 - f. No expansion joint required between curbs and walks parallel to curb.
 - g. Provide expansion joint at end of walks perpendicular to and terminating at curb.
 - h. Provide expansion joint between concrete work and buildings. Construct per plan details including preparation of existing building finishes.
 - i. Expansion joints shall be installed at conform with existing concrete surfaces.
 - j. Seal Joints in accordance with Manufacturer's application instructions.
9. Contraction Joints
 - a. Locations on indicated on plans. In not shown, per below:
 - b. Spacing -
 - 1) Sidewalks, Curbs, and Curb & Gutter - 8 feet on center.
 - 2) Mechanical Pads, Dumpster Enclosures, etc. - 8 feet on center.
 - 3) Flat Drainage Structures - 8 feet on center.
 - c. Contraction Joint Depth
 - 1) 1-1/2 inch minimum depth.
 - 2) 1/4 to 1/3 concrete thickness.
 - d. Location
 - 1) Align sidewalk and curb and/or gutter.
Place at all inside corners.
 - 2) At square utility boxes, place contraction joints at each corner.
 - 3) At round utility boxes, place joint through center to nearest edges of concrete.
 - 4) Spacing may be increased or decreased to 8 feet to accommodate utility boxes.
 - e. Type
 - 1) Tooled joint up to 6" concrete depth. Tooled joint required for all sidewalks. Saw cuts not allowed. Tooled joint may be deepened with saw cut within 24 hours of concrete placement if necessary.
 - 2) Saw cut or parting strip for concrete depths over 6 inches. All saw cuts

shall be made within 24 hours of concrete placement.

3) Quality of control joint finish evaluated as part of test panel

- f. Edge Warning, Stair Treads, etc. - Precut and place prior to concrete placement where practical in accordance with manufacturer's recommendation.
- g. Crack Repair - Cracks resulting from failure to comply with requirements will require removal and replacement of entire panel or section of concrete to adjacent contraction joints.

B. Finish

- 1. Curb, Gutter, Slabs, Mow Strips, Flat Drainage Structures, And Miscellaneous -
 - a. Light Broom finish.
 - b. Round edges including edges formed by expansion joints.
 - c. Remove edger marks.
- 2. Sidewalk
 - a. Unless specified otherwise on plans, sidewalks shall have a light broom finish with the following requirements:
 - b. Round edges including edges formed by expansion joints.
 - c. Remove edger marks.
- 3. Curb Faces -
 - a. Remove forms as soon as practical.
 - b. Fill voids with fresh concrete if necessary.
 - c. Finish face full depth with smooth steel trowel finish.
 - d. Remove any excess concrete beyond form line at bottom of curb face at time of finishing.
- 4. Walls -
 - a. Immediately after removing forms, remove joints, marks, bellies, projections, loose materials, and cut back metal ties from surfaces to be exposed.
 - b. Point up voids with cement mortar, 1:2 mix, and rub exposed surface with carborundum to smooth, even surface.
- 5. Ramps - Medium broom finish transverse to direction of travel on ramp.

C. Special Requirements

- 1. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree. Remove any excess concrete beyond form face immediately after forms removed.
- 2. Sidewalks, Exterior Stairs, and Landings -
 - a. Slope to drain.
 - 1) Slope sidewalks with cross slope of 1 percent minimum to 2 percent maximum in direction of intended drainage.
 - 2) Slope sidewalks away from building one percent minimum.
 - 3) Dusting with cement not permitted.
 - 4) Adding water during finish not permitted.
- 3. At Channel Iron over Rain leaders -
 - a. Grout space between pipe and channel iron at curb face and sidewalk edge.
 - b. Grind 1/4 inch bevel on saw cut edge if applicable prior to concrete placement.
Round over concrete edge of fresh concrete.

D. Colored and Textured Concrete

- 1. Place all colored and textured concrete on each side of each block at the same time
- 2. Provide solid barricades to surround the work area for a minimum of 3 days after placement. As an alternative, cover with cardboard (RAM or equal).

E. Detectable Warning Surfaces -

- 1. 36 inch minimum width, length per plan.
- 2. Surface flush with adjacent concrete.

3. Construct with no significant voids under insert
4. Install warning surface in accordance with manufacturer's recommendations.
5. Assure compliant ADA slopes on panel and adjacent concrete.

704-3.3 FIELD QUALITY CONTROL

- A. Inspection - Do not place concrete unless inspection has been made of formwork and inspector is present.

704-4 PAYMENT

- A. Detectable Warning Surface – measured and paid for on a square foot.
- B. Stair Treads – included in the bid price for raised landing and no separate payment will be made.
- C. All other items of site work concrete to be measured and paid for as listed in the bid schedule and shall be considered full compensation for all labor, equipment, and materials required to perform the work as described herein.
- D. If sample panel(s) is required it shall be included in the unit cost of the work.

705 COLD PLANING

705-1 GENERAL

705-1.1 SUMMARY

- A. Includes But Not Limited To
 1. Cold planing existing asphalt concrete for transitions and conforms.
 2. Removal of dig outs and repair areas.
 3. Removing CLSM backfill in trenches crossing the full depth HMA in travel lanes
 4. Reducing the thickness of existing asphalt concrete pavements.
 5. The pavement to be cold planed may contain pavement fabric.
- B. Scope of Cold Planing
 1. The entire pavement will be cold planed to grades provided by the designer in a digital surface model.
 2. The Contractor shall have the experience and capacity to use the establish cut and fill grades on the existing pavement prior to cold milling.
 3. A minimum of 2 working days shall be provided to the Engineer to review the cut and fill grades after they are marked on the pavement prior to cold planing.
 4. The average mill depth will not exceed 3 inches average.
 5. Additional pavement removal areas will be marked by the Engineer after the cold milling is completed. The locations shall be marked by the Engineer during the day after the cold milling is complete to facilitate the following night.
 6. Utility trench crossing removal areas will be marked by the Engineer at the same time as the pavement removal areas. Utility removal areas will be limited to 6 inches on either side of the trench.

705-1.2 PROJECT CONDITIONS

- A. Project Environmental Requirements
 1. Do not cold plane when precipitation is imminent.

705-2 PRODUCTS - NOT USED

705-3 EXECUTION

705-3.1 EXAMINATION

- A. Contractor shall visit the site to:
 - 1. Identify all utility surface features such as utility covers are clearly visible to work crews.

705-3.2 PREPARATION

- A. Layout transitions, conforms and milling limits for Owner to review prior to proceeding with the work.
- B. Lower utility facilities prior to reducing pavement thickness by cold milling.
- C. Provide cuts and fills as described above on a minimum of 20 foot intervals longitudinally and at each grade break at the lane edges (4 locations across pavement).

705-3.3 EQUIPMENT

- A. Cold planer shall be equipped with automatic controls and sensing devices. Cold planers shall produce finished surface within 0.02 foot tolerance. The width of the cold planer shall match the smallest pavement removal area. Multiple cold planers may be used.
- B. Equipment shall be capable of cold planing concrete.
- C. Contractor shall maintain equipment by changing teeth as often as necessary to provide a smooth surface which meets the required tolerance.
- D. Cold planers shall be equipped with water spray devices to prevent the creation of dust.
- E. Cold planing equipment shall not be cleaned on site using water application unless specific measures for such cleaning have been addressed in the project SWPPP.

705-3.4 APPLICATION

- A. General
 - 1. All pavement grindings shall be trucked and stockpiled at the designated location on the plans.
 - 2. If the depth of pavement removal extends into native material, the removal shall be performed in two steps to prevent contamination of the grindings with native material.
 - 3. Prevent damage to gutter lips, curbs or other facilities while cold planing. If necessary, use hand removal methods.
- B. Transitions
 - 1. Cold plane to width and depth as indicated on project plans and details.
 - 2. For full-depth transitions, cold planing may extend below existing asphalt pavement section into underlying base material to meet depth requirement. .
- C. Pavement Repairs
 - 1. Remove pavement to the limits indicated on the plans or as marked on the pavement by the Engineer.
 - 2. If excess pavement is removed due to contractor equipment selection, excess area shall be replaced per specification without any additional expense to the City.
 - 3. The ends of the cold planed removal area need not be saw cut perpendicular with the pavement surface.
- D. Dust Control
 - 1. Cold planers and sweepers shall maintain spray application to prevent dust at all times.
 - 2. Hand work areas shall use hand sprayers or other means to control dust.
 - 3. Dust control measures shall not create ponding of applied water on the pavement or runoff into the gutters or storm drain system.
- E. Finishing
 - 1. Remove remaining material between grinding edge and concrete surface edge (gutter, swale, sidewalk, etc.). Remove high areas inaccessible to cold planer by jack hammer or other means.
 - 2. Patch gouges or low areas by tack coating and filling with hot-mix asphalt. HMA shall be compacted using hand tamps or other means prior to the surface

temperature of the patch falling below 250⁰F. Patching is not required if the area will be covered by a leveling course of HMA.

F. Temporary Transitions

1. Temporary transitions shall be placed prior to opening to traffic if the drop off exceeds 0.10 feet.
2. Temporary transitions shall be constructed of cold patch asphalt. The transitions shall be 3 foot minimum and have a slope of 20H: 1V, whichever is greater.

705-3.5 TOLERANCES

A. Cold plane to limits and depths as follows:

Vertical:	+/-0.02 feet
Horizontal:	+/- 0.2 feet
Adjacent Passes:	0.02 maximum variance
Variance from Plane: (Using String line)	0.01' high to 0.05' low

B. Correct any high areas by cold planing.

705-3.6 CLEANING

- A. Sweepers shall have dust suppression spray equipment working at all times.
- B. Remove all grindings and debris immediately.
- C. Clean pavement by power sweeping. Areas inaccessible to power brooms shall be cleaned using hand brooms or power blowers. If power blowers are used, prevent damage to vehicles, landscaping and any other facilities. Repair any damage to property owner's satisfaction.
- D. Continue daily sweeping and cleaning until pavement restored.
- E. Clean drop inlet protections at the end of completion of cold planing. Retain inlet protections in place until paving is completed.

705-4 PAYMENT

A. Unit Prices

1. The contract unit prices indicated in the bid schedule shall apply to this work.

B. Measurement and Payment

1. Contractor shall supply documentation of lineal or area measurements.

706 HOT MIX ASPHALT (HMA)

706-1 GENERAL

706-1.1 SUMMARY

A. Includes But Not Limited To

1. Prepare pavement sub-grade to receive paving.
2. Furnish and install hot-mix asphalt for pavement repairs, leveling course and surface course.
3. Complete HMA Paving as provided in Section 39 of 2010 Caltrans Standard Specifications, Section 39- 1 General, Section 39-2 Standard Construction, and Section 39-Method Construction Process and as amended herein.

706-1.2 REFERENCES

A. Abbreviations and Acronyms

1. HMA – Hot Mix Asphalt
2. JMF – Job Mix Formula
3. QA – Quality Assurance Inspection and/or testing by Owner
4. QC – Quality Control Inspection and/or testing by Contractor
5. RAP – Reclaimed Asphalt Pavement

B. Reference Standards

1. ASTM - American Society of Testing and Materials or ASTM International
2. CT – Caltrans Test
3. 2010 Caltrans Standard Specifications Section 39
4. AASHTO – American Association of State Highway and Transportation Officials

706-1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting
 1. Contractor shall schedule a pre paving meeting no more than 5 working days nor less than 2 working day prior to first paving day.
 2. Attendees at the pre paving meeting shall include but not be limited to:
 - a. Owner's Representative
 - b. Contractor's paving foreman
 - c. Paving fabric installer (if applicable)
 - d. QA Representative
 - e. QC Representative
 - f. Other pavement users or affected parties as applicable.
- B. Sequencing
 1. Contractor shall sequence the work to minimize cold joints.
 2. Contractor shall sequence the work to prevent paving operations damaging new pavement.
 3. Contractor shall not commence paving until all Storm Water protection BMPs have been installed.
 4. Conforms at side streets shall be paved prior to Main Street.
 5. Parking areas shall be paved concurrently with through lanes
- C. Scheduling
 1. Contractor shall schedule the work after completion of all underground utilities including testing. Underground utilities shall be retested immediately prior to paving.
 2. Paving work shall not be performed until all concrete work is performed.

706-1.4 SUBMITTALS

- A. HMA JMFs
 1. Submit a JMF for each mix to be used. JMF shall be submitted on Caltrans CEM 3511 and CEM 3512 forms. If JMF is verified by Caltrans, submit CEM 3513
- B. Paving Grids/ Fabric/ Mats
 1. Provide manufacturers product information sheets of material to be used which demonstrate compliance with project specifications.
- C. Contractor QC Plan
 1. Provide QC Plan indicating compliance with requirements herein. QC Plan shall include the following as a minimum:
 - a. QC Manager and Organization Chart
 - b. AMRL and Caltrans Laboratory Certifications
 - c. Field Personnel Resumes and Certifications
 - d. Sample and Testing Log
 - e. Sample Reports and Labels
 - f. Action Plan for non-complying work or materials
 - g. Random Sampling Plan for materials testing and compaction testing
 2. Nominate Third Party Testing Laboratory

706-1.5 CLOSEOUT SUBMITTALS

- A. Delivery Tickets
 1. Submit delivery tickets for all mix used on the project at the end of each paving day. Tickets shall be organized by mix type and in sequential date order for that mix type.
- B. Testing Reports
 1. Provide test results for HMA materials and installation as required herein.

2. Manufacturers product information sheets of material to be used which demonstrate compliance with project specifications.

706-1.6 QUALITY ASSURANCE

A. Quality Assurance Inspection and/or Testing.

1. City may, at their option, have independent quality assurance inspection and testing.
 - a. Inspections may be made during or after the work.
 - b. QA Inspection and testing is for the sole purpose of providing the Owner a greater degree of assurance that the requirements of the contract have been met. QA inspection and testing does not relieve the Contractor of any responsibility to comply with or perform in accordance with the Contract documents.
2. All HMA testing laboratories shall be AMRL and Caltrans certified.

B. QC/QA Coordination

1. If QA compaction testing utilizing a nuclear gauge is to be used, Contractor shall coordinate gauge correlation testing with QA testing personnel during production startup on the first paving day.

C. QC/QA Sampling

1. The Contractor shall perform all sampling at both the plant and jobsite. The contractor shall provide qualified personnel for this sampling. Sample sizes shall meet the following minimums in size:

Sample Type	Sample Description	Sample Size (min)	Container
Aggregate	Hot Bin Samples	25 pounds	Bag
	Supplemental Fine Aggregate	5 pounds	Bag
	RAP Stockpile	25 pounds	Bag
	Combined Belt Sample	50 pounds	Bag
Binder		2 Quarts	Quart Metal Cans
Hot Mix		4 boxes	4'x8'x8"

2. Contractor shall split and label all samples. Label Samples with the following information:

- a. Project Name
- b. Supplier and Plant
- c. Date, Time, Tonnage Lot (if applicable) & Temperature (if applicable)
- d. Material Description (Aggregate source, binder type, mix type)
- e. Continuously maintain a sampling log which includes all of the information indicated above. Provide access to log during progress of the work and a completed copy of the sample log at the completion of work.

3. Contractor shall have QA samples transported to the jobsite or elsewhere if agreed upon by City representative.

D. Dispute Resolution

1. If the QC and QA test results differ on determining compliance, the Contractor can dispute the test results. The third parties shall use remaining test samples or determination of test results if practicable. Third party test results shall govern. Party losing dispute pays cost of third party testing.

706-1.7 PROJECT CONDITIONS

A. Project Environmental Requirements

1. Do not perform work during following conditions:
 - a. Ambient, base, or pavement temperature below 50 degrees F.
 - b. Presence of free surface water or damp pavement.
 - c. Unstable grade as demonstrated by proof rolling with a minimum of a 10 wheeler truck.
 - d. Over-saturated base and sub-base materials.

706-2 PRODUCTS

706-2.1 MATERIALS

A. Tack Coat

1. Tack coat on existing or new pavements shall be utilized and will be emulsified asphalt Grade RS-1, RS-1h, SS-1, or SS-1h and shall conform to Section 94, ‘Asphaltic Emulsions’, of the Standard Specifications.
2. Paving binder shall not be used as a tack coat for other than geotextile paving fabrics and or mats.
3. Tack coat for geotextile paving fabric shall be PG70-10.

B. Pavement Reinforcement Composite Grid

1. TenCate Mirafi PGM-G4, GlasGrid CG100, or equal approved prior to bid.

C. Mixes

1. The aggregate size for the HMA shall comply the sizes indicated in the contract documents. If aggregate size is not provided, comply with the following table:

Layer Type	Layer Thickness	HMA Aggregate Grading
Base Courses	1-3/4 to 2-1/2 inches 0.15 to 0.20 foot	1/2” Type A
	2-1/2 to 4 inches 0.20 to 0.33 foot	1/2” or 3/4” Type A
Full Depth Stabilization	6 inches and greater 0.50 feet and greater	3/4” Type A
Leveling Course	½ to ¾ inches 0.04 to 0.06 foot	No. 4 Type A
	¾ to 1-1/4 inches 0.06 to 0.10 foot	3/8” Type A
Surface Courses	1-3/4 to 2-1/2 inches 0.15 to 0.20 foot	1/2” Type A
	2-1/2 to 3 inches 0.20 to 0.25 foot	1/2” or 3/4” Type A

2. Current, approved and verified Job Mix Formula (JMF) for each mix supplied to the project.
3. The HMA mixes shall have the following indicated in the attached table in lieu of those indicated in Section 39-1.03B “Hot Mix Asphalt Mix Design”:

Mix Use	Property	Test Method	Value
Pathways and Pedestrian Area	Air Voids (%)	CT 367	2.5 to 3.5
	Stability	CT 366	33 minimum
Parking Areas and Residential Streets	Air Voids (%)	CT 367	3.0 to 4.0
	Stability	CT 366	35 minimum
Collectors and Arterials	Air Voids (%)	CT 367	4.0 to 5.0
	Stability	CT 366	37 minimum
Intersections and Trucking Facilities	Air Voids (%)	CT367	4.5 to 5.5
	Stability	CT 366	39 minimum

705-2.2.1 CONTRACTOR QUALITY CONTROL

706-2.2.2

A. Perform the following QC Testing:

Quality Characteristic	Frequency	Test Results Due
Aggregate Gradation	Production Startup and every 750 tons	Prior to 4 PM on the day following paving
Sand Equivalent		
Asphalt Binder Content		
HMA moisture content		
Aggregate moisture content at continuous mixing plants and RAP moisture content at Continuous mixing plants and batch mixing plants.		
Percent of maximum theoretical density (nuclear gauge per CT 375)	Per Section 3.4.B.6 below	At end of work shift
Maximum Theoretical Unit Weight	1 per day	By end of work shift
Percent of maximum theoretical density (cores)	Production Startup and as needed	Prior to 4 PM on the day following paving
Air void content	Production Startup	3 working days from sample date
Stability value		
Percent Crushed Particles		
LA Rattler		
Flat and elongated particles		
Fine aggregate angularity		
Voids filled with asphalt		
Voids in mineral aggregate		
Dust proportion		

706-3 EXECUTION

706-3.1 EXAMINATION

- A. Contractor shall visit the site to:
 - 1. Verify that all underground utilities and facilities are complete required including testing.
 - 2. Verify that underlying aggregate base and or native soil subgrade has been properly prepared and tested..
 - 3. Verify that paving subgrade is firm and unyielding.
 - 4. Verify Sub-Grade is 0.00 inches high. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
 - 5. Verify ADA compliance at paving subgrade
 - a. All grades within ADA travel paths at the subgrade level are below 2.0% maximum slope cross slope and not greater than 5.0% in longitudinal grade.
 - b. Verify that all grades within the ADA parking and unloading zones are below 2.0% maximum slope in any direction.
- B. Examine landscaping and tree canopies for potential damage due to paving operations
 - 1. Contact City 48 hours in advance if any tree limbs need removal. City will perform work.
- C. Notify City representative of any non-compliance issues. Do not pave until issues resolved or directed in writing to proceed.

706-3.2 PREPARATION

- A. Protect existing facilities
 - 1. Existing landscaping including ground cover, shrubs and tree limbs.
 - 2. Existing buildings and structures
 - 3. Protect storm drain systems
 - 4. Do not clean or wash equipment onsite
 - 5. Place protective covers over existing pavement or paving subgrade under all motorized paving equipment.
- B. Leveling Course Layout
 - 1. Using the surface model used for cold planning, layout leveling course in the same manner and density. Allow 1 day during the day for review prior to placing leveling course.
 - 2. Verify elevations of finished leveling course using the surface model used for cold planning. Surface of leveling course should comply with grades to within +/- 0.03 feet. Correct high areas by cold planning. Correct low areas by skin patching with No. 4 HMA.

706-3.3 APPLICATION

- A. Site Tolerances
 - 1. Apply HMA paving in single lift up to 3 inches thick minimum after compaction, except where shown thicker on Drawings. Paving thicker than 3 inches may be applied in two or more lifts with a minimum lift thickness of 1-3/4 inches thick.
 - 2. Paving adjacent to cast-in-place concrete site elements shall be between 1/4 inch higher than concrete and flush with concrete.
 - 3. Thicknesses
 - a. Average pavement thickness shall equal design thickness
 - b. For total HMA thicknesses less than 4 inches in thickness, the minimum thickness shall be minus 1/4 inch from the design thickness.
 - c. For total HMA thickness 4 inches and greater, the minimum thickness shall be minus 1/2 inch from the design thickness.
- B. Tack Coat
 - 1. Tack coat shall be applied to every vertical face of concrete to be paved against, including gutters and swales.
 - 2. Protect concrete above paving line with masking or shield. Clean all tack coat on concrete more than 1 inch above pavement surface.
 - 3. Brush application allowed
 - 4. Tack coat application shall be reapplied between paving layers if tack coat application becomes damaged due to scraping by equipment or dust.
- C. Pavement Removal and Trench Patching in Full Depth HMA Areas
 - 1. All of the pavement removal areas (3 and 6 Inch depth) may be paved and compacted in a single lift.
 - 2. A self-propelled paver is not required.
- D. Pavement Reinforcement Composite Grid
 - 1. Install in accordance with manufacturer's application guide.
 - 2. Do not install more grid than can be covered with HMA paving work shift.
- E. HMA Installation
 - 1. Use self-propelled laydown machine for all surface courses. Base courses for dig outs or stabilization areas may be placed with a grader or skip loader.
 - 2. Heat joints if laid more than 3 hours previously.
 - 3. Compaction – Leveling Course
 - a. Comply with Method Construction Process requirements for passes, equipment type and temperatures
 - b. Pneumatic tired roller with full time operator required.
 - c. Only one steel wheel roller with full time operator required.

4. Compaction – Base R&R and Surface Course
 - a. Compact HMA to a lot average of 92.0% to 96.0% of Theoretical Maximum Density per ASTM D2041 or CT 309.
 - b. Compact HMA to individual locations to 91.0% to 97.0% of Theoretical Maximum Density per ASTM D2041 or CT 309.
 - c. Compact handwork areas simultaneously with breakdown rolling. Compact with hand tamps, vibraplates or other means that will provide density and a smooth surface. Failure to keep hand compaction areas concurrent with breakdown rolling shall be cause to stop paving until handwork compaction catches up to breakdown rolling.
 - d. Roll with powered equipment capable of obtaining specified density and smoothness.
 - e. Execute compaction so visibility of joints is minimized. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while HMA is above 140 °F surface temperature.
5. Finish
 - a. Surface shall be uniform with no 'birdbaths'. Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed 1/4 inch (0.02 feet). When tested with 10 foot straight edge, surface of complete work shall not contain irregularities in excess of 1/4 inch.
 - b. Completed surface shall match the texture of the machine laid mat. Areas worked by raking shall have coarse aggregate removed rather than pushed back onto the mat. Any areas of coarse or segregated surface shall be remedied immediately and prior to finish rolling. Failure to comply with this provision shall cause all paving to stop until mat surface corrections are performed.

706-3.4 CONTRACTOR QUALITY CONTROL

- A. Materials Quality Control Testing
- B. Contractor shall perform testing as outlined in the Contractor Quality Control Plan submitted under Section 1.5 C, “Contractors QC Plan”.
- C. Contractor shall perform all testing for materials indicated in Section 2.2 “Source Quality Control” of these specifications.
- D. Density Quality Control
 1. Divide pavement area into lots in accordance with the following guidelines
 2. Each lot not to represent more than 500 tons or 45,000 sf, whichever is less.
 3. Each lot must be homogeneous relative to placement time and methods. Different streets or separated areas shall be considered separate lots for the purposes of compaction testing.
 4. Correlate gauge using a minimum of 5 cores on first paving day. Core correlation will not be required if 1) the QC and QA gauges are within 0.5% of each other on the average of 5 locations and 2) both QC and QA gauges indicate test results within the range of 92.5% to 95.5% of Theoretical Maximum Density based on the JMF Rice Gravity.
 5. Daily Rice Gravity tests shall be used to determine compaction. If Rice Gravity results vary more than 0.03 gm/cc on a daily basis, use a moving average of 5 and recomputed density results
 6. Test each lot using randomly determined locations per CT 375 or ASTM D3665.
 - a. Minimum of 3 tests per lot
 - b. One nuclear gauge per 50 tons
 7. If nuclear gauge test results determine noncompliance, Contractor may choose to have in place density verified by cores. Cores will be taken at the rate of 1 per 100 tons. Cores will be taken by Contractor and tested by QA laboratory. Take cores in presence of Owner’s representative. Cost of coring shall be borne by Contractor and cost of core testing by Owner. For lot average determination, a minimum of three cores shall be taken. For individual sites, a single core may be taken. Reduced payment will be determined by cores if cores are taken.
- E. Quality Control Reporting

1. If QC Reports indicate non-compliance, paving may continue till the end of the day. Paving shall not be resumed until acceptable changes have been made to either the materials quality or contractor's placement and compaction operations to assure future compliance with requirements.
2. Failure to supply QC Reports as indicated will be cause for withholding payment for the work until such reports are submitted and evaluated.

706-3.5 PROTECTION

- A. Protect completed pavement from damage
 1. Equipment and material storage.
 2. Fuels or solvents of any kind
 3. Staining from landscape material storage, installation or runoff.

706-4 PAYMENT

- A. Unit Prices
 1. The contract unit prices indicated in the bid schedule shall apply to this work.
- B. Measurement and Payment
 1. If paid by tonnage, the Contractor shall supply delivery tickets for each load of HMA delivered to the jobsite at the end of each work day.
 2. If paid by the unit area of paving, Contractor shall supply documentation of area measurements.
- C. Payment for Pavement Fabric
 1. If pavement fabric is paid by the unit area measurement, the payment area is limited to the actual applied area of the fabric excluding joints and laps.
- D. Reduced Payment for HMA Density
 1. Reduced payment shall be made on HMA which does not meet the requirements of Section 2.3.C.6 "Compaction" herein. The reduced payment schedule is based on both individual test locations and lot averages. The reduced payment schedule is as follows:

Reduced Payment Factors for Percent of Maximum Theoretical Density					
Percent of Maximum Theoretical Density		Reduced Payment Factor	Maximum Theoretical Density		Reduced Payment Factor
Lot Average	Individual Test Result		Lot Average	Individual Test Result	
92.0	91.0	0.0000	96.0	97.0	0.0000
91.9	90.9	0.0125	96.1	97.1	0.0125
91.8	90.8	0.0250	96.2	97.2	0.0250
91.7	90.7	0.0375	96.3	97.3	0.0375
91.6	90.6	0.0500	96.4	97.4	0.0500
91.5	90.5	0.0625	96.5	97.5	0.0625
91.4	90.4	0.0750	96.6	97.6	0.0750
91.3	90.3	0.0875	96.7	97.7	0.0875
91.2	90.2	0.1000	96.8	97.8	0.1000
91.1	90.1	0.1125	96.9	97.9	0.1125
91.0	90.0	0.1250	97.0	98.0	0.1250
90.9	89.9	0.1375	97.1	98.1	0.1375
90.8	89.8	0.1500	97.2	98.2	0.1500
90.7	89.7	0.1625	97.3	98.3	0.1625
90.6	89.6	0.1750	97.4	98.4	0.1750
90.5	89.5	0.1875	97.5	98.5	0.1875
90.4	89.4	0.2000	97.6	98.6	0.2000
90.3	89.3	0.2125	97.7	98.7	0.2125
90.2	89.3	0.2250	97.8	98.8	0.2250
90.1	89.2	0.2375	97.9	98.9	0.2375
90.0	89.0	0.2500	98.0	99.0	0.2500
< 90.0	<89.0	Remove and Replace	> 98.0	>99.0	Remove and Replace

- E. There shall not be an adjustment of contract unit prices due to adjustments in the asphalt price index.

707 STREET LIGHTING AND ELECTRICAL

707-1 GENERAL

707-1.1 SUMMARY

The work under this section shall consist of furnishing and installing electrical conduit, wire, pull boxes, street lights, electrical outlets, and related items, including securing electrical service, obtaining permits, utility coordination, excavating, backfilling, and compacting, at the locations designated on the project plans and in accordance with the details shown on the plans and the requirements of these specifications.

707.1.2 CODES AND STANDARDS

- A. Work shall comply with the latest edition of the California Electrical Code, and other applicable state and local codes.

- B. All equipment and material shall be UL listed for its proposed use and shall be installed in accordance with the manufacturer's instructions.

707-2 MATERIALS

707-2.1 ELECTRICAL WIRE

Electrical wire shall be copper with XHHW-2 insulation, except ground wire may be bare, and shall be bare in pole base foundation. Conductors shall conform to the specifications of the NEC, UL, and other applicable industry standards. The UL label shall be present on each reel, coil or container of wire or cable. The wire shall be annealed copper and shall be uncoated unless otherwise specified. The wire shall be solid for number 10 AWG and smaller, and stranded for number 8 AWG and larger.

707-2.2 ELECTRICAL CONDUIT AND WARNING TAPE

- A. Unless otherwise specified, all conduit installed underground or in concrete structures shall be rigid Schedule 40 PVC. All exposed conduit and fittings to be installed above ground shall be the rigid metal type manufactured of galvanized steel with threaded couplings. Non-threaded couplings shall not be used. Rigid galvanized steel conduit with a 40 mil PVC exterior tape or factory applied coating shall be used for rigid steel installed underground or rising to above grade. Threads shall be coated with zinc rich paint prior to making up.
- B. Conduit warning tape shall be provided 6" to 8" below grade above all buried conduit. Warning tape shall be 4 mil (100 micrometer) inert plastic film specially formulated for prolonged use underground. All tape shall be highly resistant to alkalis, acids, and other destructive agents found in the soil. Tape shall have a continuous printed message warning of the location of underground conduits. The message shall be in permanent ink specifically formulated for prolonged underground use and shall bear the words, "CAUTION--ELECTRIC LINE BURIED BELOW" in black letters on a red background.

707-2.3 PULLBOXES

- A. Precast reinforced concrete pull boxes, covers and extensions shall be installed and located as shown on the project plans and shall be the size specified. Chipped or cracked pull boxes, covers, and extensions will not be accepted.
- B. Pullboxes shall be manufactured by Oldcastle/Christy. Boxes and covers shall be concrete and have pedestrian rated minimum vertical test load of 350 pounds per square foot. The concrete shall test to a minimum of 4,500 psi compressive strength. Boxes shall have an etched polyethylene face, anchored in concrete, with an ultraviolet inhibitor. Boxes shall be 12" deep plus a 12" extension.
- C. Lids shall be secured by two hex head bolts at corners diagonally across from each other.
- D. Lids shall be marked "City Electrical". Markings shall be clearly defined and uniform in depth and shall be placed parallel to the long side of the cover. Letters shall be one inch high.

707-2.4 SERVICE

- A. The service system shall include the service system components as shown on the Service Riser Diagram. Their installation shall conform to California Electrical Code, UL, local applicable codes, and the requirements of the utility company providing service. The contractor shall secure the necessary utility company permits, pay related fee(s) for said permit, and coordinate the installation of the required power service. Meter sockets shall be approved by the serving utility company. They shall be furnished and installed by the contractor.

- B. The contactor shall be of the mechanical armature type and shall consist of a 120 Volt operating coil, a laminated core, a laminated armature, contacts, and terminals. The contacts shall be fine silver, silver-alloy, or other superior low contact resistance metal.
- C. On-Off-Auto Switch. A three position selector switch shall be installed to control the contactor to turn the lights on or off. The switch shall be the rotary selector or toggle type having double pole, double throw contacts with the center position being the "off" position, and be rated at 10 amperes at 250 volts A.C. The switch shall be manually activated in the up or left position and shall be activated by the photocell in the down or right position.
- D. Enclosure
 - 1. Provide free standing NEMA 3R or NEMA 4 enclosure with a window for meter reading.
 - 2. Panelboards, contactor, etc. shall be enclosed in NEMA 1 enclosures within the service enclosure so that with door to service enclosure open, circuit breaker handles, contractor control switch, and irrigation controller will be accessible with system being dead front.
 - 3. Enclosure shall be fabricated from 12 or 10 gauge steel with stiffeners as needed.
 - 4. Finish shall be polyester powder inside and out over pretreated surface. Submit color samples for City selection of color.
 - 5. A white back panel mounted on studs shall be provided for mounting equipment so that no screws or bolts penetrate the back of the enclosure.
 - 6. Hardware. Hardware for a service enclosure shall include a two piece hinged door with three point latch, a padlock hasp suitable for a City lock and a utility lock. All exterior hardware such as hinge pins, bolts, screws, and locking devices shall be of 304 or 305 stainless steel. All interior screws and fittings shall be stainless steel or approved non-ferrous corrosion resistant material.
 - 7. Enclosure shall have rolled lip around three sides of door and along top of enclosure opening.
 - 8. Doors shall be sealed with poured in place polyurethane gasket.
 - 9. Enclosure shall be vandal resistant with a minimum of exterior screws and hinge pins, and those that are exterior shall be vandal resistant.
- E. Lightning Arrestor: A lightning arrestor shall be provided connected to a two pole circuit breaker in Panel N. It shall be of the silicon oxide varistor type rated for 120/240V, single phase, 3 wire service, with a maximum current of 100,000 Amps, maximum energy of 3,000 Joules, and a 10 nanosecond response time to clamp 10,000 Amps. It shall be a Delta LA302 lightning arrestor.

707-3 CONSTRUCTION DETAILS

707-3.1 CONDUIT

- A. Storing and Handling. All PVC conduit shall be stored and handled in an approved manner to minimize ultraviolet deterioration due to exposure to sunlight.
- B. Cleaning. All conduit including existing conduit to be incorporated into a new system shall be blown out with compressed air. A mandrel shall be pulled through the conduit to remove any obstructions.
- C. Size. The minimum inside diameter of each conduit shall be as shown on the plans. The contractor may, at his option and expense, use a larger size conduit than specified provided the larger size is continuous for the entire length of the run from outlet to outlet. Reducing couplings shall not be used. Changes in the location and size shown on the project plans shall be documented by the contractor and submitted to the Engineer.

- D. Cuts and Connections. The PVC conduit shall be cut square and trimmed to remove rough edges. Conduit connections shall be of the solvent weld type. Where a connection is made to steel conduit, the coupling used shall be a PVC female adapter
- E. Bends. Bends shall be factory bends or field bends. Field bends shall be done without crimping or flattening, using the longest radius practicable. The sum of the deflection angles of all bends in any conduit run shall not exceed 270 degrees between termination and/or junction points.
- F. End Treatments. Conduit ends shall be capped with conduit end cap fittings until wiring is started. When end caps are removed, non-metallic conduit shall be provided with an approved conduit end bell unless conduit is being extended. End bells shall be installed prior to the installation of the conductors. Approved insulated grounding bushings shall be used on ends of steel conduit runs. Conduits with grounding bushings shall be bonded together, bonded to a metal box and grounded. Ends of conduit runs, designated for future use, shall be capped with conduit end cap fittings.
- G. Conduit entering pull boxes shall terminate a minimum of 3 inches inside the box wall. The conduit shall be between 3 inches and 4 inches above the bottom of the pull box and shall be sloped to facilitate pulling of the cable and conductors. Conduit entering through the bottom of a pull box shall be located near the sides and ends of the pull box in order to leave the major interior portion clear. At all outlets, conduits shall enter from the direction of the run and allow for expansion and contraction.
- H. Where the depth of conduit changes the trench bottom shall be sloped 3 horizontal to 1 vertical to accommodate the depth change.
- I. If a trench is left open overnight, a minimum of 6 inches of backfill material shall be used as a protective cover to eliminate contraction of the conduit system. The backfill material shall be removed if final inspection by the Engineer has not been made.
- J. Backfill material placed within 6 inches of the conduit shall not contain frozen lumps, stones larger than 3 inches in diameter, chunks of clay, organic matter or other objectionable material.
- K. The contractor shall place warning tape in all trenches where new conduit is placed. All warning tape shall be buried at a depth of 6 to 8 inches below the finished grade.

707-3.2 PULL BOXES: Pull boxes shall be installed in accordance with the details shown on the plans. Pull boxes shall be installed flush with the finished grade and, when in concrete, shall have a 1/2 inch felt expansion joint installed around all sides of the pull box.

707-3.3 FUSES

- A. Ungrounded leads tapped from feed conductors in pull boxes shall be protected with fused in-line connectors. In-line connectors shall be fused with high-interrupting capacity fuses with a fault current rating of 100,000 amperes at 600 volts AC. The in-line connectors shall be watertight, non-locking and rated at 600 volts AC.
- B. Fuses for receptacle circuits shall be rated time delay sized for the Amp rating of the receptacle.
- C. Fuses for street light circuits shall be fast acting, rated three times the maximum current of the luminaire(s) being powered.

707-3.4 SPLICES AND TAPS

In circuits where the voltage does not exceed 240 volts AC, splices shall be made utilizing approved spring-type wire connectors. All neutral and ground wire splices shall be made using split bolt connectors. Soldered connections will not be permitted unless so specified. The insulation for the splice shall consist of two layers of electrical rubber tape, four layers of plastic electrical tape and two layers of friction tape. The tapes shall be securely applied over

the bare wire splice area and back onto the original insulation a minimum of 1 inch. A minimum of three coats of approved liquid waterproof splicing compound shall then be applied to the splice. The finished splices shall be such that their electrical and mechanical characteristics and insulation quality are equal to those of the original cable. Conductors shall be spliced only in pull boxes and terminal compartments.

707-3.5 TAGGING AND TAPING

All conductors shall be tagged to identify their circuit number or function with wire marking tags. The tag identification shall correlate with the conductor schedule shown on the project plans. Tags shall be nylon cable ties with integral marking tag. Tags shall be labeled with a permanent ink pen. The tags shall be furnished and installed by the contractor. Each tag shall be wrapped entirely around the conductor. Each wire shall be tagged to identify the panel and circuit number.

707-3.6 BONDING AND GROUNDING

All metallic enclosures including, but not limited to, cabinets, poles, and metal conduit shall be bonded to form a continuous grounded system. Nonmetallic portions of the system such as PVC conduit shall have a bare copper bond wire installed with suitable connections to form a continuous grounded system. All grounding connections shall be exposed in services, pull boxes, and pole bases. Connections shall be made with split bolt connectors or lugs of appropriate size and type. Spring type connectors will not be acceptable for grounding applications.

707-3.7 LIGHT POLES

Light Poles shall be installed plumb. Poles, luminaires, and receptacles shall be bonded to pole base grounds and the conduit ground wires.

707-3.7 TESTING

The Contractor shall perform an insulation to ground test and an insulation line to line test on all conductors prior to final acceptance. The test may be witnessed by the City's Representative who shall be given 48 hours notice. If the resistance to ground is less than 50 megohms when measured with a 1,000 volt DC meggering device corrective action shall be taken as directed by the Owner's Representative. Circuits shall be energized for 100 hours prior to final acceptance. Failures occurring during this test period shall be corrected.

707-4 METHOD OF MEASUREMENT

707-4.1 SERVICE EQUIPMENT

The new electric service shall include the work shown on the Service Riser Diagram including enclosure, meter socket, contactor, circuit breaker panels, conduit to the utility pull box and the nearest City pullbox, wire as shown in the service riser diagram, and all other components necessary to complete the work. The payment is included in the lump sum price for the appropriate items.

707-4.2 STREET LIGHT POLES

Street Light Poles, new and relocated, shall be measured as a unit including pole base, conduit and wire to pull box, fuses, lamps, and receptacle covers for outlets on poles, including relocated poles.

707-4.3 CONDUIT

- A. Conduit shall be paid for on a lump sum basis as shown in each respective item.
- C. Conduit associated with electric service and associated equipment shall be included in the unit cost for the service.
- D. Conduit associated with light poles or tree wells shall be included in the unit cost of the light poles or tree wells respectively.

- 707-4. CONDUCTORS
- A. Conductors shall be paid for on a lump sum basis as shown in each respective item.
 - B. Conductors between tree wells and street light poles and the associated pull boxes shall be included in the unit cost for the light poles and the tree wells. No measurement or direct payment will be made for wire to light poles or tree wells, the cost being considered as included in the contract price for the pole, foundation, or tree well items.
- 707-4.6 PULL BOXES
- A. Payment for pull boxes is included in the unit prices of the street lights.
 - B. Pull boxes shall include any excavating and backfilling necessary to complete necessary to complete the work.
 - C. Pull boxes shall include conduit installed to extend existing conduit to new pull box locations.
- 707-4.7 OUTLETS IN TREE WELLS
- Outlets in tree wells shall be measured as a unit for each tree well and shall include the outlet, box, ground fault switch, and two pigtails per outlet. For each tree well, one pigtail shall have a band of orange tape at each end. Seven (7) extra sets (14 total) of pigtails shall be provided with the cost spread in the unit cost for the remainder of the work.
- 707-4.8 PAYMENT
- The accepted quantities measured as provided above, will be paid for at the contract unit price per unit (linear foot, each, etc.) which price shall be full compensation for the item, complete in place.

708 IRRIGATION AND STREET TREES

708-1 IRRIGATION SYSTEM

708-1 GENERAL

708-1.1 SUMMARY

- A. It is the intent of the specifications and drawings that the finished system is complete in every respect and shall be ready for operation satisfactory to the City.
- B. The work shall include all materials, labor, services, transportation, and equipment necessary to perform the work as indicated on the drawings, in these specifications, and as necessary to complete the contract.

708-1.2 CONSTRUCTION DRAWINGS

- A. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, sleeves, etc. which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc. as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.
- B. All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications. When an item is shown on the plans but not shown on the specifications or vice versa, it shall be deemed to be as shown on both. The Landscape Architect shall have final authority for clarification.

- C. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Landscape Architect as soon as detected. In the event this notification is not performed, the Irrigation Contractor shall assume full responsibility for any revision necessary.

708-1.3 QUALITY ASSURANCE

- A. Provide at least one English speaking person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the manufacturer's recommended methods of installation and who shall direct all work performed under this section.
- B. Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer of articles used in this contract furnish directions covering points not shown in the drawings and specifications.
- C. All local, municipal, and state laws, rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in these specifications shall not be construed to conflict with any of the above rules and regulations of the same. However, when these specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these specifications and drawings shall take precedence.
- D. All materials supplied for this project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to City.
- E. The Contractor shall secure the required licenses and permits including payments of charges and fees, give required notices to public authorities, verify permits secured or arrangements made by others affecting the work of this section.

708-1.4 SUBMITTALS

- A. Water Pressure Test
 - 1. After award of contract and before any irrigation system materials are ordered from suppliers or delivered to the job site, submit to the City a written verification of the existing water pressure on the project at each of the points of connection shown.
 - 2. The water pressure test shall be performed to measure the dynamic water pressure at the point of connection at the maximum flow rate of the proposed irrigation system as shown on the point of connection note. Dynamic water pressure is when water is flowing through the point of connection. Static water pressure readings, water is not flowing, are not acceptable.
 - 3. Written dynamic water pressure test confirmation shall be made on the contractor's letterhead and include the flow rate during the test, the recorded water pressure, the date of the test and the time of the test.
- B. Material List:
 - 1. After award of contract and before any irrigation system materials are ordered from suppliers or delivered to the job site, submit to the City a complete list of all irrigation system materials, or processes proposed to be furnished and installed as part of this contract.
 - 2. The submittals materials list shall include the following information:

- a. A title sheet with the job name, the contractor's name, contractor's address and telephone number, submittal date and submittal number.
 - b. An index sheet showing the item number (i.e. 1,2,3, etc.); an item description (i.e. sprinkler head); the manufacturer's name (i.e. Hunter Industries); the item model number (i.e. I-40-ADV/36V); and the page(s) in the submittal set that contain the catalog cuts.
 - c. The catalog cuts shall be one or two pages copied from the most recent manufacturer's catalog that indicate the product submitted. Do not submit parts lists, exploded diagrams, price lists or other extra information.
 - d. The catalog cuts shall clearly indicate the manufacturer's name and the item model number. The item model number, all specified options and specified sizes shall be circled on the catalog cuts.
 - e. Submittals for equipment indicated on the legend without manufacturer names, or "as approved", shall contain the manufacturer, Class or Schedule, ASTM numbers and/or other certifications as indicated in these specifications.
3. Submittal materials list format requirements:
- a. Submittals shall be provided as one complete package for the project. Multiple partial submittals will not be reviewed.
 - b. Submittal package shall be stapled or bound in such a way as to allow for disassembly for review processing. Submittals shall not have tabs, tab sheets, spiral binding, or any other type of binding that will interfere with automated copying of submittals.
 - c. Submittal package shall have all pages numbered in the lower right hand corner. Page numbers shall correspond with submittal index.
 - d. Re-submitted packages must be revised to include only the equipment being re-submitted. Equipment previously reviewed and accepted shall not be re-submitted in the materials list/index sheet or in the catalog cut sheet package.
- C. Substitutions: If the Irrigation Contractor wishes to substitute any equipment or materials for those equipment or materials listed on the irrigation drawings and specifications, he may do so by providing the following information to the Landscape Architect or City's authorized representative for approval.
- 1. Provide a written statement indicating the reason for making the substitution.
 - 2. Provide catalog cut sheets, technical data, and performance information for each substitute item.
 - 3. Provide in writing the difference in installed price if the item is accepted.
- D. The Landscape Architect or City's authorized representative will allow no substitutions without prior written acceptance
- E. No substitutions of pump manufacturers, distributors or assemblies will be accepted.
- F. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.
- G. The Landscape Architect or City's authorized representative will not review the submittal package unless provided in the format described above.

708-1.5 EXISTING CONDITIONS

- A. The Contractor shall verify and be familiar with the locations, size and detail of points of connection provided as the source of water, and electrical supply connection to the irrigation system.
- B. Irrigation design is based on the available static water pressure shown on the drawings. Contractor shall verify static water on the project prior to the start of construction. Should a

discrepancy exist, notify the Landscape Architect and City's authorized representative prior to beginning construction.

- C. Prior to cutting into the soil, the Contractor shall locate all cables, conduits, sewer septic tanks, and other utilities as are commonly encountered underground and he shall take proper precautions not to damage or disturb such improvements. If a conflict exists between such obstacles and the proposed work, the Contractor shall promptly notify the Landscape Architect and City who will arrange for relocations. The Contractor will proceed in the same manner if a rock layer or any other such conditions are encountered.
- D. The Contractor shall protect all existing utilities and features to remain on and adjacent to the project site during construction. Contractor shall repair, at his own cost; all damage resulting from his operations or negligence.
- E. The Irrigation Contractor shall coordinate with the General Contractor for installation of required sleeving as shown on the plans prior to paving operations.
- F. The Contractor shall verify and be familiar with the existing irrigation systems in areas adjacent to and within the Project area of work.
- G. The Contractor shall protect all existing irrigation systems, in areas adjacent to and within the project area of work, from damage due to his operations.
- H. Contractor shall notify City's Representative if any existing system is temporarily shut off, capped or modified. Provide 48-hour notice, prior to turning off or modifying any existing irrigation system.
- I. The Contractor shall repair or replace all existing irrigation systems, in areas adjacent to and within the project area of work, damaged by the construction of this project. Adjacent irrigation systems shall be made completely operational and provide complete coverage of the existing landscaped areas. All repairs shall be complete to the satisfaction of the City's Representative.
- J. The contractor shall provide bore holes under any existing pavement or paving encountered for the required lateral, mainline and low voltage control wire sleeving. Bore holes under 2 inches in diameter and smaller shall be made with a BulletMole® underground boring tool as manufactured by Dimension Tools, LLC (Contact telephone number (888)-650-5554 or at www.bulletmole.com). Bore holes larger than 2 inches in diameter shall be made with an approved mechanical boring tool. No air jacking or hydraulic boring of any kind shall be allowed.

708-1.6 INSPECTIONS

- A. The Contractor shall permit the Landscape Architect and City's authorized representative to visit and inspect at all times any part of the work and shall provide safe access for such visits.
- B. Where the specifications require work to be tested by the Contractor, it shall not be covered over until accepted by the Landscape Architect, City's authorized representative, and/or governing agencies. The Contractor shall be solely responsible for notifying the Landscape Architect, City, and governing agencies, a minimum of 48 hours in advance, where and when the work is ready for testing. Should any work be covered without testing or acceptance, it shall be, if so ordered, uncovered at the Contractor's expense.
- C. Inspections will be required for the following at a minimum:
 - 1. Pre-construction meeting.

2. System layout.
 3. Pressure test of irrigation mainline and lateral lines (Four hours at 125 PSI or 120% of static water pressure, whichever is greater.) Mainline and lateral line pressure loss during test shall not exceed 2 PSI.
 4. Coverage test of irrigation system. Test shall be performed prior to any planting.
 5. Final inspection prior to start of maintenance period.
 6. Final acceptance prior to turnover.
- D. Site observations and testing will not commence without the field record drawings as prepared by the Irrigation Contractor. Record drawings must be complete and up to date for each site visit.
- E. Work that fails testing and is not accepted will be retested. Hourly rates and expenses of the Landscape Architect, City's authorized representative, and governing agencies for re-inspection or retesting will be paid by the Irrigation Contractor at no additional expense to City.

708-1.7 STORAGE AND HANDLING

- A. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installation work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Landscape Architect and City and at no additional cost to the City.
- B. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings under cover until ready to install. Transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load.

708-1.8 CLEANUP AND DISPOSAL

- A. Dispose of waste, trash, and debris in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Bury no such waste material and debris on the site. Burning of trash and debris will not be permitted. The Contractor shall remove and dispose of rubbish and debris generated by his work and workmen at frequent intervals or when ordered to do so by the City's authorized representative.
- B. At the time of completion the entire site will be cleared of tools, equipment, rubbish and debris which shall be disposed of off-site in a legal disposal area.

708-1.9 TURNOVER ITEMS

- A. Record Drawings:
1. Record accurately on one set of drawings all changes in the work constituting departures from the original contract drawings and the actual final installed locations of all required components as shown below.
 2. The record drawings shall be prepared to the satisfaction of the City. Prior to final inspection of work, submit record drawings to the Landscape Architect or City's authorized representative.
 3. All record drawings shall be prepared using AutoCAD 2016 drafting software and the original irrigation drawings as a base. No manual drafted record drawings shall be acceptable. The Contractor may obtain digital base files from the Landscape Architect or City's authorized representative.

4. If the Contractor is unable to provide the AutoCAD drafting necessary for the record drawings the irrigation designer does provide record drawing drafting as a separate service.
5. Prior to final inspection of work, submit record drawings plotted onto vellum sheets for review by the Landscape Architect or City's authorized representative. After acceptance by the Landscape Architect, City Inspector or City's authorized representative re-plot the record drawings onto reproducible Mylar sheets. The Contractor shall also provide record drawing information on a digital AutoCAD Release 2016 drawing file. All digital files shall be provided on a compact disc (CD) clearly marked with the project name, file descriptions and date.
 - a. Record drawing information and dimensions shall be collected on a day-to-day basis during the installation of the pressure mainline to fully indicate all routing locations and pipe depths. Locations for all other irrigation equipment shall be collected prior to the final inspection of the work.
 - b. Two dimensions from two permanent points of reference such as buildings, sidewalks, curbs, streetlights, hydrants, etc. shall be shown for each piece of irrigation equipment shown below. Where multiple components are installed with no reasonable reference point between the components, dimensioning may be made to the irrigation equipment. All irrigation symbols shall be clearly shown matching the irrigation legend for the drawings. All lettering on the record drawings shall be minimum 1/8 inch in size.
6. Show locations and depths of the following items:
 - a. Point of connection (including water POC, backflow devices, master control valves, flow sensors, etc.)
 - b. Routing of sprinkler pressure main lines (dimensions shown at a maximum of 100 feet along routing)
 - c. Isolation valves
 - d. Automatic remote control valves (indicate station number and size)
 - e. Quick coupling valves
 - f. Routing of control wires where separate from irrigation mainline
 - g. Irrigation controllers (indicate controller number and station count)
 - h. Related equipment (as may be directed)

B. Controller Charts:

1. Provide one controller chart for each automatic controller. Chart shall show the area covered by the particular controller. The areas covered by the individual control valves shall be indicated using colored highlighter pens. A minimum of six individual colors shall be used for the controller chart unless less than six control valves are indicated.
2. Landscape Architect or City's authorized representative must approve record drawings before controller charts are prepared.
3. The chart is to be a reduced copy of the actual "record" drawing. In the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a readable size.
4. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being a minimum 20 mils in thickness.

C. Operation and Maintenance Manuals:

1. Two individually bound copies of operation and maintenance manuals shall be delivered to the Landscape Architect or City's authorized representative at least 10 calendar days prior to final inspection. The manuals shall describe the material installed and the proper operation of the system.
 2. Each complete, bound manual shall include the following information:
 3. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment including names and addresses of local manufacturer representatives.
 4. Operating and maintenance instructions for all equipment.
 5. Spare parts lists and related manufacturer information for all equipment.
- D. Equipment:
1. Supply as a part of this contract the following items:
 - a. Two (2) wrenches for disassembly and adjustment of each type of sprinkler head used in the irrigation system.
 - b. Three 30-inch sprinkler keys for manual operation of control valves.
 - c. Two keys for each automatic controller.
 - d. Two quick coupler keys with a 3/4" bronze hose bib, bent nose type with hand wheel and two coupler lid keys.
 - e. One valve box cover key or wrench.
 - f. Six extra sprinkler heads of each size and type.
- E. The above equipment shall be turned over to City's authorized representative at the final inspection.

708-1.10 COMPLETION

- A. At the time of the pre-maintenance period inspection, the Landscape Architect, City's authorized representative, and governing agencies will inspect the work, and if not accepted, will prepare a list of items to be completed by the Contractor. Punch list to be checked off by contractor and submitted to Landscape Architect or City's authorized representative prior to any follow-up meeting. This checked off list to indicate that all punch list items have been completed. At the time of the post-maintenance period or final inspection the work will be re-inspected and final acceptance will be in writing by the Landscape Architect, City's authorized representative, and governing agencies.
- B. The City's authorized representative shall have final authority on all portions of the work.
- C. After the system has been completed, the Contractor shall instruct City's authorized representative in the operation and maintenance of the irrigation system and shall furnish a complete set of operating and maintenance instructions.
- D. Any settling of trenches which may occur during the one-year period following acceptance shall be repaired to the City's satisfaction by the Contractor without any additional expense to

the City. Repairs shall include the complete restoration of all damage to planting, paving or other improvements of any kind as a result of the work.

708-1.11 25 YEAR HDPE PIPE WARRANTY

A. AquaFuse Product Warranty

1. LIMITED WARRANTY: Seller warrants that, for a period of twenty five (25) years from the date of shipment, it will replace any section of CMF Global, AquaFuse HDPE pipe, fittings and valves product that is defective in materials or workmanship, provided that Buyer, upon discovery of a defect, promptly notifies Seller of the defect and, as instructed by Seller at such time, either returns the product to Seller for inspection or allows Seller to inspect at the place of installation. If Seller determines the product to be defective, Seller will provide new product of the same specification and same quantity as the defective product and Seller will bear the expense of freight to deliver the replacement product to the jobsite for domestic projects, and to the closest USA port for foreign projects. Seller does not warrant the installation of product. Any defects introduced after the shipment of product by Seller, whether due to handling, installation or other cause, are not covered by this warranty. This warranty does not cover labor or other costs of installing products. Buyer's sole remedy for defective product shall be to receive replacement product as provided in this Limited Warranty.
2. Other than the above limited warranty, seller makes no warranty and expressly disclaims all other warranties, express or implied, including, but not limited to, the warranties of merchantability and fitness for a particular purpose. Seller's liability arising out of or related to this contract or any product or service supplied by seller (whether such liability is alleged as a breach of contract, breach of warranty, misrepresentation, negligence, indemnification, product liability or otherwise) shall in no event exceed the original purchase price of the defective product plus applicable freight costs actually paid by buyer. Seller will not be liable for any consequential, incidental, special, indirect or punitive damages, loss of profits, loss of business opportunity or other loss even if seller knew or should have known of the possibility of such damages or losses.

B. CONTRACTOR'S WARRANTY

1. LIMITED WARRANTY: Contractor warrants that, for a period of twenty five (25) years from the date of installation, it will re-fuse or repair a fusion connection that is defective in workmanship, provided that Buyer, upon discovery of a defect, promptly notifies Contractor of the defect and, allows the Contractor to inspect at the place of installation. If it is determined the fused connection to be defective, Contractor will re-fuse or repair the connection at the jobsite. Contractor does not warrant the product itself, only the fused connection. This warranty does not cover labor or other costs, only the fused connection. Buyer's sole remedy for defective connection shall be to receive replacement fusion of the pipe or fitting as provided in this Limited Warranty.
2. Other than the above limited warranty, contractor makes no warranty and expressly disclaims all other warranties, express or implied, including, but not limited to, the warranties of merchantability and fitness for a particular purpose.
3. Contractor's liability arising out of or related to this contract or any product or service supplied by contractor (whether such liability is alleged as a breach of contract, breach of warranty, misrepresentation, negligence, indemnification, product liability or otherwise) shall in no event exceed the original purchase price of the defective connection plus

applicable freight costs actually paid by buyer. Contractor will not be liable for any consequential, incidental, special, indirect or punitive damages, loss of profits, loss of business opportunity or other loss even if contractor knew or should have known of the possibility of such damages or losses.

708-1.12 GUARANTEE

- A. The entire sprinkler system, including all work done under this contract, shall be unconditionally guaranteed against all defects and fault of material and workmanship, including settling of backfilled areas below grade, for a period of one (1) year following the filing of the Notice of Completion.
- B. Should any problem with the irrigation system be discovered within the guarantee period, it shall be corrected by the Contractor at no additional expense to City within ten (10) calendar days of receipt of written notice from City. When the nature of the repairs as determined by the City constitute an emergency (i.e. broken pressure line) the City may proceed to make repairs at the Contractor's expense. Any and all damages to existing improvement resulting either from faulty materials or workmanship, or from the necessary repairs to correct same, shall be repaired to the satisfaction of the City by the Contractor, all at no additional cost to the City.
- C. Guarantee shall be submitted on Contractors own letterhead as follows:

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse, or neglect excepted. We agree to repair or replace any defective material during the period of one year from date of filing of the Notice of Completion and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the City. We shall make such repairs or replacements within 10 calendar days following written notification by the City. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from City, we authorize the City to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT NAME:
PROJECT LOCATION:

CONTRACTOR NAME:
ADDRESS:

TELEPHONE:

SIGNED:

DATE:

708-2 MATERIALS

708-2.1 SUMMARY

Use only new materials of the manufacturer, size and type shown on the drawings and specifications. Materials or equipment installed or furnished that do not meet Landscape

Architect's, City's, or governing agencies standards will be rejected and shall be removed from the site at no expense to the City.

708-2.2 PIPE

- A. Backflow prevention assemblies, and all other above grade assemblies, shall be constructed of threaded brass pipe and threaded brass fittings the same size as the backflow device, unless otherwise directed.
- B. Pressure supply lines 1 1/2 inches in diameter downstream of the point of connection shall be High Density Polyethylene (HDPE), iron pipe size (IPS), PE4710, pressure rated DR 11 (200 PSI rated) conforming to ASTM F714.
- C. Non-pressure lines 1 inch in diameter and larger downstream of the remote control valve shall be High Density Polyethylene (HDPE), iron pipe size (IPS), PE4710, pressure rated DR 11 (200 PSI rated) conforming to ASTM F714.

708-2.3 METAL PIPE AND FITTINGS

- A. Brass pipe shall be 85 percent red brass, ANSI, IPS Standard 125 pounds, Schedule 40 screwed pipe.
- B. Fittings shall be medium brass, screwed 125-pound class.
- C. Copper pipe and fittings shall be Type "K" sweat soldered, or brazed as indicated on the drawings.

708-2.4 PLASTIC PIPE AND FITTINGS

- A. Pipe shall be marked continuously with manufacturer's name, nominal pipe size, schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion.
- B. All plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2672, ASTM D2241 or ASTM D1785.
- C. All solvent weld PVC fittings shall be standard weight Schedule 40 (and Schedule 80 where specified on the irrigation detail sheet, all mainline fittings shall be Schedule 80 PVC) and shall be injection molded of an improved virgin PVC fitting compound. Slip PVC fittings shall be the "deep socket" bracketed type. Threaded plastic fittings shall be injection molded. All tees and ells shall be side gated. All fittings shall conform to ASTM D2464 and ASTM D2466.
- D. All threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785.
- E. All solvent cementing of plastic pipe and fittings shall be a two-step process, using primer and solvent cement applied per the manufacturer's recommendations. Cement shall be of a fluid consistency, not gel-like or ropy. Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855.
- F. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape, or equal.

- G. All pressure mainlines installed with solvent weld PVC fittings shall be installed with concrete thrust blocking at all directional changes in the mainline routing. Concrete thrust blocking shall not be required when ductile iron fittings and mechanical restraints are specified.

708-2.5 BACKFLOW PREVENTION UNITS

- A. The backflow prevention unit shall be of the manufacturer, size, and type indicated on the drawings.
- B. The backflow prevention unit shall be installed in accordance with the requirements set forth by local codes.
- C. The backflow enclosure shall be of the manufacturer, size, and type indicated on the drawings.
- D. The backflow freeze prevention cover shall be of the manufacturer, size, and type indicated on the drawings.

708-2.6 VALVES

- E. Ball Valves:
 - 1. Ball valves shall be of the manufacturer, size, and type indicated on the drawings.
 - 2. Ball valves shall be constructed of a bronze or stainless steel body, stainless steel ball and stem. Ball valves shall have threaded connections.
 - 3. All ball valves shall have a minimum working pressure of not less than 150 PSI and shall conform to AWWA standards.
- F. Quick Coupler Valves:
 - 1. Quick coupler valves shall be of the manufacturer, size, and type indicated on the drawings.
 - 2. Quick coupler valves shall be brass with a wall thickness guaranteed to withstand normal working pressure of 150 psi without leakage. Valves shall have 3/4" female threads opening at base, with two-piece body. Valves to be operated only with a coupler key, designed for that purpose. Coupler key is inserted into valve and a positive, watertight connection shall be made between the coupler key and valve.
- G. Automatic Control Valves:
 - 1. Automatic control valves shall be of the manufacturer, size, and type indicated on the drawings.
 - 2. Automatic control valves shall be electrically operated.
 - 3. Provide Christy's valve ID tags for each remote control valve with valve number.

708-2.8 VALVE BOXES

- A. Valve boxes shall be fabricated from a durable, weather-resistant concrete material resistant to sunlight and chemical action of soils.
- B. The valve box cover shall be cast iron and secured with a hidden latch mechanism or bolts.
- C. Valve box extensions shall be by the same manufacturer as the valve box.

- D. Automatic control valve, master valve, flow sensor, and ball valve boxes shall be 17"x11"x12" 'nominal' rectangular size. Valve box covers shall be marked (brazed) "RCV" with the valve identification number, or "MV", "FS", "BV" "heat branded" onto the cover in 1-1/4 inch high letters / numbers.
- E. Quick coupler valve boxes shall be 10" circular size. Valve box covers shall be marked (brazed) with "QCV" "heat branded" onto the cover in 1-1/4 inch high letters.

708-2.9 AUTOMATIC CONTROLLER

- A. Automatic controller shall be of the manufacturer, size, and type indicated on the drawings.
- B. Controller enclosure shall be of the manufacturer, size, and type indicated on the drawings.
- C. Controller shall be grounded according to local codes using equipment of the manufacturer, size, and type indicated on the drawings; or as required by local codes and ordinances.

708-2.9 ELECTRICAL

- A. All electrical equipment shall be NEMA Type 3, waterproofed for exterior installations.
- B. All electrical work shall conform to local codes and ordinances.

708-2.10 LOW VOLTAGE CONTROL WIRING

- A. Remote control wire shall be direct-burial AWG-UF type, size as indicated on the drawings, and in no case smaller than 14 gauge.
- B. Remote control wire shall be 14 AWG solid core twisted pair, type as indicated on the irrigation drawings.
- C. Connections shall of the manufacturer, size, and type indicated on the drawings.
- D. Common wires shall be white in color. Control wires shall be red (where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" plans located on controller door).
- E. Ground wires shall be green in color or bare copper and in no case smaller than 6 gauge.

708-2.11 IRRIGATION HEADS AND DRIP EMITTERS AND INLINE DRIP TUBING

- A. Irrigation heads and drip emitters shall be of the manufacturer, size, type, with radius of throw, operating pressure, and discharge rate indicated on the drawings.
- B. Irrigation heads and drip emitters shall be used as indicated on the drawings.

708-2.12 DRIP IRRIGATION EQUIPMENT

- C. Drip tubing equipment such as wye strainers and pressure regulators shall be of the manufacturer, size, and type indicated on the drawings.

708-2.13 MISCELLANEOUS EQUIPMENT

- A. Landscape Fabric:

1. Landscape fabric for valve box assemblies shall be 5.0- oz. weight woven polypropylene weed barrier. Landscape fabric shall have a burst strength of 225 PSI, a puncture strength of 60 lbs. and capable of water flow of 12 gallons per minute per square foot.
 2. Type: DeWitt Pro 5 Weed Barrier or approved equal.
- B. Equipment such as flow sensors, rain sensors, wye strainers, and master valves shall be of the manufacturer, size and type indicated on the drawings.

708-3 EXECUTION

708-3.1 SITE CONDITIONS

- A. Inspections:
1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 2. Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.
- B. Discrepancies:
1. In the event of discrepancy, immediately notify the Landscape Architect or City's authorized representative.
 2. Do not proceed with installation in areas of discrepancy until all discrepancies have been resolved.
- C. Grades:
1. Before starting work, carefully check all grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.
 2. Final grades shall be accepted by the Engineer before work on this section will be allowed to begin.
- D. Field Measurements:
1. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Contractor shall coordinate the installation of all irrigation materials with all other work.
 2. All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions prior to proceeding with work under this section.
 3. Exercise extreme care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect.
- E. Diagrammatic Intent:
1. The drawings are essentially diagrammatic. The size and location of equipment and fixtures are drawn to scale where possible. Provide offsets in piping and changes in equipment locations as necessary to conform with structures and to avoid obstructions or conflicts with other work at no additional expense to City.
- F. Layout:
1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of sprinkler heads, valves, backflow preventer, and automatic controller.
 2. Layout irrigation system and make minor adjustments required due to differences between site and drawings. Where piping is shown on drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas.
- G. Water Supply:

1. Connections to, or the installation of, the water supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to City.

H. Electrical Service:

1. Connections to the electrical supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to City.
2. Contractor shall make electrical connections to the irrigation controller. Electrical power source to controller locations shall be provided by others.
3. Contractor shall make electrical connections to the irrigation controller. 230-volt single-phase electrical power source to pump assembly location shall be provided by others per NEC codes.

708-3.2 TRENCHING

- A. Excavations shall be straight with vertical sides, even grade, and support pipe continuously on bottom of trench. Trenching excavation shall follow layout indicated on drawings to the depths below finished grade and as noted. Where lines occur under paved area, these dimensions shall be considered below subgrade.
- B. Provide minimum cover of 18 inches on pressure supply lines 2 ½ inches and smaller.
- C. Provide minimum cover of 24 inches for control wires within conduits below paving.
- D. Provide minimum cover of 36 inches on pressure supply lines under vehicular travel ways.
- E. Provide minimum cover of 24 inches for non-pressure lines.
- F. Pipes installed in a common trench shall have a 4-inch minimum space between pipes.

708-3.3 BACKFILLING

- A. Backfill material on all lines shall be the same as adjacent soil free of debris, litter, and rocks over 1/2 inches in diameter.
- B. Backfill shall be tamped in 4-inch layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Backfill materials shall be sufficiently damp to permit thorough compaction, free of voids. Backfill shall be compacted to dry density equal to adjacent undisturbed soil and shall conform to adjacent grades.
- C. Flooding in lieu of tamping is not allowed.
- D. Under no circumstances shall truck wheels be used to compact backfill.
- E. Provide sand backfill a minimum of 4 inches over and under all piping under paved areas.

708-3.4 PIPING

- A. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. No hydraulic driving is permitted under asphalt pavement.
- B. Cutting or breaking of existing pavement is not permitted.

- C. Carefully inspect all pipe and fittings before installation, removing dirt, scale, burrs, and reaming. Install pipe with all markings up for visual inspection and verification.
- D. Remove all dented and damaged pipe sections.
- E. All lines shall have a minimum clearance of 4 inches from each other and 12 inches from lines of other trades.
- F. Parallel lines shall not be installed directly over each other.
- G. In solvent welding, use only the specified primer and solvent cement and make all joints in strict accordance with the manufacturer's recommended methods including wiping all excess solvent from each weld. Allow solvent welds at least 15 minutes setup time before moving or handling and 24 hours curing time before filling.
- H. PVC pipe shall be installed in a manner, which will provide for expansion and contraction as recommended by the pipe manufacturer.
- I. Center load all plastic pipe prior to pressure testing.
- J. All threaded plastic-to-plastic connections shall be assembled using Teflon tape or Teflon paste.
- K. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope on all threaded plastic-to-metal connections, except where noted otherwise. All plastic-to-metal connections shall be made with plastic male adapters.

708-3.5 CONTROLLER

- A. The exact location of the controller shall be approved by the Landscape Architect or City's authorized representative before installation. The electrical service shall be coordinated with this location.
- B. The Irrigation Contractor shall be responsible for the final electrical hook up to the irrigation controller.
- C. The irrigation system shall be programmed to operate during the periods of minimal use of the design area.

708-3.6 CONTROL WIRING

- A. Low voltage control wiring shall occupy the same trench and shall be installed along the same route as the pressure supply lines whenever possible.
- B. Where more than one wire is placed in a trench, the wiring shall be taped together in a bundle at intervals of 10 feet. Bundle shall be secured to the mainline with tape at intervals of 20 feet.
- C. All connections shall be of an approved type and shall occur in a valve box. Provide an 18-inch service loop at each connection.
- D. An expansion loop of 12 inches shall be provided at each wire connection and/or directional change, and one of 24 inches shall be provided at each remote control valve.

- E. A continuous run of wire shall be used between a controller and each remote control valve. Under no circumstances shall splices be used without prior approval.

708-3.7 VALVES

- A. Automatic control valves, quick coupler, and ball valves are to be installed in the approximate locations indicated on the drawings.
- B. Valve shall be installed in shrub areas whenever possible.
- C. Install all valves as indicated in the detail drawings.
- D. Valves to be installed in valve boxes shall be installed one valve per box.
- E. Provide valve ID tags for each remote control valve with valve number.

708-3.8 VALVE BOXES

- A. Valve boxes shall be installed in shrub areas whenever possible.
- B. Each valve box shall be installed on a foundation of 3/4 inch gravel backfill, 3 cubic feet minimum. Valve boxes shall be installed with their tops 1/2 inch above the surface of surrounding finish grade in lawn areas and 2 inches above finish grade in ground cover areas.

708-3.9 IRRIGATION HEADS DRIP EMITTERS AND INLINE DRIP TUBING

- A. Irrigation heads and drip emitters shall be installed as indicated on the drawings.
- B. Spacing of heads and inline drip tubing shall not exceed maximum indicated on the drawings.
- C. Riser nipples shall be of the same size as the riser opening in the sprinkler body.

708-3.10 BACKFLOW PREVENTION UNITS

- A. Backflow Prevention Units shall be installed as indicated on the drawings. The backflow prevention unit shall be installed in accordance with the requirements set forth by local codes.
- B. The exact location of the backflow device shall be approved by the Landscape Architect or City's authorized representative before installation.
- C. The contractor shall be responsible for the testing and certification of the backflow device for proper operation. Testing and certification shall be performed by a state qualified backflow tester.

708-3.11 MISCELLANEOUS EQUIPMENT

- A. Install all assemblies specified herein according to the respective detail drawings or specifications, using best standard practices.
- B. Quick coupler valves shall be set approximately 18 inches from walks, curbs, header boards, or paved areas where applicable.

- C. Install devices such as rain sensors, master valves, and flow sensors as indicated on the drawings and as recommended by the manufacturer.

708-3.12 FLUSHING THE SYSTEM

- A. Prior to installation of irrigation heads, the valves shall be opened and a full head of water used to flush out the lines and risers.

708-3.13 ADJUSTING THE SYSTEM

- A. Contractor shall adjust valves, align heads, and check the coverage of each system prior to coverage test.
- B. If it is determined by the Landscape Architect or City's authorized representative that additional adjustments or nozzle changes will be required to provide proper coverage, all necessary changes or adjustments shall be made prior to any planting.
- C. The entire system shall be operating properly before any planting operations commence.
- D. Automatic control valves are to be adjusted so that the irrigation heads, drip emitters, and drip tubing operate at the pressure recommended by the manufacturer.

708-3.14 TESTING AND OBSERVATION

- A. Do not allow or cause any of the work of this section to be covered up or enclosed until it has been observed, tested and accepted by the Landscape Architect, City, and governing agencies.
- B. The Contractor shall be solely responsible for notifying the Landscape Architect, City, and governing agencies, a minimum of 48 hours in advance, where and when the work is ready for testing.
- C. When the sprinkler system is completed, the Contractor shall perform a coverage test of each system in its entirety to determine if the water coverage for the planted areas is complete and adequate in the presence of the Landscape Architect.
- D. The Contractor shall furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate, without bringing this to the attention of the Landscape Architect. This test shall be accepted by the Landscape Architect and accomplished before starting any planting.
- E. Areas to be maintained for the formal maintenance period shall start maintenance at the same time, as directed by the Landscape Architect, City, and governing agencies. Partial areas will not be released into maintenance prior to completion of items listed in the pre-maintenance review. The maintenance period may not be phased.
- F. If, after the maintenance review, the irrigation systems are not accepted by the Landscape Architect, the contractor shall reimburse the Architect for additional site visits, or additional time required to review work. All additional time will be billed at the Architect's hourly rate and will be paid for by the contractor at no additional cost to the City.
- G. Final inspection will not commence without record drawings as prepared by the Irrigation Contractor.

708-3.15 MAINTENANCE

- A. During the maintenance period the Contractor shall adjust and maintain the irrigation system in a fully operational condition providing complete irrigation coverage to all intended plantings.

708-3.16 COMPLETION CLEANING

- A. Clean up shall be made as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be swept, and any damage sustained on the work of others shall be repaired to original conditions.

708-1.4 PAYMENT

Payment shall be made on lump sum items as outlined in Section 700-5 Bid Item Descriptions. Costs and work shall be distributed between these bid items in such a manner that no work or materials are not included in the group of bid items and that no work is duplicated between bid items.

709 LANDSCAPE SOIL PREPARATION

709-1 - GENERAL

709-1.01 SCOPE

- A. Furnish and install all landscape soil preparation as shown and specified including, but not necessarily limited to, the following: tree pit backfill placement, organic amendment and fertilizer placement, and finish grading.

709-1.02 QUALITY CONTROL

- A. Reviews: Contractor shall specifically request at least two days in advance the following reviews prior to progressing with the work:
 - 1. Finish grade
- B. Certification: Written certificates stating quantity, type, and composition, weight and origin for all amendments and chemicals shall be delivered to the Landscape Architect before the material is used on the site.
- C. Soil Samples: Contractor shall provide a one-quart sample of the native topsoil, and a one quart sample of any proposed import topsoil, to Soil and Plant Laboratory of Santa Clara, (408) 727-0330, for their testing for conformance to this specification. No material shall be delivered to the site, graded on-site, or otherwise modified until the Landscape Architect approves the material. All testing costs shall be paid by Contractor. Contractor shall allow for sufficient time for such testing prior to construction.

Contractor shall also submit a copy of this technical specification Section 02911 with the soil and amendment samples. All testing costs shall be paid by Contractor. Contractor shall allow for sufficient time for such testing prior to construction.

- D. Amendment Samples: Contractor shall provide a one-quart sample of each proposed amendment to Soil and Plant Laboratory of Santa Clara, (408) 727-0330, for their testing for conformance to this specification, together with the native topsoil sample. No material shall be delivered to the site until the Landscape Architect approves the samples. Testing costs shall be paid by the Contractor.
- E. Planting Areas: All areas to be planted, whether in seed, sod, container stock, flats, liners, or otherwise, are defined as planting areas in these documents.

709-2 – PRODUCTS

709-2.01 MATERIALS

- A. Native Topsoil: Shall be the existing surface layer of soil on site. This layer typically will be a different color and texture than the subsoil, and may be of varying thicknesses. The Contractor shall be responsible for reviewing the area limits and depths of native topsoil on site with the Landscape Architect.
- B. Import Topsoil: Shall be an homogeneous mineral soil classified as sandy loam, or fine sand. Particle size data shall be based upon standard USDA methodology. Of the material falling in the sand category, a minimum of 80% shall fall in the fine sand range .05 - 5mm. Gravel content greater than 2.0mm shall be less than 15%. Import topsoil shall not contain more silt and clay than the on-site native soil. The sum of silt plus clay shall be less than 25%, the soil shall be nonsaline as determined on the saturation extract. Salinity shall not exceed 3.0 mmhos/cm, boron shall not exceed 1.0 ppm and the sodium absorption ratio (SAR) shall not exceed 6.0. Soil reaction as determined on a saturated paste shall fall between 5.5 and 7.5. The soil shall be free of organic herbicides, or other growth-restricting chemicals.
- C. Fertilizer: Shall be determined from soils analysis results. For purposes of bidding only, assume the use of 6-20-20 commercial fertilizer, 20-10-5 planting tablets by Agriform International Chemicals, Inc., and iron sulfate.
- D. Organic Amendment: Shall be BFI Super Humus Compost, conforming to:

1. BFI Super Humus Compost conforming to

- a. Gradation: A minimum of 90% of the material by weight shall pass a 1/2" screen. Material passing the 1/2" screen shall meet the following criteria.

<u>Percent Passing</u>	<u>Sieve Designation</u>
85-100	9.51 mm (3/8")
50-80	2.38 mm (No. 8)
0-40	500 micron (No. 35)

- b. Organic Content: Minimum 50% based on dry weight and determined by ash method. Minimum 250 lbs. organic matter per cubic yard of compost.

- c. Carbon to Nitrogen Ratio: Maximum 35:1 if material is claimed to be nitrogen stabilized.
- d. Soluble Salts: Soluble nutrients typically account for most of the salinity levels but sodium should account for less than 25% of the total. To avoid a leaching requirement, the addition of the compost shall result in a final ECe of the amended soil of less than 4.0 ds/m @ 25 degrees C. as determined in a saturation extract. Use the following table to determine the maximum allowable ECe (ds/m of saturation extract) of compost at desired use rate and allowable ECe increase.
- e. Moisture Content: 35-60%.
- f. Contaminants: The compost shall be free of contaminants such as glass, metal and visible plastic.
- g. Maturity: Physical characteristics suggestive of maturity include:
 Color: dark brow to black
 Odor: acceptable = none, soil like, musty or moldy
 unacceptable = sour, ammonia or putrid
- h. Particle Characterization: identifiable wood pieces are acceptable but the balance of material should be soil-like without recognizable grass or leaves

E. Pot Mix for Hanging Baskets

- 0.5 cu. yd. Fine Sand
- 0.15 cu. yd. Spagnum Peat Moss
- 0.35 cu. yd. Raw Fir Bark
- 2 lbs. Urea Formaldehyde
- 3 lbs. Single Superphosphate
- 1 lb. Potassium Nitrate
- 10 lbs. Dolomite Lime
- 3 lbs. Gypsum

Prior to placement of this mixture, Contractor shall deliver and have tested a one quart sample to verify degree of compliance. No mix shall be installed until tested by the soils laboratory and approved for installation by the Landscape Architect.

709- 3 - EXECUTION

709-3.01 ORGANIC AMENDMENT AND FERTILIZER INCORPORATION

- A. Materials determined from the soils test shall be uniformly distributed throughout all irrigated planting areas and incorporated to a homogeneously blended soil depth of six inches. Assume per 1000 square feet:

- 6 cubic yards Nitrogen Stabilized Organic Amendment
- 30 pounds Commercial Fertilizer (6-20-20)
- 10 pounds Iron Sulfate

(Note: Iron sulfate should be applied cautiously, avoiding contact with concrete, since permanent staining may result. Any such stained concrete shall be replaced at Contractor's expense.)

709-3.02 BACKFILL

- A. Only unamended soil shall be used beneath the root ball; cultivate bottom of plant pit to improve porosity.
- B. Soil immediately below the root ball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.
- C. The top of the rootball should be at or slightly above final grade.
- D. The top 12-inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

1/3 by volume organic amendment/fertilizer mix per plant laboratory recommendations
2/3 by volume native or imported topsoil

709-3.03 PLANT TABLETS

- A. All container plants shall receive plant tablets as follows:

36 inch box trees eighteen 21-gram tablets

Space the tablets evenly around the root ball halfway up backfill touching side of root ball. Landscape Architect may require excavation of plants selected at random for conformance review.

709-3.04 POT MIX

- A. Contractor shall pre-mix and install the following mix at 85% compaction in all pots:

0.5 cu. yd. Fine Sand
0.15 cu. yd. Spagnum Peat Moss
0.35 cu. yd. Raw Fir Bark
2 lbs. Urea Formaldehyde
3 lbs. Single Superphosphate
1 lb. Potassium Nitrate
10 lbs. Dolomite Lime
3 lbs. Gypsum

Prior to placement of this mixture, Contractor shall deliver and have tested a one quart sample to verify degree of compliance. No mix shall be installed until tested by the soils laboratory and approved for installation by the Landscape Architect.

710 SECTION PLANTING and TREE GRATES

710-1 - GENERAL

710-1.01 SCOPE

- A. Furnish and install all, container plantings, root barrier, pea gravel mulch, and related work thereto.
- B. Furnish and install all tree grates.
- C. Coordinate and provide all services as required to contract grow plant material indicated in the drawings as necessary.

710-1.02 QUALITY CONTROL

- A. Reviews: The Contractor shall specifically request the following reviews prior to progressing with the work:
 - 1. Nursery Inspection: All plants shall be inspected at the nursery by the landscape architect or engineer prior to shipment. Provide 10 working day notice.
 - 2. Plant material approval at the site prior to planting
 - 3. Finish grade
 - 4. Substantial completion
 - 5. Final completion

710-1.03 SUBMITTALS

- A. Plant Material: Within 5 days after award of contract, Contractor shall submit notice to the Landscape Architect certifying the quantity and species of plant material ordered, the nursery supplying the material, any plant material unavailable at the time, and proposed plant substitutions. No plants shall be delivered prior to written acceptance by the Landscape Architect.

710- 2 – PRODUCTS

710-2.01 PLANT MATERIALS

- A. Nomenclature and Labels: Plant botanical names shall conform to “Standardized Plant Names”, by Harian P. Kelsey, second edition, Fife Press; and secondly, “A Checklist of Woody Ornamental Plants of California”, Manual 32, University of California. All plants of each clone, species, and cultivar shall be delivered to the site labeled with their full botanical names. Every plant species shall be labeled with no less than one label for every ten plants of a species.

- B. Quality: Minimum quality of all plant material shall conform to prevailing published specifications of the California Association of Nurserymen and the American Association of Nurserymen 'American Standard for Nursery Stock' unless otherwise indicated. Additional specifications shall be indicated on the drawings.
- C. Quantities: the quantities, if shown on the plant list and in labels, are for the Landscape Architect's use and are not to be construed as the complete and accurate limits of the contract. Contractor shall furnish and install all plants shown schematically on the drawings. Any unlabelled plants shall be considered as the smaller size shown for that type on the drawings.
- D. Root Systems: All container-grown stock shall be grown in its container for at least six months prior to its planting. Contractor shall allow one percent of the quantity of plants for removal and inspection. Any plant material, within one year following the final acceptance of the project, determined by the Landscape Architect to be defective, restricted, declining or otherwise deficient due to abnormal root growth, shall be replaced by Contractor, to the equal condition of adjacent plants, at the time of replacement.
- E. Health: Foliage roots and stems of all plants shall be of vigorous health and normal habit of growth for its species. All plants shall be free of all diseases, insect stages, burns, or disfiguring characteristics.
- F. Untrue Species: All plant material, within two years following the final acceptance of the project, determined by the Landscape Architect to be untrue to the species, clone, and/or variety specified, shall be replaced by the Contractor, to the equal condition of adjacent plants at the time of replacement.

710-2.02 TREE GRATES

- A. Tree Grates shall be 4' by 6', two section, DTN model as available from Olympic Foundry, or approved equal.
- B. Tree grates shall bear the name "Historic Lakeport" and the incorporation date shall be "1888".
- C. Cast iron to conform to ASTM A48, Class 30, for gray iron casting.
- D. Tree grates shall be pattern and dimension indicated, of uniform quality, free from blow holes, porosity, hard spots, shrinkage defects, cracks or other injurious defects.
- E. Finish shall be smooth, well cleaned by shot blasting or other approved method. Finished grates are not to have asphaltic paint applied.

710-2.03 CHEMICALS

- A. Refer to Section 02935, Landscape Maintenance.

710-2.04 MULCH

- A. Mulch in tree wells shall be washed pea gravel

710-2.05 ROOT BARRIER

- A. Root Barrier shall be #UB-24 by Deep Root Corporation or approved equal.

710-3 – EXECUTION

710-3.01 PLANTING

- A. Plant Material Approvals: Before planting operations commence, all or a representative sampling of plant material shall be reviewed at the site for the Landscape Architect's approval. Defective plants installed without such review shall be removed from the site upon request by the Landscape Architect and an acceptable plant substituted in its place.
- B. Layout: Only those plants to be planted in any single day shall be laid out. Locations of all plants shall be reviewed prior to planting. Plants installed without this review shall be transplanted as directed by the Landscape Architect.
- C. Protection of Plants: Contractor shall maintain all plant material in a healthy growing condition prior to and during planting operations. Contractor shall be responsible for vandalism, theft and damage to plant material until the commencement of the maintenance period.
- D. Root Systems: Contractor shall be responsible for inspection of all root systems on plant materials. Inspection shall include, but not be limited to, checking for rootbound stock, encircling roots at the perimeter of the container, girdling roots at the top surface of the rootball, and other defective root conditions. Such inspections shall include the complete removal of soil from one percent of plant material containers, or at least one plant from each nursery and each plant type. Contractor shall cut defective or potentially defective girdling, rootbound, and encircling roots and spread the root system into the surrounding backfill. Plants with excessively defective root systems shall be rejected by the Contractor.
- E. Pruning: Contractor shall do no pruning without the specific approval of the Landscape Architect. Plants pruned without approval shall be replaced by the Contractor, if required.
- F. Basins: Construct basins as necessary to water plants. Remove basins from all plants under a permanent irrigation system prior to final inspection and finish grade the planting area. Basins for plants to be hand-watered shall remain in place. Basin bottoms shall drain to berm away from plant stem.
- G. Staking: All trees shall be staked as drawn with stakes driven securely into existing soil aligned with the trunk and perpendicular to the direction of the prevailing winds. A minimum of two figure-eight wire and rubber tree ties required per stake.
- H. Plant Pits, Backfill and Finish Grading: See SOIL PREPARATION Section for materials and installation requirements.

- I. Cleanup: After completion of all operations, Contractor shall remove all trash, excess soil and other debris. All walks and pavement shall be swept and washed clean, leaving the entire area in a neat, orderly condition.
- J. Mulch Installation: All tree wells shall receive a three-inch layer of pea gravel mulch. Spread mulch to a uniform thickness. Keep mulch away from the crown of trees.
- K. Root Barrier: Install root barrier per detail. Install tight to adjacent pavement or other hardscape surface.

710-3.02 TREE GATES

- A. Tree grates to be installed as detailed on drawings with the use of metal shims to leave the grate level with adjacent surfaces. Installed grates shall be stable and non-rocking.

711 LANDSCAPE MAINTENANCE

711-1 - GENERAL

711-1.1 SCOPE

- A. Work in this section includes the growing and maintenance operations necessary to establish the plantings; to provide pest and disease control, and to maintain the irrigation system, and related construction elements.

711-1.2 SUBMITTALS

- A. Soil Testing: Contractor shall collect a one-quart representative composite sample of the in-place tree pit backfill 20 days after completion of planting and submit to Soil and Plant Laboratory of Santa Clara, (408) 727-0330, for maintenance period fertilizer recommendation. Test results shall be made available to the Landscape Architect. Sample shall be a representative composite taken from several planting areas. Cost of soil test shall be paid for by the Contractor.
- B. Herbicide: Submit a written recommendation from a State of California appropriately licensed individual along with complete product data from proposed manufacturer, for review by Owner's representative.

711-2 – PRODUCTS

711-2.1 MATERIALS

- A. Fertilizer: Used during the course of the maintenance period shall be determined by soils test required under Part 1 of this Section. For bidding purposes only, assume the use of ammonium sulfate (21-0-0) at 5 lbs. per 1000 SF, minimum of two applications.
- B. Water: During the course of construction and maintenance period shall be paid for by the Contractor.

- C. Herbicide: Shall be a commercially available pre-emergent herbicide material recommended for this project and these plantings by a State of California appropriately licensed individual. The licensed individual shall review all planting, including but not limited to seed, sod, groundcovers, shrubs, and trees, the types and extent of soil preparation, the irrigation systems, drainage patterns, and other project characteristics to verify type, compatibility, and recommend the appropriate herbicide(s) for use. Contractor shall be responsible for all overspray, spreading, runoff, plant health, and other impacts from the use of the herbicide.

711-3 – EXECUTION

711-3.1 TIME LIMITS: The maintenance period shall commence from the date of substantial completion of planting as defined in paragraph 3.6 below, and extend for a 90-day period thereafter, or until the acceptance of Final Completion.

711-3.2.FERTILIZER APPLICATION: Fertilizer(s) shall be applied per Soil and Plant Laboratory recommendations. For bidding purposes, assume initial application to be four weeks after planting and subsequent applications to be at 45-day intervals.

711-3.3 HERBICIDE APPLICATION: Herbicide shall not be used until all plant material has been planted a minimum of 20-days. All planting areas shall be kept weed-free by non-herbicide methods during this time period. Herbicide shall not be applied to any areas which are or have been seeded. Contractor must apply the material in conformance with the written recommendations of the State appropriately licensed individual.

711-3.4 BASIC REQUIREMENTS: All planting areas shall be kept weed-free at all times during the maintenance period. All pest and disease control shall be the Contractor's responsibility. All planting areas shall be kept at optimum moisture for plant growth. Settlement of soil and plants and soil erosion shall be repaired and areas replanted as required. Dying or deficient plants shall be replaced as soon as they become apparent.

711-3.5 OWNER'S RESPONSIBILITY: Work installed under this contract that is damaged or stolen prior to Substantial Completion shall be repaired or replaced by the Contractor without cost to the Owner. After Substantial Completion and through the maintenance period, these damages and similar factors such as extensive litter, abuse and defacement shall be the Owner's responsibility to repair or replace and shall not be a part of this contract. No planting shall be guaranteed beyond the maintenance period, except as to conformance to specified species and variety, and except as to conditions specified under "Root Systems" of Landscape Planting, Section 02934.

711-3.6 MULCH REPLENISHMENT: Mulch shall be maintained at the specified thickness, and shall be replenished as necessary.

711-3.7 SUBSTANTIAL COMPLETION: Shall be deemed as the time all plantings are installed, and when all other work is satisfactorily completed (with the exception of minor items to be completed as noted upon a checklist compiled by the Landscape Architect. Maintenance period shall not commence until work is deemed substantially complete by the Landscape Architect.

710-3.8 FINAL REVIEW: Contractor shall request a final review of the project at least five days in advance of the proposed date. Failure to request this notice shall automatically extend the date of completion. The maintenance period will continue until project is deemed complete.

711 SITE METAL

711-1 GENERAL

711-1.01 SUMMARY

A. Section Includes:

1. This section includes fabrication and installation of all steel handrails and related hardware as indicated on plans and as specified herein.

711-1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications and installation instructions for products and processes used in site metal, including finishes and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of handrails. Include plans, elevations and details of fittings, connections and anchorages to other work. Provide templates for anchor and bolt installation by others.

1. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural details, material properties and other information needed for review.

C. Samples: Submit samples for each type of metal finish indicated. Prepare samples on metal on same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, provide "range" samples showing limits of such variations.

1. Include 12 inch long samples of distinctly different members including handrails, top rails, posts and rail coverings, if any. Include samples of fittings and brackets if requested by Engineer.
2. Submit one sample of skate stopper.

711-1.03 QUALITY ASSURANCE

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

711-1.04 SYSTEM PERFORMANCES

A. Structural Performances: Provide metal assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.

1. Handrails and Toprails: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 pounds applied at any point in any direction.
 - b. Uniform load of 50 pounds per linear foot applied simultaneously in both vertical and horizontal directions.

711-2 MATERIALS

711-2.01 PRODUCTS

- A. Steel
 1. Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.
 2. Steel Plates, Shapes and Bars: ASTM A48, Class 30.
 3. Gray Iron Castings: ASTM A48, Class 30.
 4. Malleable Iron Castings: ASTM A47, grade as recommended by fabricator for type of use indicated.
- B. Non-Shrink Non-Metallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- C. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, and as required for color match, strength and compatibility in fabricated items.
- D. Fasteners: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials jointed.
 1. Provide concealed fasteners for interconnection of handrail and railing components and for their attachment to other work, except where otherwise indicated.
 2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
- E. Anchors and Inserts: Provide anchor of proper type, size and material for type of loading and installation conditions shown, as recommended by manufacturer, unless otherwise indicated. Use non-ferrous metal of hot-dipped galvanized anchors and inserts for exterior locations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- F. Primer Paint for Ferrous Metals: Manufacturer's standard rust-inhibiting primer, compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified.
- G. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with Military Specification MIL-P-21035 (ships).

H. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

711-2.02 FABRICATION

- A. General: Fabricate all metal items to design, dimensions and details shown. Provide metal members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not less than required to support the design loading indicated.
- B. Welded Connections: Fabricate handrails, fencing, gates, and utility roof of materials indicated below for interconnections of members by welding. Preassemble railing units in shop to maximum extent practicable and consistent with shipping and handling limitations. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
1. Provide welded connections for ferrous pipe handrails, fencing, gates, and utility roof.
- C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of handrail and railing components.
- D. For exterior handrails, fencing, gates, utility roof, and those exposed to moisture from condensation or other sources, provide weep holes or other means for evacuation of entrapped water in hollow sections of railing members.
- E. Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated. Furnish inserts and other anchorage devices for connecting handrails and railing to concrete or masonry work. Fabricate and space anchorage devices as indicated and as required to provide adequate support. Coordinate anchorage devices with supporting structure.
1. For posts set in concrete provide sleeves of galvanized steel, not less than 6 inches long and with inside dimensions not less than 1/2 inch greater than outside dimensions of post. Provide galvanized steel plate closure welded to bottom of sleeves, make closure 1 inch greater in length and width than outside dimensions of sleeve.
 2. Provide slip-fit metal sockets to receive removable railing posts. Include removable socket covers designed and fabricated to fit into socket and resist accidental removal.

711-2.03 METAL FINISHES

- A. General: Finish shall be an acrylic polyurethane paint system as manufactured by TNEMEC Co., Inc., or other similar system by an approved manufacturer. Color to be selected by Owner's representative.

- B. Surface Preparation: Prepare all surfaces by removing all loose mill scale, loose rust, dirt, grease or other foreign matter by sandblasting to a commercial grade according to SSPC-SP6, by the manufacturer of the paint system.
- C. Shop Applied Prime Coat: Apply a prime coat of TNEMEC Series 66, Color Hi-Build Epoxoline, to a dry thickness of 3 to 4 mils.
- D. Shop Applied Finish Coat: Apply two finish coats of Hi-Build Acrylic Polyurethane Enamel, TNEMEC Series 73 (semi-gloss) or 74 (high-gloss), Endura-Shield III, to a dry film thickness of 2.5 to 3.5 mils per coat.

2.04 SKATE STOPS

- A. Skate Stops shall be HR series as available from Skate Stoppers, (619) 447-6374, size to fit specified handrails.

711-3 – EXECUTION

711-3.01 EXAMINATION

- A. Installer must examine the areas and conditions under which handrails, fencing, and gates are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

711-3.02 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages such as sleeves, concrete inserts, anchor bolts and miscellaneous items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- b. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for adjustments during installation where taking field measurements before fabrication might delay work.

711-3.03 INSTALLATION

- A. General
 - 1. Fit exposed connections accurately together to form tight, hairline joints.
 - 2. Perform cutting, drilling and fitting required for installation of handrails and railings. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Do not weld, cut or abrade surfaces of handrails and railing components which have been coated or finished after fabrication, and are intended for field connection by mechanical means without further cutting or fitting.

3. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections which are not to be left as exposed joints, but could not be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat.
4. Adjust handrails, fencing, and gates prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated or, if not indicated, as required by design loadings.

B. Anchoring Posts

1. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between posts and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
 - a. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.
2. Anchor posts to metal surfaces with manufacturer's standard fittings designed for this purpose, unless otherwise indicated.
3. Provide removable railing sections as indicated, using slip-fit metal sockets. Accurately locate sockets to match post spacing.

711-3.04 ADJUST AND CLEAN

- A. Protect finishes of railings and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at project completion or when directed by Owner's representative. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units as required.
- B. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint; and paint exposed areas with same material.

711-3.05 SKATE STOPS

- A. Install Skate Stops on all handrails per manufacturer's recommendations.

712 SITE FURNISHINGS

712-1 - GENERAL

712-1.01 SUMMARY

- A. Section Includes: Benches, News Racks, Bicycle Bollards, and Trash Receptacles. For this contract, only Trash Receptacles apply. All others are NIC.

712-1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for all items.

712-2 MATERIALS

712-2.01 Bench (NIC)

- A. Timberform "Restoration" Series #2118-6, 6 feet length, Alaskan Yellow Cedar slats, kiln dried, with dark green or custom verde gris powder coated frame, surface mount, with optional center arm rest and optional custom lettering or graphic to be selected by City Staff

712-2.02 Bicycle Bollard (NIC)

- A. Madrax PARBC-2-SF-P, with dark green or custom verde gris powder coated finish, ball cap, and surface mount.

712-2.03 News Rack (NIC)

- A. K-Jack "The Stacker"

712-2.04 Trash Receptacle

- A. Timberform Craftsman #2667 (same as existing), with optional ash/dome top, optional custom lettering or graphic to be selected by City Staff, and dark green or custom verde gris powder coating.

712-2.05 Ca Tree Grates

- A. See Planting Section

712-3 EXECUTION

712-3.01 Installation

- A. Install all site furniture in accordance with manufacturer's instructions and construction details.

712-3.02 ADJUSTMENTS

- A. It is understood and agreed that should minor changes and deviations from the locations established on the drawings be required by the Engineer, this shall be done by the Contractor at no additional cost thereto.

713 TEXTURED AND COLORED PAVEMENT

713-1 GENERAL:

Stamped asphalt pavement is described as Textured/Colored AC Pavement on the drawings and documents related to the project. The Contractor doing this work shall be an Authorized StreetPrint Applicator as licensed by Integrated Paving Concepts Inc., and shall have a foreman, supervisor or lead hand on site who has successfully completed a StreetPrint Level 1 Accreditation Training Program.

StreetPrint Pavement Texturing is defined as a proprietary finishing system, which treats the surface of Hot Mix Asphalt Concrete (HMA) by imprinting freshly laid, fully compacted, asphalt, or reheated existing asphalt pavement, with "grid style" or other styles of depressions. This is done to replicate, in relief, the concrete grout depressions common to hand-laid brick or cobblestone, or any other design as shown on the drawings or described in the specifications, and coating the imprinted asphalt surface using the StreetBond Surfacing System.

StreetBond Surfacing System is defined as a collection of proprietary coating products, specially formulated by Integrated Paving Concepts, Inc., for application on asphalt surfaces, to provide color and texture to the asphalt surface, and/or to fill surface voids or segregation.

Imprinting Hot Mix Asphalt is defined as pressing flexible templates into hot, compacted asphalt concrete to create the appearance of grout lines or patterns in the asphalt surface.

Templates are defined as flexible, woven wire rope cut and welded in various patterns, used for imprinting Hot Mix Asphalt. The template pattern shall be determined by the Engineer.

Level 1 Accredited StreetPrint Applicator is someone who has successfully completed the StreetPrint Level 1 Accreditation Training Program. Level 1 Accreditation is obtained by attending a StreetPrint Training Program, successfully completing a written or oral test, and completing at least one StreetPrint project of at least 1000 sq. ft. in area, that meets minimum criteria as set out by Integrated Paving Concepts, Inc.

Reheating of the asphalt surface is defined as the softening of existing compacted Hot Mix Asphalt by applying heat to the asphalt surface using equipment such as infrared heaters or hot air heaters. To avoid over heating or burning and degradation of the asphalt surface continuous monitoring of the surface temperature, during the heating process, using an infra red thermometer is required. Equipment that is specifically excluded from this section and shall not be used for reheating of the asphalt is any form of direct flame heaters. Overheating of the asphalt is defined as applying excessive heat to the asphalt surface. This occurs when blue/black smoke is emitted from the surface. Overheating should be avoided, since coating adhesion is drastically affected when overheating occurs.

713-2 MATERIALS

The color of the coating surface shall be determined by the Engineer. The coating system shall consist of two coats of the StreetBond SP150E with a topcoat of sealer concentrate. A sample of the stamped and colored pavement shall be submitted to the ENGINEER and obtain approval prior to applying on the project.

713-3 CONSTRUCTION

Layout and imprint the pattern into the surface of the HMA shall be as per the drawings or

specifications. Installation shall be in accordance with the latest StreetPrint Application Procedures as issued by Integrated Paving Concepts Inc.

The street print imprinting process and coating shall be performed prior to the adjacent thermoplastic pavement markings.

The Contractor shall follow the latest StreetPrint Application Procedures as issued by Integrated Paving Concepts Inc. The pattern shall be created in accordance with the design as agreed by the Owner or Owner's representative. Patterning shall begin once the asphalt has reached its final density and while there is still sufficient heat in the asphalt to permit imprinting. Patterning shall be achieved using steel rollers and/or vibratory plate compactors and shall be of consistent depth.

Alternatively, imprinting can be carried out at a later stage, on existing asphalt, by applying heat to the asphalt surface to make the upper portion of the asphalt surface pliable enough to accept the imprint of the template. For proper imprinting success, the asphalt pavement must be adequately heat soaked (softened) to a depth of at least 1/2 inch (12.5mm), without burning the asphalt. The asphalt surface temperature shall not exceed 300°F (150°C). If smoke is visible, that is an indication that the asphalt is burning and the pavement may spall or crumble at a later date. Regular monitoring of the surface temperature during heating is recommended to prevent over heating.

The Contractor shall apply the StreetBond Surfacing System as specified above. The air temperature shall be at least 50°F and rising for applying the StreetBond Surfacing System. There should be no precipitation expected within 24 hours after applying StreetBond SP150E Base. The StreetBond products shall be spray applied and broomed using a broom or brushes to cut in small areas where required.

When StreetBond SP 150E has fully dried, StreetBond Sealer Concentrate shall applied as a curing membrane or final coating. StreetBond Sealer Concentrate shall be tinted using StreetBond colorant, and shall be spray applied and broomed into the surface. Care shall be taken to ensure that the entire surface is covered, including the vertical edges of the imprinted surfaces. Sufficient masking shall be used to ensure that the surfacing products are applied only where specified.

All StreetPrint projects shall have on site a foreman, supervisor or lead hand who is registered with Integrated Paving Concepts, Inc., as a Level 1 Accredited StreetPrint Installer.

713-4 PAYMENT

Payment shall be made on a unit cost basis per square foot of installed and coated street print.

714 PAVEMENT MARKINGS

714-1 GENERAL

714-1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish material and apply pavement and curb markings as described in Contract Documents.
2. Remove existing pavement markings in areas which will conflict with new striping layout beyond the paving limits.
3. Thermoplastic traffic stripes and pavement markings shall consist of a single uniform layer of thermoplastic and layer of bonded core elements and a layer of glass beads.
4. Painting Red Curb markings

B. Related Sections

1. Work shall comply with Section 84 of the 2010 Caltrans Standard Specifications
2. Work shall comply with the latest addition of the California Manual of Uniform Traffic Devices (CAMUTCD)

714-1.2 SUBMITTALS

- A. Paint Datasheets and Certificates of Compliance
- B. Thermoplastic Datasheets and Certificates of Compliance
- C. Glass Bead Data Sheets and Certificates of Compliance
- D. 3M Bonded Core Data Sheet
- E. Red Paint for Curbs

714-1.3 PROJECT CONDITIONS

- A. Project Environmental Requirements
 1. Apply only on dry surfaces, during favorable weather, and when damage by rain, fog, or condensation not anticipated.
 2. Provide temporary pavement markings whenever throughout project duration until final pavement markings are installed.
 3. Allow HMA to cure a minimum of 7 days and a maximum of 14 days prior to application.

7104-2 PRODUCTS

- A. All pavement markings shall be thermoplastic.
- B. All Materials shall comply with the requirements of Section 84 and 85 of the 2010 Caltrans Standard Specifications and these Special Provisions.
- C. All thermoplastic shall be alkyd thermoplastic.
- D. Glass Beads shall comply with AASHTO M247 Type 2.
- E. Alkyd Paint per Section 84 and 85 of the Standard Specifications

714-3 EXECUTION

714-3.1 PREPARATION

- A. Surfaces shall be dry and free of grease and loose dirt particles
- B. Layout all pavement markings per plan and in accordance with Section 84. Layout markings shall be kept to a minimum.
- C. Allow 4 working days for City review. Make any changes as provided during review.

714-3.2 APPLICATION

- A. Install per Section 84 and these Special Provisions
- B. Thicknesses
 1. Stripes -0.100 inches minimum
 2. Legends and Markings – 0.125 inches
- C. Bonded Core Elements
 1. 1st layer shall be 3M Bonded Core All Weather Reflective Elements for use in thermoplastic traffic stripes and markings.
 2. Color of bonded core elements shall match color of stripe or marking.
 3. Application rate shall be 6.6 pounds per 100 square feet.
- D. Glass Beads
 1. Apply as second layer.
 2. Application rate of 14.4 pounds per square foot.
- E. Minimum Initial Retro reflectivity Values

	White	Yellow
Dry (ASTM E1710)	700	500
Wet recovery (ASTM E2177)	280	250
Wet continuous (ASTM E2176)	90	75

- 714-3.2 CLEANING
- A. Remove drips, overspray, improper markings, and thermoplastic or paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Owner's Agent prior to performance.

- 714-4 PAYMENT
- A. All pavement markings shall be paid at the unit price itemized in the bid schedule.

715 PROJECT SIGNAGE

715-1 GENERAL

715-1.1 SUMMARY

- A. Includes But Not Limited To
1. Furnish and install new sign post bases in sidewalk as indicated on the plans.
 2. Furnish material and install new signs panels and signposts as indicated on the plans
- B. Related Sections
1. Work Specifications shall comply with the latest addition of the California Manual of Uniform Traffic Devices (CAMUTCD)
 2. Comply with City Standard Details

715-1.2 SUBMITTALS

- A. Sign product data sheets indicating compliance with CAMUTCD

715-2 PRODUCTS

- A. Posts and Post Bases
1. Schedule 40 Galvanized Pipe
 2. Sizes and lengths per plans.
- B. Signs shall comply with the latest addition of the California Manual of Uniform Traffic Devices (CAMUTCD)
- C. Signs shall be the type and installed at the locations indicated on the plans

715-3 EXECUTION

715-3.1 PREPARATION

- A. Locate sign pole bases as indicated on the drawings prior to placement of sidewalks.
- B. Sign pole bases may be cast in place prior to sidewalk construction.

715-3.2 APPLICATION

- A. Verify that sign pole bases are cast plumb prior to placing sidewalk concrete.
- B. Install new signs and poles after completion of sidewalk improvements on a block by block basis.

715-3.2 CLEANING

- A. Remove any foreign marks or concrete splatter from pole bases.

715-4 PAYMENT

- A. All signs shall be paid at the unit price itemized in the bid schedule. The unit cost will include the installation of the base, pole and sign.

BID ALTERNATE 1. BRICK PAVERS

716 BID ALTERNATE 1. BRICK PAVERS

716-1 - GENERAL

716-1.01 SUMMARY

- A. Section Includes: Precast unit pavers complete, including interlocking precast pavers, sand setting bed, sand joints, joint-stabilizing sealer, aggregate base, and compaction of subgrade and base.

716-1.02 REFERENCES

A. Reference Specifications

1. As herein noted, the work shall comply with requirements of:

a. The current American Society of Testing Materials series of Standard

1. ASTM C 33, Standard Specification for Concrete Aggregates.
2. C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile, Section 8, Freezing and Thawing.
3. ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
4. ASTM C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
5. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
6. ASTM C 936, Standard Specification for Solid Concrete Interlocking Paving Units.
7. ASTM C 979, Standard Specification for Pigments for Integrally Colored Concrete.
8. ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³ (600 kN-m/m³)).
9. ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
10. ASTM D 2940, Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.

b. The current California Department of Transportation Standard Specifications, referred to as DTSS.

c. AASHTO M 288 Geotextiles

- B. Interlocking Concrete Pavement Institute (ICPI):

1. ICPI Tech Spec Technical Bulletins

716-1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each manufactured product, including certification that each product complies with specified requirements.
- B. Samples for Verification Purposes: Submit two samples made up of actual unit pavers for each type, color and texture required. Include in each set of samples the full range of exposed color and texture to be expected in the completed work.
- C. Non-woven geotextile fabric: submit manufacturer's product data and one square foot sample.
- D. Submit testing certification showing capability of pavers proposed to comply with the specified strength requirement.
- E. Field Test Reports: During construction, submit field test reports in accordance with the testing schedule.

716-1.04 QUALITY CONTROL

- A. Installer Qualifications: Engage an installer who has successfully completed within the past three years at least three unit paver applications similar in type and size to that of this project and who will assign installers from these earlier applications to this project, of which one will serve as lead installer.
- B. Testing and Inspection Service: The Contractor shall engage testing and inspection service to perform gradation analysis for both setting bed and joint sand. Contractor shall cooperate with Owner in performing compaction testing.
- C. Job Mock-Up
 - 1. The Contractor shall construct a mock-up sample, 6 feet by 10 feet minimum, and shall indicate the materials, pattern and joint treatment required in actual construction. Mock up shall include border and field patterns. The Contractor shall make all mock-up samples as required until acceptance by the Engineer. The selected mock-up shall become a minimum standard of workmanship when accepted and shall be matched or bettered through the project. The sample may be constructed as part of the project and, if approved, will be accepted as part of the work. However, should the sample fail to meet the Engineer's approval, it shall be removed and reconstructed until approved.

716-1.05 JOB CONDITIONS

- A. Existing Conditions
 - 1. Examine work in place on which this work is dependent. Defects which may influence satisfactory completion and performance of this work shall be corrected in accordance with the requirements of the applicable section of work prior to commencement of the

work. Commencement shall be construed as work in place being acceptable for satisfying the requirements of this section.

B. Protection

1. Protect the work and adjacent work against damage during progress of the work.
2. Construction equipment which will damage existing or new pavement shall not be used.
3. Protect unit pavers during storage and construction against wetting by rain or groundwater, and against soilage or intermixture with earth or other types of materials.

C. Storage and Handling

1. Handle pavers to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of pavers with wood or other rigid materials. Lift with wide-belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slide.
2. Store pavers on wood skids or pallets. Place and stock skids and pavers to distribute weight evenly and to prevent breakage or cracking. Protect stored pavers from weather with waterproof non-staining covers or enclosures, but allow air to circulate around pavers.
3. Materials in containers: Deliver materials to the project site in their original, unopened containers bearing label clearly identifying manufacturer's name and brand. Store materials under cover, clear of the ground and protected from the weather.

716-2 - MATERIALS

716-2.01 SAND SETTING BED

- A. Sand shall be well graded, washed sharp sand conforming to ASTM C33, and meeting the following sieve analysis gradations:

<u>Sieve</u>	<u>Percent Passing</u>
3/8 inch	100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	20 - 30
No. 200	0 - 5

Note: Use of masonry sand will not be permitted.

716-2.02 PAVERS

- A. Brick pavers shall have spacer bars on each unit. These insure a minimum joint width between each unit in which the sand is placed. Spacer bars help prevent contact of the edges with adjacent pavers and subsequent chipping.
- B. Brick pavers shall be A Grade pavers manufactured/supplied by a member of the Brick Institute of America (BIA). The BIA manufacturer/supplier shall be:
Name: PINE HALL BRICK
Address: P. O. Box 11044
2701 Shorefair Drive
Winston-Salem, NC 27116-1044
Phone: (800) 334-8689

- C. Product name/shape, overall dimensions, and thickness of the paver(s) shall be:

English Edge Red Pavers:
4" x 8" x 2 1/4" thick
With beveled edge and spacer nibs

- D. Pavers shall meet the following requirements set forth in ASTM C 902, Specification for Pedestrian and Light Traffic Paving Brick:

1. Minimum average compressive strength of 10,000 psi.
2. The average cold water absorption shall not be greater than 6% with no individual unit testing greater than 7%. Absorption test results may not be achieved through the use of sealers or other products applied to the clay paver. (Sealer protection degrades over time requiring re-application after several years.)
3. Resistance of 50 freeze-thaw cycles, when tested in accordance with ASTM C67. In addition the clay paver must pass CSA-A231.2 freeze thaw test in saline solution without the use of sealers or other products applied to the paver. A test report must be submitted by the manufacturer.
4. Dimensional tolerances shall meet the PX standard. The dimensional tolerances around the mean values for length, width, and depth shall be 1/16".
5. The pavers should be solid units without core holes or other perforations.
6. The contractor shall ensure that the manufacturer conducts a test sampling of 24 pavers every 50,000 pavers manufactured to determine the pavers compliance with dimensional and water absorption characteristics. The 24-paver sample shall be representative of the color mix in the typical finished package and chosen on a consistent basis from one kiln car.

- E. Proven Field Performance: 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 three years. The units used as the basis for proven field performance shall have been exposed to the same general type of environment, temperature range and traffic volume as is contemplated for the units supplied to the purchaser.
- F. Visual Inspection: All units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Cracks or

chipping resulting from handling in shipment, delivery and installation shall be deemed grounds for rejection.

716-2.03 JOINTING SAND

- A. Polymeric joint sand, Polysweep Tan, by SEK Surebond, or approved equal.

716-2.04 JOINT-STABILIZING SEALER

- A. SB-1300 Joint-Stabilizing Sealer, by SEK Surebond, or approved equal.

716-2.05 AGGREGATE BASE

- A. Class 2 conforming to DTSS.

716-2.06 NON-WOVEN GEOTEXTILE FABRIC

- A. Non-woven geotextile fabric shall be needle-punched and composed of polypropylene or polyester fibers formed into a stable network. Elongation shall be greater than 50 percent and shall meet requirements of AASHTO M 288, Class 3.
 - 1. Non-woven geotextile fabric shall be TenCate Geosynthetics Mirafi 140N or equal.

716-3 - EXECUTION

716-3.01 EXCAVATION

- A. Perform all subgrade cut and fill as necessary to meet the final grades shown on the plans. Compact subgrade to 92%.

716-3.02 AGGREGATE BASE

- A. Place aggregate base to depth indicated and compact to 95%.

716-3.03 SAND SETTING BED

- A. The sand shall be of uniform moisture content when screeded and shall be protected against rain when stockpiled on site prior to screeding. For installation, the moisture content shall be in the range of 4 to 8 percent.
- B. Spreading: The bedding sand shall be spread loose in a uniform layer to give a depth after compaction of the paving units of a minimum of 3/4 inch thickness and as required to achieve designed grades.
- C. Screeding
 - 1. The spread sand shall be carefully maintained in a loose condition and protected against precompaction by traffic or rain both prior to and following screeding. Sand shall be lightly screeded in a loose condition to predetermined depth. Under no circumstances shall the sand be screeded in advance of the laying face to an extent to which paving will

not be completed on that day. Any screeded sand which is precompacted prior to laying of paving unit shall be brought back to profile in a loose condition. Neither pedestrian or vehicular traffic shall be permitted on the screeded sand.

2. The Contractor shall screed the bedding sand using either an approved mechanical spreader or by the use of screed guides and boards.

716-3.04 SETTING PAVERS

- A. General: Pavers with excessive chips, cracks, voids, discolorations or other defects shall not be installed.
- B. Pattern: The pavers shall be laid in a stack bond pattern as shown on approved shop drawings.
- C. Color Blending: Paving units shall be installed from a minimum of three bundles simultaneously.
- D. Joints: In order to maintain the desired pattern, joint spacing must be consistent. Joint spacing inch shall be maintained unless noted otherwise. Joint spacing shall be governed by the setting nodes Precast into the concrete paver units. Pavers with setting nodes shall be set tight, with each node set to edge of adjacent paver surface.
- E. Alignment: String lines or chalk lines on bedding sand should be used to hold all pattern lines true.
- F. Cutting
 1. Where cutting is necessary, the gaps at the edge of the paving surface shall be filled with manufactured edge pavers or with pavers to cut to fit. Cutting shall be accomplished to leave a clean edge to the traffic surface using a mechanical hydraulic, or guillotine cutter or masonry saw.
 2. The use of infill concrete or discontinuities in patterns will not be permitted. Lay out pavers in all areas so as to eliminate slivers at edges.
- G. Sweeping Clean: Upon completion of cutting the area must be swept clean of all debris to facilitate inspection and to ensure pavers are not damaged during compaction.
- H. Compaction
 1. After inspection of the paving units, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than three passes of a suitable plate compactor.
 2. Compaction shall be accomplished by the use of a plate compactor capable of a minimum of 5,000 pound compaction force.
 3. Initial compaction should proceed as closely as possible following installation of the paving units and prior to acceptance of any traffic or application of sweeping sand.

4. Compaction should not be attempted within 3 feet (1 meter) of the laying edge.
- I. Paver Inspection: Any units which are structurally damaged during compaction shall be immediately removed and replaced.
 - J. Jointing Sand
 1. The jointing sand shall be spread over the pavement after initial compaction has been completed. This jointing sand shall be spread as soon as is practical after initial compaction and prior to the termination of work on that day. The Contractor shall not use wet sand.
 2. The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the pavers shall be compacted again to settle the jointing sand.
 - K. Final Compaction of Pavers
 1. After jointing sand has been installed and the pavement surface swept clean, final compaction shall be accomplished by not less than two passes of the plate compactor.
 2. Final compaction should proceed as closely as possible following installation of jointing sand and prior to the acceptance of any traffic.
 3. Inspection by the Engineer shall determine whether a second application or partial application of jointing sand is required.
 - K. Joint-Stabilizing Sealer
 1. Apply to paving in accordance with manufacturer's instructions.

716-3.05 NON-WOVEN GEOTEXILE FABRIC

- A. Lay smooth and free of tension, stress, folds, and wrinkles. Overlap ends of panels a minimum of 16 inches.

716-3.06 ALLOWABLE TOLERANCE

- A. The finished surface shall be smooth, even, and true to the lines, grades and cross section indicated. When tested with a 10 foot straight-edge parallel to the centerline of the surfaced area, finished surface shall not show a deviation in excess of $\frac{1}{4}$ inch in 10 feet.
- B. The maximum offset from flush from paver surface to paver surface or from paver surface to a fixed flush edge shall not exceed $\frac{1}{16}$ inch.

716-3.07 REPAIR, CLEANING AND PROTECTION

- A. Remove and replace pavers which are 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.
- B. Clean concrete pavers after setting is complete; use procedures recommended by producer for types of application indicated.

716-3.08 CLEAN-UP

- A. Sweep clean all paved areas of excess sand and dirt.
- B. Pick up and remove from the site all surplus materials, equipment and debris resulting from this section of the work.
- C. Provide final protection and maintain conditions in a manner acceptable to the installer, which ensures paver work being without damage or deterioration at time of substantial completion.

716-3.09 GUARANTEE

- A. Finished area shall be free of bumps or depressions, evenly graded to levels shown, and shall be guaranteed against defects of materials and workmanship for a period of one year after substantial completion.

END OF SECTION