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Letting August 4, 2023

Notice to Bidders, Specifications and Proposal



**Contract No. 89804
TAZEWELL County
Section 20-00196-00-RS (Pekin)
Route FAP 693 (Court Street)
Project EMYF-921 ()
District 4 Construction Funds**

Prepared by

Checked by

F

(Printed by authority of the State of Illinois)



- 1. TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. August 4, 2023 at which time the bids will be publicly opened from the iCX SecureVault.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 89804
TAZEWELL County
Section 20-00196-00-RS (Pekin)
Project EMYF-921 ()
Route FAP 693 (Court Street)
District 4 Construction Funds**

Resurfacing and intersection improvements on Court Street from Stadium Drive to Hilltop Drive in Pekin.

- 3. INSTRUCTIONS TO BIDDERS.** (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.
- 4. AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to re-advertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Omer Osman,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2023

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS, frequently used RECURRING SPECIAL PROVISIONS, and LOCAL ROADS AND STREETS RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-22) (Revised 1-1-23)

SUPPLEMENTAL SPECIFICATIONS

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RECURRING SPECIAL PROVISIONS

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| 1 | <input checked="" type="checkbox"/> Additional State Requirements for Federal-Aid Construction Contracts | 53 |
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| 11 | <input type="checkbox"/> Subsealing of Concrete Pavements | 86 |
| 12 | <input type="checkbox"/> Hot-Mix Asphalt Surface Correction | 90 |
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BDE SPECIAL PROVISIONS

The following special provisions indicated by an "X" are applicable to this contract. An * indicates a new or revised special provision for the letting.

| <u>File Name</u> | <u>Pg.</u> | <u>Special Provision Title</u> | <u>Effective</u> | <u>Revised</u> |
|------------------|------------|--|------------------|----------------|
| 80099 | 298 | <input checked="" type="checkbox"/> Accessible Pedestrian Signals (APS) | April 1, 2003 | Jan. 1, 2022 |
| 80274 | | <input type="checkbox"/> Aggregate Subgrade Improvement | April 1, 2012 | April 1, 2022 |
| 80192 | | <input type="checkbox"/> Automated Flagger Assistance Device | Jan. 1, 2008 | April 1, 2023 |
| 80173 | | <input type="checkbox"/> Bituminous Materials Cost Adjustments | Nov. 2, 2006 | Aug. 1, 2017 |
| 80426 | | <input type="checkbox"/> Bituminous Surface Treatment with Fog Seal | Jan. 1, 2020 | Jan. 1, 2022 |
| 80436 | 300 | <input checked="" type="checkbox"/> Blended Finely Divided Minerals | April 1, 2021 | |
| 80241 | | <input type="checkbox"/> Bridge Demolition Debris | July 1, 2009 | |
| 50531 | | <input type="checkbox"/> Building Removal | Sept. 1, 1990 | Aug. 1, 2022 |
| 50261 | | <input type="checkbox"/> Building Removal with Asbestos Abatement | Sept. 1, 1990 | Aug. 1, 2022 |
| * 80449 | 301 | <input checked="" type="checkbox"/> Cement, Type II | Aug. 1, 2023 | |
| 80384 | 302 | <input checked="" type="checkbox"/> Compensable Delay Costs | June 2, 2017 | April 1, 2019 |
| 80198 | | <input type="checkbox"/> Completion Date (via calendar days) | April 1, 2008 | |
| 80199 | | <input type="checkbox"/> Completion Date (via calendar days) Plus Working Days | April 1, 2008 | |
| 80261 | | <input type="checkbox"/> Construction Air Quality – Diesel Retrofit | June 1, 2010 | Nov. 1, 2014 |
| 80434 | | <input type="checkbox"/> Corrugated Plastic Pipe (Culvert and Storm Sewer) | Jan. 1, 2021 | |
| 80029 | 306 | <input checked="" type="checkbox"/> Disadvantaged Business Enterprise Participation | Sept. 1, 2000 | Mar. 2, 2019 |
| 80229 | | <input type="checkbox"/> Fuel Cost Adjustment | April 1, 2009 | Aug. 1, 2017 |
| 80447 | | <input type="checkbox"/> Grading and Shaping Ditches | Jan 1, 2023 | |
| 80433 | | <input type="checkbox"/> Green Preformed Thermoplastic Pavement Markings | Jan. 1, 2021 | Jan. 1, 2022 |
| 80443 | | <input type="checkbox"/> High Tension Cable Median Barrier Removal | April 1, 2022 | |
| * 80446 | | <input type="checkbox"/> Hot-Mix Asphalt – Longitudinal Joint Sealant | Nov. 1, 2022 | Aug. 1, 2023 |
| 80438 | | <input type="checkbox"/> Illinois Works Apprenticeship Initiative – State Funded Contracts | June 2, 2021 | Sept. 2, 2021 |
| 80045 | | <input type="checkbox"/> Material Transfer Device | June 15, 1999 | Jan. 1, 2022 |
| * 80450 | | <input type="checkbox"/> Mechanically Stabilized Earth Retaining Walls | Aug. 1, 2023 | |
| 80441 | 316 | <input checked="" type="checkbox"/> Performance Graded Asphalt Binder | Jan 1, 2023 | |
| * 80451 | 321 | <input checked="" type="checkbox"/> Portland Cement Concrete | Aug. 1, 2023 | |
| 34261 | | <input type="checkbox"/> Railroad Protective Liability Insurance | Dec. 1, 1986 | Jan. 1, 2022 |
| 80445 | 322 | <input checked="" type="checkbox"/> Seeding | Nov. 1, 2022 | |
| 80448 | 328 | <input checked="" type="checkbox"/> Source of Supply and Quality Requirements | Jan. 2, 2023 | |
| 80340 | | <input type="checkbox"/> Speed Display Trailer | April 2, 2014 | Jan. 1, 2022 |
| 80127 | | <input type="checkbox"/> Steel Cost Adjustment | April 2, 2014 | Jan. 1, 2022 |
| 80397 | 329 | <input checked="" type="checkbox"/> Subcontractor and DBE Payment Reporting | April 2, 2018 | |
| 80391 | 330 | <input checked="" type="checkbox"/> Subcontractor Mobilization Payments | Nov. 2, 2017 | April 1, 2019 |
| 80437 | 331 | <input checked="" type="checkbox"/> Submission of Payroll Records | April 1, 2021 | Nov. 1, 2022 |
| 80435 | | <input type="checkbox"/> Surface Testing of Pavements – IRI | Jan. 1, 2021 | Jan. 1, 2023 |
| 80410 | | <input type="checkbox"/> Traffic Spotters | Jan. 1, 2019 | |
| 20338 | 333 | <input checked="" type="checkbox"/> Training Special Provisions | Oct. 15, 1975 | Sept. 2, 2021 |
| 80429 | | <input type="checkbox"/> Ultra-Thin Bonded Wearing Course | April 1, 2020 | Jan. 1, 2022 |
| 80439 | 336 | <input checked="" type="checkbox"/> Vehicle and Equipment Warning Lights | Nov. 1, 2021 | Nov. 1, 2022 |
| 80440 | | <input type="checkbox"/> Waterproofing Membrane System | Nov. 1, 2021 | |
| 80302 | 337 | <input checked="" type="checkbox"/> Weekly DBE Trucking Reports | June 2, 2012 | Nov. 1, 2021 |
| 80427 | 338 | <input checked="" type="checkbox"/> Work Zone Traffic Control Devices | Mar. 2, 2020 | |
| 80071 | 340 | <input checked="" type="checkbox"/> Working Days | Jan. 1, 2002 | |

Special Provisions

The following Special Provisions supplement the “Standard Specifications for Road and Bridge Construction”, Adopted January 1, 2022, the latest edition of the “Manual on Uniform Traffic Control Devices for Streets and Highways”, and the “Manual of Test Procedures of Materials” in effect on the date of invitation of bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included here in which apply to and govern the construction of Court Street Rehabilitation, Section 20-00196-00-RS, in the City of Pekin, Tazewell County. In case of conflict with any part, or parts of said specifications, the said Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

The project is located on Court Street in Pekin, Tazewell County (T24N, R5W, Section 1), Illinois. The project limits are from approximately 300 feet west of Stadium Dr. to the eastern intersection of Hilltop Dr.

DESCRIPTION OF PROJECT

The Court Street rehabilitation project consists of hot mix surface removal, HMA overlay, median improvements, and associated work items. Improvements include median removal, concrete base course widening, pavement patching, concrete sidewalk, concrete curb and gutter, drainage improvements, and all incidental items shown in the plans and as described in these Special Provisions.

EXISTING UNDERGROUND FACILITIES

The City of Pekin assumes no responsibility for the presence, specific size or location of underground distribution systems of the several public utility corporations. No responsibility for the protection of said underground systems will be assumed by the City of Pekin. If such protection is found to be necessary for water mains, gas mains, steam mains, underground electrical distribution systems, underground telephone circuit systems or any other underground systems of non-city Ownership, the cost of same, in whole or in part, is disclaimed of the City of Pekin.

NOTIFICATION OF UTILITIES PRIOR TO CONSTRUCTION

All utility companies must be notified, in writing, by the Contractor at least one (1) week in advance prior to starting construction. All utility companies must be notified so that they may have personnel on the job site to assist in locating their utility lines and avoid damage to their utilities. A copy of the letter notifying the utility companies of the Contractor's intention to start work must

be received by the City of Pekin Engineering Department before he will be permitted to start construction.

J.U.L.I.E. SYSTEM

The J.U.L.I.E. (Joint Utility Locating Information for Excavators) must be notified prior to starting construction so that the respective utilities may have adequate time to locate and mark their underground facilities. Phone: 1-800-892-0123. The following information may be requested by J.U.L.I.E.:

County Name: Tazewell
 Township Name: Pekin
 Section Number: 1, T24N, R5W

STATUS OF UTILITIES/UTILITIES TO BE ADJUSTED

Effective: January 21, 2005

Revised: January 1, 2022

The following utilities are located within the project limits. For relocations, the utility companies have provided the estimated dates.

| <u>Name, Contact, Address And Phone Number of Utility</u> | <u>Type</u> | <u>Location</u> | <u>Relocation Needed</u> | <u>Estimated Date Relocation Completed</u> |
|--|--------------------|----------------------------------|-------------------------------------|---|
| Ameren Electric Dan Urbaniac (309)253-6142 | Aerial | North & South side | Relocate poles | spring 2023 |
| Ameren Gas Elizabeth Cooke (309)401-9000 | Underground | | Valve Adjustments Only | During construction |
| Comcast Mark Wabel (309)303-2037 | Aerial | North & South side | Handhole to be relocated | spring 2023 |
| BrightSpeed Brad Stockham (309)267-3287 | Aerial | North & South side | Relocate poles | spring 2023 |
| Illinois American Water Josh Harken (309)360-2037 | Underground | | Valve Adjustments Only | During construction |
| I3 Broadband Ryan Clark (309)256-7696 | Underground | Stadium Drive | Handhole to be relocated | Spring 2023 |
| Bluebird Network Patrick Higgins (314)458-7922 | Underground | Intersection of Parkway Drive | Handhole to be relocated | Spring 2023 |

| | | |
|---|-------------|--|
| Windstream KDL Devin Barnhill (815)715-2287 | Aerial | No Work Anticipated |
| Stratus Network Butch Forkell (309)696-6349 | Underground | Intersection of Parkway Drive Handhole to be relocated Spring 2023 |

The above represents the best information of the Department and is only included for the convenience of the bidder. The applicable provisions of Recurring Special Provisions LRS1, LRS6 and Articles 105.07, 107.20 and 108.02 of the Standard Specifications for Road and Bridge Construction shall apply. The estimated utility relocation dates should be part of the progress schedule submitted by the Contractor. If any utility adjustments or relocations have not been completed by the above dates specified and when required by the Contractor's operations after these dates, the Contractor should notify the Engineer in writing. A request for an extension of time will be considered to the extent the Contractor's critical path schedule is affected.

UTILITIES – LOCATIONS/INFORMATION ON PLANS

Effective: November 8, 2013

The locations of existing water mains, gas mains, sewers, electric power lines, telephone lines, and other utilities as shown on the plans are based on field investigation and locations provided by the utility companies, but they are not guaranteed. Unless elevations are shown, all utility locations shown on the cross sections are based on the approximate depth supplied by the utility company. It shall be the Contractor's responsibility to ascertain their exact location from the utility companies and by field inspection.

SALVAGING EXISTING MATERIALS

All existing municipally owned street castings, frames and grates on inlets and manholes, signs and posts in usable condition within the limits of the improvement shall, if not required for further use in the construction of the improvement, be carefully excavated and preserved by the Contractor. Said street castings, frames and grates on inlets and manholes, signs and posts if desired by the City, shall be picked up and hauled from the job site by the City or the Contractor shall deliver such items to a location (within the City limits) determined by the City.

The cost of salvaging existing municipally owned street castings, frames and grates on inlets and manholes, signs and posts, as outlined herein, will not be paid for separately, but the cost shall be included in the contract unit price for the item of construction involved.

CONSTRUCTION SEQUENCE AND SCHEDULE

The Contractor shall prepare a progress schedule as required by Section 108 of the Standard Specifications. The Contractor shall coordinate items of work in order to keep hazards, traffic inconvenience and limited access to residences along Court Street to a minimum. In particular, construction shall be staged as shown on the plans and as listed below to meet the following requirements:

- Temporary Erosion control items shall be installed before work begins on any part of the project.
- Prior to the start of any work, the City of Pekin shall be contacted, two weeks in advance, to inform them of the beginning date of construction. Construction staging shall be implemented according to plans or as agreed to by the City Engineer.

A construction progress schedule indicating project milestones shall be completed and strictly adhered to by the Contractor unless a request to modify the schedule is submitted in writing and approved by the Engineer.

TRAFFIC CONTROL AND PROTECTION (SPECIAL) CHANGEABLE MESSAGE SIGN

Description

This work shall consist of providing the necessary traffic control personnel and devices and the installation, maintenance, relocation and removal of these devices during construction of the improvement.

TRAFFIC CONTROL PLAN

Traffic control shall be in accordance with the applicable sections of the "Standard Specifications for Road and Bridge Construction," the applicable guidelines contained in the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways," these Special Provisions, and any special details and Highway Standards contained herein and in the plans.

Special attention is called to Articles 107.09 and 107.14 and Sections 701 through 705 of the SSRBC and the traffic control related Highway Standards shown in the plans; Supplemental Specifications and Recurring Special Provisions; BDE Special Provisions; and Other Special Provisions relating to Traffic Control.

Highway Standards: 701301, 701311, 701501, 701602, 701611, 701701, 701801, and
701901

Special Provisions

LRS 3 Work Zone Traffic Control Surveillance
LRS 4 Flaggers in Work Zones apply.

Traffic/Access: The contractor is required to:

- Provide one lane of traffic in each direction through project limits as indicated.
- Provide aggregate for temporary access at vehicle entrances.

Maintenance of Traffic

The conveyance of thru and local traffic within and around the construction zone shall be provided for in accordance with the Plan Details noted above and the use of the above referenced Highway Standards as directed by the Engineer. Except as otherwise provided herein, the Contractor shall provide at least one entrance/exit point to properties at all times. The Contractor shall maintain one 11 foot lane in each direction on Court Street during the entire construction process as shown on the Stage Construction and Maintenance of Traffic Plan.

With the approval of the Engineer, the Contractor may modify the suggested construction sequence and attendant traffic control procedures as shown. The Contractor shall submit his proposed sequence of operations and any necessary revisions to attendant traffic control to the Engineer for approval before actual construction operations begin.

Existing pavement markings that conflict with each stage of construction shall be removed and restored at the completion of each stage. Temporary and short term pavement marking shall be installed at locations shown on the plans and in accordance with the plan details and IDOT Highway Standards. Placement and removal of temporary and short term pavement marking, and removal and replacement of existing markings in conflict, shall not be paid for separately but shall be included in the contract lump sum price bid for Traffic Control and Protection (Special).

Driveways

Except where the plans expressly authorize temporary complete closures, the Contractor shall keep driveways open to local traffic by keeping at least half of the width of said driveway open or by providing access at a temporary location, as approved by the Engineer. The Contractor shall provide and maintain access to commercial and private properties abutting the roadway being improved in accordance with Article 107.09 of the Standard Specifications. Access to commercial property shall, at no time, be shut off completely except as expressly authorized in the plans. At no time shall a driveway be closed for no more than 1 hour. An estimated quantity of AGGREGATE FOR TEMPORARY ACCESS has been included in the plans for use in the conveyance of local traffic and the provision of temporary access.

Construction of driveway entrances shall be completed within 5 consecutive days before or after construction of mainline pavement in front of the driveway. This is necessary in order to accommodate vehicle turning movements in and out of the driveways after completion of construction on, and in front of, their properties thus eliminating the need for closure of these facilities twice; i.e., once for mainline pavement construction and again for the entrance or side road construction. Closures shall be coordinated with property owners to minimize disruptions to normal driveway use.

Removing and Resetting Traffic Signs

This work shall consist of the removal, relocation, and resetting of traffic signs which interfere with construction operations. This work shall also include the removal, relocation, and resetting of existing wood signs, delineators and other miscellaneous signs which interfere with construction operations. This work shall be performed in accordance with the applicable portions of Article 107.25 of the Standard Specifications and as directed by the Engineer. The contractor shall remove, temporarily relocate and/or permanently reset existing signs which interfere with the construction operations. This work will not be paid for separately but shall be included in the contract lump sum price of TRAFFIC CONTROL AND PROTECTION, (SPECIAL). The Engineer will determine which signs will be removed, temporarily relocated and permanently reset. Before the completion of each construction stage the Contractor shall install traffic and street name signs in accordance with the signing plan.

Traffic Control Surveillance

Traffic control surveillance will be required, but will not be paid for separately on this project. The special provision check sheet LRS 3 "Work Zone Traffic Control Surveillance" will apply for the inspection of traffic control devices on this project along with the following additional requirements. The minimum frequency of worksite inspections by the Contractor shall be defined as daily unless directed otherwise by the Engineer. The person responsible for surveillance shall complete an inspection form, furnished by the Engineer, on a daily basis. The completed form shall be given to the Engineer on the first working day after the inspection.

Construction Signs

All signing for traffic control shall meet current IDOT policy for retro-reflectivity requirements.

Construction signs referring to daytime lane closures during working hours shall be removed, covered or turned away from the view of motorists during non-working hours.

Flashing lights shall be used on each approach in advance of the work area, and in accordance with the details shown on the Plans and Standard Drawings.

All provisions of Article 107.25 of the Standard Specifications shall apply except the third paragraph shall be revised to read: "The Contractor shall maintain, furnish, and replace at his/her own expense, any traffic sign or post which has been damaged or lost by the Contractor or a third party."

All advance-warning signs shall be in new or like new condition at the start of the project. If an advanced warning sign is damaged or becomes unreadable, the sign shall be replaced by a new or like new sign.

Solar Powered Changeable Message Signs

Changeable message signs shall be placed at each end of the improvements for two weeks before construction begins. Changeable message signs shall be furnished, placed and maintained in accordance with the "Stage Construction and Maintenance of Traffic Plans" and Section 701 of the Standard Specifications. All changeable message signs to be used on this

project shall be solar powered. This work will be paid at the contract unit price per calendar day for each sign as CHANGEABLE MESSAGE SIGN.

Solar Powered Arrow Boards

Arrow boards shall be used as required by the Standards and as directed by the Engineer. All arrow boards to be used on this project shall be solar powered. Any additional cost in meeting this requirement shall be considered as included in the cost of TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Placement and Removal of Signs and Barricades

Placement of all signs and barricades shall proceed in the direction of flow of traffic. Removal of all signs and barricades shall start at the end of the construction areas and proceed toward oncoming traffic unless otherwise directed by the Engineer.

Public Safety and Convenience

The Contractor shall provide a telephone numbers, utilizing the IDOT Form BSPE 725, where a responsible individual can be contacted on a 24-hour-a-day basis to receive notification of any deficiencies regarding traffic control and protection. The Contractor shall dispatch personnel, materials and equipment to correct any such deficiencies. The Contractor shall respond to any call from the Engineer or government agencies concerning any request for improving or correcting traffic control devices and begin making the requested repair within **two (2) hours** from the time of notification.

When traveling in lanes open to public traffic, the Contractor's vehicles shall always move with and not against or across the flow of traffic. These vehicles shall enter or leave work areas in a manner which will not be hazardous to, or interfere with, traffic and shall not park or stop except within areas designated by the Engineer.

Personal vehicles will not be allowed to park within the right-of-way. The Contractor shall provide for off-site parking of his/her personal vehicles.

The Contractor shall maintain entrances and side roads along the proposed improvement. Interference with traffic movements and inconvenience to owners of abutting property and the public shall be kept to a minimum. Any delays or inconveniences caused to the Contractor by complying with these requirements shall be considered included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Flaggers

Remove last sentence of Article 701.20 (i).

Flaggers shall be provided in accordance with Article 701.13 of the Standard Specifications during all milling, priming, paving, median work, and any activities which place the contractor's equipment or personnel within 10 feet of active traffic. Any additional cost in meeting this requirement shall be considered as included in the cost of TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Temporary Ramps

At the end of each work day, and as directed by the engineer, temporary ramps shall be placed in accordance with Article 406.08 of the Standard Specifications to address elevation differences in pavement at entrances and intersections. Temporary ramps may also include rubber mats placed at mill joints. Temporary ramps shall not be removed until the day on which new pavement will be placed unless otherwise approved by the engineer. Placement and removal of Temporary Ramps will not be paid for separately but shall be included in the contract lump sum price of TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Construction Access

The Contractor shall present a plan of the access that will be used during construction of said project by the Contractor or Subcontractor to the Engineer at the time of the Pre-Construction Meeting. The Engineer and Contractor shall both examine the plan noting any areas of concern before construction begins.

Upon completion of the project the Engineer shall examine the streets prior to approving final payment to the Contractor. Any areas that have been damaged, due to construction activity, shall be repaired by the Contractor to the satisfaction of the Engineer. When work is complete, the Contractor shall arrange, within a reasonable time period, to clean up and restore areas where equipment or material has been stored on the right-of-way or easement. This work shall be included in the cost of the contract.

The Engineer may restrict the movement of construction vehicles on the completed surface in order to prevent damage to these surfaces.

Contractor Access

At road closure locations where Type III barricades are installed in a manner that will not allow Contractor access to the project without relocation of one or more of the barricades, the arrangement of the barricades at the beginning of each work day may be relocated, when approved by the Engineer, in the manner shown on Highway Standard 701901 for Road Closed to Through Traffic. "Road Closed" signs (R11-2), supplemented by "Except Authorized Vehicles" signs (R3-I101), shall be mounted on both the near-right and far-left barricade(s). At the end of each work day, the barricades shall be returned to their in-line positions. This work will be included in the cost of the contract, and no extra compensation will be allowed.

Basis of Payment: All work prescribed and referenced herein shall be measured and paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION, (SPECIAL). This price shall be considered payment in full for all labor, materials, transportation, handling and incidental work necessary to furnish, install, relocate, maintain and remove all traffic control devices as required by the traffic control plan and as directed and approved by the Engineer, for the duration of the contract. No separate payment will be made for complying with the provisions of the Standards shown in the plans. Article 701.20 of the Standard Specifications is revised in that no additional payment will be made for furnishing, installing, maintaining, and

removing additional traffic control devices or signs from those shown on the plans or as directed by the Engineer.

The cost of furnishing, placing, compacting, maintaining, removing, and disposing of coarse aggregate for temporary driveways will be paid for at the contract unit price per ton of material furnished for AGGREGATE FOR TEMPORARY ACCESS.

The portable changeable message signs will be paid for at the contract unit price per calendar day for each sign as CHANGEABLE MESSAGE SIGN, which work shall include furnishing, installing, maintaining, replacing, relocating and removing all portable changeable message signs as directed by the Engineer.

COORDINATION WITH OTHER CONTRACTORS

The City of Pekin plans to let a consecutive contract to remove the structures at 2211 Court Street and 2213 Court Street. The roadway contractor will need to coordinate work near these parcels. The cost for coordination between contractors will not be paid for separately but shall be included in the cost of the contract.

PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 6 INCH

Entrances with integral curbs, as indicated in the plans, shall include the curbs in the plan area computation for PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 6 INCH, and no additional payment will be made for construction of the curbs.

PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 8 INCH

Entrances with integral curbs, as indicated in the plans, shall include the curbs in the plan area computation for PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 8 INCH, and no additional payment will be made for construction of the curbs.

DRIVEWAY PAVEMENT REMOVAL

Removal of curbs along entrances shall be paid for as DRIVEWAY PAVEMENT REMOVAL and included in the plan area for this area. Curb removal will not be paid for separately.

Entrances with distinct curb and gutter along the sides of the existing entrance, as noted in the plans, shall be paid for as COMBINATION CURB AND GUTTER REMOVAL and not included in the plan area computation for DRIVEWAY PAVEMENT REMOVAL at that location.

STORM SEWER REMOVAL

This work shall consist of the removal and disposal of existing storm sewers at the locations shown on the plans in accordance with Section 551 of the Standard Specifications and as directed by the Engineer.

Pipe culvert and storm sewer materials determined not to be salvageable by the Engineer shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications. Excavations resulting from the removal of the pipe culverts and storm sewers that result in holes within two feet of paved surfaces shall be backfilled with controlled low-strength material. Controlled low-strength material shall not be paid for separately but shall be included in the contract unit price per foot for STORM SEWER REMOVAL, of various sizes. Where existing storm sewer that connect to an existing drainage structure to remain in place are removed, any holes left by removing the storm sewer shall be plugged as directed by the engineer. Removal of any end sections or headwalls attached to the storm sewer designated for removal shall not be paid for separately but shall be included in the contract unit price per foot for STORM SEWER REMOVAL, of various sizes.

Basis of Payment: This work will be measured for payment and paid for at the contract unit price per foot for STORM SEWER REMOVAL, of various sizes, which price shall be considered payment in full for all labor, equipment, and materials required for the satisfactory removal and disposal of the existing storm sewers.

REMOVING INLETS

This work shall consist of removal and disposal of existing inlets at locations shown on the plans in accordance with Section 605 of the Standard Specifications and as directed by the Engineer. Where existing storm sewer will remain, but is not reconnected to the system, the pipes shall be plugged or capped as directed by the Engineer. No additional compensation will be allowed.

CONNECTION INTO PROPOSED DRAINAGE STRUCTURES

This work shall consist of furnishing all labor, material, and equipment necessary to satisfactorily complete the connection of existing storm sewer into proposed drainage structures as shown in the plans and as determined by the Engineer.

At locations where proposed drainage structures are to be placed at the end of existing storm sewer lines or on existing storm sewer lines, storm sewer removal may be required for installation of the proposed structure. The cost of storm sewer removal shall be included in the proposed drainage structure item to be constructed and no additional compensation will be allowed.

CONNECTION INTO EXISTING DRAINAGE STRUCTURES

This work shall consist of furnishing all labor, material, and equipment necessary to satisfactorily complete the connection of proposed storm sewer into existing drainage structures as shown in the plans and as determined by the Engineer.

At locations where proposed storm sewers are to be connected into existing drainage structures, the connections shall be made by core drilling holes into the structures and constructing brick and masonry around the connections to prevent leakage.

Basis of Payment: This work shall not be paid for separately but shall be included in the contract unit price per foot of STORM SEWERS, of the class, type, and diameter specified.

PIPE CULVERT OR STORM SEWER GRADE CHANGE

The Contractor shall be aware that at times the Engineer may require a change in pipe culvert or storm sewer elevation due to a utility or other obstruction. If such a grade change does not alter the pipe type, the additional excavation or sheeting required shall be considered as incidental to the cost of the pipe culvert. However, if the revised grade results in a change in pipe types, as set forth in Article 542.03 of the Standard Specifications, payment will be for the revised type of pipe culvert or storm sewer.

WOODEN FENCE REMOVAL

This work shall consist of furnishing all labor, material, and equipment necessary to remove the wooden fence at 2217 Court Street.

The wooden fence will be reinstalled by others. Remove the fence in a manner that the horizontal wooden beams will not be damaged. Coordinate the salvage and storage of the undamaged fence portions with the property owner and in accordance with Section 202 of the Standard Specifications and the Salvaging Existing Materials section of these Special Provisions.

Basis of Payment: This work shall be paid for at the contract unit price per foot for WOODEN FENCE REMOVAL. The price will include all materials, equipment and labor necessary to complete the work as specified herein.

CONCRETE WALL REMOVAL

This work shall consist of removing portions of existing concrete walls that are located within the proposed Right-of-Way in the project area. Wall segments that continue outside of the proposed Right-of-Way will be sawcut along a line perpendicular to the face of the wall that is located no greater than 6 inches behind the proposed Right-of-Way and within the limits of the Temporary Construction Easement. The sections of concrete walls to remain will be protected in place.

Cracks, spalling, and any other damage to the wall that results from the sawcutting will be repaired to the satisfaction of the Engineer. Concrete wall patching and repair shall conform to IDOT Guide Bridge Special Provision 53, Structural Repair of Concrete and Section 503 of the Standard Specifications.

Basis of Payment: This work shall be paid for at the contract unit price per Foot for CONCRETE WALL REMOVAL. The price will include all materials, equipment and labor necessary to complete the work as specified herein.

FILL EXISTING STORM SEWERS

This work shall consist of filling existing storm sewer pipes that will be abandoned in place with controlled low-strength material as directed by the Engineer. The controlled low-strength material shall be in accordance with Section 593 of the Standard Specifications. The pipes shall be filled with the use of concrete pumping machines or by methods approved by the Engineer.

Excavations shall be made to expose the ends of pipes to be filled. If necessary, vent holes shall be made in the pipes to allow air to release while filling. The pipes shall be completely filled with controlled low-strength material to prevent collapsing and the ends capped to contain the controlled low-strength material. Excavations within paved areas shall be backfilled with controlled low-strength material.

Basis of Payment: This work will be measured and paid for at the contract unit price per cubic yard for FILL EXISTING STORM SEWERS, which price shall include all labor, equipment, excavation, controlled low-strength material for filling the pipe, pipe caps, earth backfill, and controlled low-strength material backfill.

INLET-MANHOLE, TYPE G-1, 6' DIAMETER

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and materials for the construction of Inlet-Manhole, Type G-1, 6' Diameter and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLET-MANHOLE, TYPE G-1, 6' DIAMETER" to Article 602.16 of the Standard Specifications. Delete the first paragraph of Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLET-MANHOLE, TYPE G-1, 6' DIAMETER" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLET-MANHOLE, TYPE G-1, 6' DIAMETER.

INLET-MANHOLE, TYPE G-1, 6' DIAMETER, SPECIAL

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and materials for the construction of Inlet-Manhole, Type G-1, 6' Diameter, Special and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLET-MANHOLE, TYPE G-1, 6' DIAMETER, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph of Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLETMANHOLE, TYPE G-1, 6' DIAMETER, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLET-MANHOLE, TYPE G-1, 6' DIAMETER, SPECIAL.

INLET RISER STRUCTURES (OPEN BOTTOM)

This work shall consist of constructing of inlets in accordance with the plan details, applicable Highway Standards, Sections 602 and 604 of the Standard Specifications, and as directed by the Engineer.

The inlets shall be various heights with cast in place bases and flat slab tops as shown on the details in the plans. The barrel sections shall be precast reinforced concrete. Any necessary lengths of risers required to achieve the top-of-frame elevations as shown in the plans shall also be included.

The Contractor shall core and saw cut a hole in the existing storm sewer as necessary to allow for drainage as shown on the detail in the plans. A reinforced concrete base shall be constructed as shown on the details in the plans.

Basis of Payment: This work will be measured and paid for at the contract unit price each for INLET RISER STRUCTURES (OPEN BOTTOM), which price shall include all labor, equipment, and material necessary to complete the work as specified, including excavation, furnishing and installing the concrete base, reinforcement bars, inlets, flat slab tops, adjusting rings, frames and lids, concrete fillets, saw cutting, and backfilling with controlled low-strength material.

MANHOLE RISER STRUCTURES (OPEN BOTTOM)

This work shall consist of constructing of manholes in accordance with the plan details, applicable Highway Standards, Sections 602 and 604 of the Standard Specifications, and as directed by the Engineer.

The manholes shall be 4'-diameter Type A manholes of various heights with cast in place bases and flat slab tops as shown on the details in the plans. The manhole barrel sections shall be precast reinforced concrete. Any necessary lengths of 24-inch diameter risers required to achieve the top-of-frame elevations as shown in the plans shall also be included.

The Contractor shall core and saw cut a hole in the existing storm sewer as necessary to allow for drainage as shown on the detail in the plans. A reinforced concrete base shall be constructed as shown on the details in the plans.

Basis of Payment: This work will be measured and paid for at the contract unit price each for MANHOLE RISER STRUCTURES (OPEN BOTTOM), which price shall include all labor, equipment, and material necessary to complete the work as specified, including excavation, furnishing and installing the concrete base, reinforcement bars, manholes, flat slab tops, adjusting rings, frames and lids, concrete fillets, saw cutting, and backfilling with controlled low-strength material.

SANITARY MANHOLES TO BE ADJUSTED

This work shall consist of adjusting sanitary manholes to the proposed top of pavement.

The maximum height of adjusting rings to be allowed for use under the manhole frame shall be eight (8) inches. Rubber adjusting rings shall be used for adjustments where the raise is less than or equal to three (3) inches; for all adjustments, at least two (2) inches of rubber adjusting rings shall be used immediately below the manhole frame. Manhole casting adjusting rings may be used for minor height adjustments not exceeding eight (8) inches; however, concrete adjusting rings of thickness two (2) inches or less shall not be allowed. If the surface surrounding the manhole is uneven, tapered rubber adjusting rings as provided by the manufacturer may be used.

Rubber adjusting rings shall be either Infra-Riser Multi-Purpose Rubber Composite Adjustment Risers as manufactured by East Jordan Iron Works, Inc. or rubber adjusting rings as manufactured by American Highway Products, Ltd.

Basis of Payment: The adjustment of sanitary manholes shall be paid for at the contract unit price per each for SANITARY MANHOLES TO BE ADJUSTED, which shall include all materials, equipment and labor necessary to complete the work as specified herein.

CURB WALL (SPECIAL)

This work shall consist of constructing curb walls at locations specified on the plans and within the limits of areas paid for as Portland Cement Concrete Driveway Pavement as detailed on IDOT District 4 Standard Drawing 423116-D4, Urban Entrances, Special Design for Closely Spaced Entrances (With Pavement Edge Curb Between Entrances).

Curb wall may be located within the driveway payment area but outside of the area between the driveways. Curb Wall (Special) items at these locations will have the same dimensions as indicated on the Standard Drawing and the plans.

The Curb Wall (Special) shall be poured monolithically with the adjacent P.C.C. Driveway Pavement or P.C.C. Sidewalk.

All provisions of Sections 424 and 606 of the Standard Specifications shall apply unless otherwise shown on the Standard Drawing.

This work will be measured for payment in square feet by the height along the back of the curb as indicated in the plans, dimension h_1 on the Standard Drawing, multiplied by the length of the curb.

Basis of Payment: This work shall be paid for at the contract unit price per SQUARE FOOT for CURB WALL (SPECIAL). The price will include all materials, equipment and labor necessary to complete the work as specified herein.

TIMBER WALL REMOVAL

This work shall consist of removing portions of timber walls, by means of saw cutting, that extend onto the proposed Right-of-Way. The contractor shall identify the saw cut line location based on the Right of Way plans so that the finished wall terminates within 6 inches of the proposed Right-of-Way line within the Temporary Construction Easement.

Where structural support and foundational elements are located in the wall portion to be removed, before the saw cutting commences, the contractor shall drill a hole that extends through the full height of the timber wall to remain at a location greater than 6 inches from the saw cut line, but not greater than 1 foot, and drive a 3/4-inch diameter General Structural Steel rod through the hole that extends 24 inches into the subgrade.

The removed portion of the timber wall shall be disposed of as specified in Section 202 of the Standard Specifications.

This work will be measured in linear feet as measured along the height of the wall at the saw cut location.

Basis of Payment: This work will be paid for at the contract unit price per FOOT for TIMBER WALL REMOVAL. The price will include all materials, equipment and labor necessary to complete the work as specified herein.

MAILBOX REMOVAL AND REINSTALLATION

This work shall consist of removing and installing mailbox post(s) at locations shown on the plans and/or as directed by the Engineer.

Existing mailbox posts that fall within the proposed Right-of-Way will be relocated outside of the Right-of-Way but within 4 feet of the back of existing sidewalk.

The work shall consist of

- Removing the existing and protecting the existing mailbox.
- Removing the existing post.
- Installing a new 4"x4" square or 4 1/2" diameter round treated wood post
- Mounting the existing mailbox on the new post.

The new post shall be embedded no more than 24" into the ground. The resulting hole shall be backfilled with suitable excavated material approved by the Engineer.

The old post shall be disposed of according to the requirements of Article 202.03 of the Standard Specifications for Road and Bridge Construction.

This work will be measured for payment as one each for each new mailbox post installed.

Basis of Payment: This work shall be paid for at the contract unit price per EACH for MAILBOX REMOVAL AND REINSTALLATION. The price will include all materials, equipment and labor necessary to complete the work as specified herein.

COMBINATION CONCRETE CURB AND SIDEWALK 4 INCH (SPECIAL)

Description

This work shall consist of construction of sidewalk with PCC curb and/or PCC curb wall along the back of the sidewalk in accordance with the plan details and Section 424 of the Standard Specification at locations noted on the plans.

Reinforcement shall not be paid for separately but included in the contract unit price.

Method of Measurement

This work will be measured for payment in place based on the top surface of the area of the curb and sidewalk and face of curb computed in square feet.

Basis of Payment: This work will be paid for at the contract unit price per square foot for COMBINATION CONCRETE CURB AND SIDEWALK 4 INCH (SPECIAL). The price will include all materials, equipment and labor necessary to complete the work as specified herein.

REMOVE AND REINSTALL SIGN PANEL

This work shall consist of removing and reinstalling sign panels within the project area. Sign panels that are located on existing utility poles being relocated by others will be removed by others, salvaged, and stored by the City of Pekin. The Contractor will coordinate the retrieval of

these sign panels from the storage location and install the panels on the relocated utility poles, new light poles, or at the direction of the Engineer.

For Remove and Reinstall Sign Panel locations indicated in the plans that are not at utility poles to be relocated, the existing sign panel shall be salvaged in a manner that the panel can be reinstalled at the location indicated in the plans. The Contractor shall be responsible for securely storing the sign panels during construction activities.

Reinstallation of sign panels shall be performed in accordance with Section 723 of the Standard Specifications.

This work will be paid for at the contract unit price per each Remove and Reinstall Sign Panel location.

FENCE REMOVAL

This work shall consist of removing the chain link fence and gate along the high school football field as noted in the plans. This work shall also include removing footings to at least 24 inches below existing grade and earth backfill.

Method of Measurement: This work will be measured for payment along the face of the fence.

Basis of Payment: This work will be paid for at the contract unit price bid per foot for FENCE REMOVAL, which shall include all materials, equipment and labor necessary to complete the work.

CONCRETE STEP REMOVAL

This work shall consist of removing the existing concrete steps along the project limits at locations noted on the plans. The work shall also include the removal of any handrail adjacent to the concrete steps.

The handrail footings shall be removed to at least 24 inches below the proposed finished grade and disposed of by the contractor.

Method of Measurement: This work will be measured for payment along the walkable surface.

Basis of Payment: This work will be paid for at the contract unit price bid per square foot for CONCRETE STEP REMOVAL, which shall include all materials, equipment and labor necessary to complete the work.

CONCRETE STEPS

This work shall consist of the construction of concrete steps at locations noted on the plans.

The existing sidewalk shall be saw cut at the limits of the concrete steps or sidewalk to be removed as required. All debris resulting from this operation shall be removed from the project site. Preformed Expansion Joint Filler will be placed at the saw cut location between the existing sidewalk and the proposed concrete steps or sidewalk. The concrete steps shall be constructed in accordance with the details noted on the plans. All reinforcement shall be epoxy coated and shall be included in the cost of the Concrete Steps.

Method of Measurement: This work shall be measured per square foot of plan area of the steps. The vertical rise will not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per square foot of plan area for CONCRETE STEPS. The price will include all materials, equipment and labor necessary to complete the work.

STAIR RAILING

This work shall consist of constructing stair railings in accordance with Section 509 of the Standard Specifications and the detail drawings shown in the plans. The railing system shall be galvanized and painted.

The handrail shall be furnished and installed in accordance with Section 509 of the Standard Specifications and the details noted in the plans.

All weld flux and other contaminants shall be mechanically removed. All surfaces shall be degreased, cleaned, and air dried to assure all moisture is removed. All galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a dry film thickness of 2.0 mils. The painting shall be in accordance with the applicable Articles of Sections 506 and 509 of the Standard Specifications. The paint finish shall be powder type and the color shall be black. Any damage to the finish after leaving the shop facility shall be repaired to the satisfaction of the Engineer using a method approved by the Engineer.

Method of Measurement: This work will be measured for payment along the top rail, including any extensions that are present.

Basis of Payment: This work will be paid for at the contract unit price per foot for STAIR RAILING. The price will include all labor, equipment and materials, including rails, posts, anchor devices and painting.

RIVER ROCK

This work shall consist of furnishing, transporting and placing rock to backfill behind the proposed sidewalk at Casey's. The material shall meet Quality Designation "B" as required in Article 1004.01 of the Standard Specifications for Road and Bridge Construction. The rock shall match the existing material as approved by the Engineer.

Landscape fabric shall be placed on the ground under the rock.

Method of Measurement: This work will be measured for payment per ton of rock placed.

Basis of Payment: This work will be paid for at the contract unit price per ton of RIVER ROCK. The price will include all labor, equipment and materials necessary to complete the work. Landscape fabric will not be paid for separately but will be included in the cost for River Rock.

IDOT DISTRICT 4 SPECIAL PROVISIONS

EMBANKMENT (RESTRICTIONS)

Effective: January 21, 2005 Revised: August 5, 2022

Replace the sixth and seventh paragraphs of Article 205.04 with the following:

Alternating layers of suitable soil and restricted-use material will not be permitted. Restricted-use materials may only be incorporated into the embankment by using one of the following procedures:

- a. Restricted-use materials shall be placed in 4" lifts and disked with the underlying lift material until a uniform and homogenous material is formed having more than 35% passing the number 200 sieve.
- b. Sand, gravel or crushed stone embankment when placed on the existing ground surface will be drained using a 10' (3 m) by 10' (3 m) French drain consisting of nonwoven geotechnical fabric with 12" (0.3 m) of B-3 riprap. This shall be constructed on both sides of the embankment at the toe of the foreslope spaced 150' (46 m) apart. At locations requiring a French drain the 3' (1 m) cohesive cap shall not be installed within the 10' by 10' riprap area. If the Engineer determines that the existing ground is a granular free draining soil, the French drain may be deleted.
- c. Sand, gravel or crushed stone embankment when placed on top of a cohesive embankment will be drained with a permanent 4" (100 mm) underdrain system. The underdrain system shall consist of a longitudinal underdrain on both sides of the embankment and transverse underdrains spaced at 250' (75 m) centers. The underdrain shall consist of a 2' (0.6 m) deep by 1' (0.3 m) wide trench, backfilled with FA4 sand and a 4" (100 mm) diameter underdrain. In addition, both sides of the embankment will have a 6" (150 mm) diameter pipe drain which will drain the underdrain system and outletted into a permanent drainage structure or outletted by a headwall at the toe of the embankment.

The above work will not be paid for separately but shall be included in the cost of EARTH EXCAVATION, FURNISHED EXCAVATION, or BORROW EXCAVATION.

PROOF ROLLING

Effective April 23, 2004 Revised January 1, 2007

This work shall consist of proof rolling the subgrade with a fully loaded tandem axle dump truck and driver at the direction of the Engineer. The truck shall travel the subgrade in all of the proposed lanes of traffic in the presence of the Engineer.

This work will not be paid for separately, but considered included in the various earthwork pay items.

SUBGRADE TREATMENT

Effective July 1, 1990 Revised January 1, 2022

Revise first sentence of first paragraph of Article 301.04 as follows:

"When compacted, the subgrade shall have a minimum dry density of 95 percent of the standard laboratory dry density and a minimum immediate bearing value (IBV) of 3.0."

Delete the second paragraph (including subparagraphs a, b, and c) of Article 301.04 of the Standard Specifications and replace it with the following:

""In cut sections the Contractor responsible for the rough grading shall obtain not less than 95% of the standard laboratory density and not more than 110% of the optimum moisture for the top 1' (300 mm) of the subgrade.

The Contractor may, at his/her option, add a drying agent to lower the moisture content as specified. The drying agent must be approved by the Engineer prior to use. Additional compensation will not be allowed for the use of a drying agent but will be considered as included in the cost of the various earthwork items.""

SAWCUTTING OF PCC BASE COURSE AND BASE COURSE WIDENING

Effective: January 1, 2016

Construction of the PCC Base Course and/or PCC Base Course Widening shall be according to Section 353 of the Standard Specifications and as described herein.

When the PCC Base Course and/or PCC base Course Widening is to be constructed adjacent to concrete gutter, curb, or median, transverse contraction joints shall be cut into the base course or widening as a continuation of the joints required for the concrete gutter, curb, or median. These contraction joints shall be cut in accordance with Article 420.05 of the Standard Specifications. No dowel bars will be required at these contraction joints and no sealing of joints will be required.

This work will not be paid for separately, but will be included in the cost of the PCC BASE COURSE AND BASE COURSE WIDENING pay items and no additional compensation will be allowed.

HOT-MIX ASPHALT SURFACE COURSE SURFACE TESTS

Effective: November 1, 2003 Revised January 1, 2007

The Contractor shall provide a person to operate the straight edge in accordance with Article 406.11 of the Standard Specifications and communicate with IDOT Personnel to minimize the surface course bumps. If surface course bumps cannot be removed at this time, IDOT personnel will record the locations and provide deductions as stated in Article 406.11.

PROTECTION OF FRAMES AND LIDS OF UTILITY STRUCTURES

Effective March 6, 1991 Revised January 1, 2007

This work shall consist of protecting frames and lids of utility structures in the pavement after the adjacent hot-mix asphalt surface has been removed to the required depth by cold milling or by hand methods.

After the area has been swept clean and before the lane is opened to traffic, a hot bituminous mixture shall be placed around the casting, flush with its surface and decreasing to a featheredge in a distance of 4 feet (1.2 m) around the entire surface of the casting. Cold mix or milled material will not be permitted. This mixture shall remain in place until the day surfacing operations are undertaken within the immediate area of the structure. Prior to placing the surface course, the temporary hot-mix asphalt mixture shall be removed and disposed of by the Contractor as specified in Article 202.03 of the Standard Specifications.

The temporary tapers and their removal shall be considered included in the contract unit price per Square Meter (Square Yard) for HOT-MIX ASPHALT SURFACE REMOVAL of the depth specified, and no additional compensation will be allowed.

STORM SEWER, (WATER MAIN QUALITY PIPE)

Effective January 1, 2011

Revised January 1, 2021

This work consists of constructing storm sewer to meet water main standards, as required by the IEPA or when otherwise specified. The work shall be performed in accordance with applicable parts of Section 550 of the Standard Specifications, applicable sections of the current edition of the IEPA Regulations (Title 35 of the Illinois Administrative Code, Subtitle F, Chapter II, Section 653.119), the applicable sections of the current edition of the "Standard Specifications for Water and Sewer Main Construction in Illinois", and as herein specified.

This provision shall govern the installation of all storm sewers which do not meet IEPA criteria for separation distance between storm sewers and water mains. Separation criteria for storm sewers placed adjacent to water mains and water service lines are as follows:

- (1) Water mains and water service lines shall be located at least 10 feet (3.05 meters) horizontally from any existing or proposed drain, storm sewer, sanitary sewer, or sewer service connections.
- (2) Water mains and water service lines may be located closer than 10 feet (3.05 meters) to a sewer line when:
 - (a) Local conditions prevent a lateral separation of 10 feet (3.05 meters); and
 - (b) The water main or water service invert is 18 inches (460 mm) above the crown of the sewer; and
 - (c) The water main or water service is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.
- (3) A water main or water service shall be separated from a sewer so that its invert is a minimum of 18 inches (460 mm) above the crown of the drain or sewer whenever water mains or services cross storm sewers, sanitary sewers or sewer service connections. The vertical separation shall be maintained for that portion of the water main or water services located within 10 feet (3.05 meters) horizontally of any sewer or drain crossed.

When it is impossible to meet (1), (2) or (3) above, the storm sewer shall be constructed of concrete pressure pipe, slip-on or mechanical joints ductile iron pipe, or PVC pipe equivalent to water main standards of construction. Construction shall extend on each side of the crossing until the perpendicular distance from the water main or water service to the sewer or drain line is at least 10 feet (3.05 meters). Storm sewer meeting water main requirements shall be constructed of the following pipe materials:

Concrete Pressure Pipe

Concrete pressure pipe shall conform to the latest ANSI/AWWA C300, C301, or C303.

Joints shall conform to Article 41-2.07B of the "Standard Specifications for Water and Sewer Main Construction in Illinois."

Ductile Iron Pipe

Ductile Iron pipe shall conform to ANSI A 21.51 (AWWA C151), class or thickness designed per ANSI A 2150 (AWWA C150), tar (seal) coated and/or cement lined per

ANSI A 21.4 (AWWA C104), with a mechanical or rubber ring (slip seal or push on) joints.

Joints for ductile iron pipe shall be in accordance with the following applicable specifications.

1. Mechanical Joints - AWWA C111 and C600
2. Push-On Joints - AWWA C111 and C600

Plastic Pipe

Plastic pipe shall be marked with the manufacturer's name (or trademark); ASTM or AWWA specification; Schedule Number, Dimension Ratio (DR) Number or Standard Dimension Ratio (SDR) Number; and Cell Class. The pipe and fittings shall also meet NSF Standard 14, and bear the NSF seal of approval. Fittings shall be compatible with the type of pipe used. The plastic pipe options shall be in accordance with the following:

1. Polyvinyl Chloride (PVC) conforming to ASTM Standard D 1785. Schedule 80 is the minimum required for all pipe sizes, except when the pipe is to be threaded, and then it shall be Schedule 120. It shall be made from PVC compound meeting ASTM D 1784, Class 12454C.
2. Polyvinyl Chloride (PVC) conforming to ASTM D 2241. A minimum wall thickness of SDR 26 is required for all pipe sizes (Note: The lower the SDR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454B.
3. Chlorinated Polyvinyl Chloride (CPVC) conforming to ASTM F 441. A minimum of Schedule 80 is required for all pipe sizes. Threaded joints are not allowed. It shall be made from CPVC compound meeting ASTM D 1784, Class 23447B.
4. Chlorinated Polyvinyl Chloride (CPVC) conforming to ASTM F 442M/F422M. A minimum wall thickness of SDR 26 is required for all pipe sizes (Note: The lower the SDR number, the higher the wall thickness and pressure rating). It shall be made from CPVC compound meeting ASTM D 1784.
5. Polyvinyl Chloride (PVC) conforming to ANSI/AWWA C900. A minimum of wall thickness of DR 25 is required for all pipe sizes (Note: The lower the DR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454.
6. Polyvinyl Chloride (PVC) conforming to ANSI/AWWA C905. A minimum of wall thickness of DR 26 is required for all pipe sizes (Note: The lower the DR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454.

Joining of plastic pipe shall be by push-on joint, solvent welded joint, heat welded joint, flanged joint, or threaded joint, butt fused or electro fused, in accordance with the pipe manufacturer's instructions and industry standards. Special precautions shall be taken to insure clean, dry contact surfaces when making solvent or heat welded joints. Adequate setting time shall be allowed for maximum strength.

Elastometric seals (gaskets) used for push-on joints shall comply with ASTM F477.

Solvent cement shall be specific for the plastic pipe material and shall comply with ASTM D 2564 (PVC) or ASTM F 493 (CPVC) and be approved by NSF.

This work will be measured and paid for at the contract unit price per Foot (Meter) for STORM SEWER (WATER MAIN QUALITY PIPE) of the diameter and type specified.

INLETS, TYPE G-1

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and material for the construction of Type G-1 Inlets and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLETS, TYPE G-1" to Article 602.16 of the Standard Specifications. Delete the first paragraph in Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLETS, TYPE G-1" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLETS, TYPE G-1.

INLETS, TYPE G-1, SPECIAL

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and material for the construction of Type G-1, Special inlets and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLETS, G-1, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph in Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLETS, TYPE G-1, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLETS, TYPE G-1, SPECIAL.

INLET-MANHOLE, TYPE G-1, 4' (1.2M) DIAMETER, SPECIAL

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and materials for the construction of Inlet-Manhole, Type G-1, 4' Diameter, Special and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLET-MANHOLE, TYPE G-1, 4' DIAMETER, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph of Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLET-MANHOLE, TYPE G-1, 4' DIAMETER, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLET-MANHOLE, TYPE G-1, 4' DIAMETER, SPECIAL.

INLET-MANHOLE, TYPE G-1, 5' (1.5M) DIAMETER, SPECIAL

Effective October 1, 1995 Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and materials for the construction of Inlet-Manhole, Type G-1, 1.5 m (5') Diameter, Special and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLET-MANHOLE, TYPE G-1, 5' (1.5 m) DIAMETER, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph of Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLET-MANHOLE, TYPE G-1, 5' (1.5 m) DIAMETER, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLET-MANHOLE, TYPE G-1, 5' (1.5 m) DIAMETER, SPECIAL.

INLETS, TYPE A, WITH SPECIAL FRAME AND GRATE

Effective: August 2, 2013

This work shall consist of furnishing equipment, labor, and materials for the construction of inlets in accordance with Section 602 of the Standard Specifications, Highway Standards 602301 or 602306, and the details in the plans.

Add "INLETS, TYPE A, WITH SPECIAL FRAME AND GRATE" to Article 602.16 of the Standard Specifications.

This work will be paid for at the contract unit price per Each for INLETS, TYPE A, WITH SPECIAL FRAME AND GRATE.

MANHOLE, TYPE A, OF THE DIAMETER SPECIFIED WITH SPECIAL FRAME AND GRATE

Effective: August 2, 2013

This work shall consist of furnishing equipment, labor, and materials for the construction of MANHOLE, TYPE A, OF THE DIAMETER SPECIFIED WITH SPECIAL FRAME AND GRATE of the diameter specified in accordance with Section 602 of the Standard Specifications and the details in the plans.

Add "MANHOLE, TYPE A, OF THE DIAMETER SPECIFIED WITH SPECIAL FRAME AND GRATE" of the diameter specified to Article 602.16 of the Standard Specifications.

This work will be paid for at the contract unit price per Each for MANHOLE, TYPE A, OF THE DIAMETER SPECIFIED, WITH SPECIAL FRAME AND GRATE.

PCC QMP ELECTRONIC REPORT SUBMITTALS

Effective January 13, 2022

The Contractor's QC personnel shall be responsible for electronically submitting the following reports to the Department: PRO and IND data for BMPR MI654 "Air, Slump, & Quantity"; PRO data for BMPR MI655 "PCC Strength"; and PRO data for BMPR MI504 "Field/Lab Gradation". The format for the electronic submittals will be the "QMP" reporting program which will be provided by the Department. Microsoft Office 2007 or newer is required for this program which must be provided by the Contractor.

PCC AUTOMATIC BATCHING EQUIPMENT

Effective April 23, 2010

Revised November 7, 2014

Portland cement concrete provided shall be produced from batch plants that conform to the requirements of Article 1103.03 (a) and (b) of the Standard Specifications for Road and Bridge Construction. Semi-automatic batching will not be allowed.

In addition, the batching plant shall be a computerized plant interfaced with a printer and shall print actual batch weights and aggregate mixtures, all water added, amount of each admixture or additive per batch, and percentage variance from design. The ticket shall also state the actual water-cement ratio as batched, and the amount of water that can be added to the batch without

exceeding the maximum water-cement ratio. Truck delivery tickets will still be required as per Article 1020.11 (a)(7) of the Standard Specifications.

ELECTRICAL SPECIAL PROVISIONS

RESPONSIBILITY OF CONTRACTOR

The Contractor shall deliver complete lighting systems, thoroughly tested and in operating condition. He is cautioned to use the procedures outlined. For example, it is necessary that the wiring be meggered in the presence of the Engineer. All defective or damaged parts must be replaced at no extra cost before payment will be made, even though approval has been given to use the parts on the basis of manufacturer's specifications and descriptions.

Any negligence on the part of the Contractor to comply with these provisions or any part thereof, may be considered by the City of Pekin as cause for default of contract in accordance with Section 105 of the "Standard Specifications for Road and Bridge Construction".

DELIVERY OF MATERIALS

The Contractor shall designate on his progress schedule the quoted shipment on the poles, luminaries, ballasts, and wiring materials that he will use to construct the project.

GUARANTEES

If a guarantee is included in the standard sales prices of any items at no extra cost, the Contractor shall supply the Engineer with a copy. Lamps, luminaries, ballasts, photocells, contactors, and circuit breakers may have such a guarantee.

PROSECUTION OF WORK

The Engineer will determine the date for starting the work on the contract and shall give the Contractor ten (10) days notice thereof.

The Contractor shall construct the lighting system in the following stages:

1. Conduits, except for services
2. Foundations and handholes
3. Wiring, except in poles and services
4. Poles, luminaires, ballasts, lamps and pole wiring
5. Controllers and services

Stages may run in succession in any order or concurrently. Stages running concurrently will be combined into a single stage.

GROUNDING

All poles and the control cabinet shall be connected to a continuous ground consisting of copper wire 1/C #6 AWG, green color insulated or bare electric cable, and the handhole cover and frame shall be grounded in accordance with State Standard 873001-02. The conductor shall be installed with the insulated cables inside the conduit.

The ground conductor shall have no splices or kinks below grade. It shall be solidly connected to the grounding lug on each pole and to the ground rod at the service installation.

Basis of Payment: Driven ground rods, connectors, connecting ground wire and their installation are included with the device being grounded. No extra compensation will be allowed.

WIRING TESTS

The tests outlined in this section are witness tests to be performed during construction in the presence of the Engineer at times approved by the Engineer. They shall be performed by the Contractor's personnel and with his equipment. The cost is incidental and no extra compensation will be allowed.

Testing will be performed at opportune times before final inspection. Defects shall be corrected and testing repeated until all sections of the installation are sound. Splicing or repairing of insulation below grade is not permissible except in handhole.

All data required herein shall be read and recorded at the time of the test by the Engineer in the log which will be retained by him for examination and approval at the time of final inspection. It is the responsibility of the Contractor to make certain that the log is complete and the data proves that the system performance exceeds the minimum requirements. Approval for payment will be given only if a complete log is submitted by the Engineer at time of final inspection and the final, corrected system meets the minimum requirements.

It is the purpose of the test to confirm the quality of insulation in the wiring

All construction shall be finished when tests are made. The pole shall be erected with Drivers and LED Light Engines in-place. Trenches shall be backfilled and all connection shall be made up in handholes, poles and control cabinets.

Insulation resistance shall be measured with a megger generating not less than 500 nor more than 1,000 volts. A multimeter is not acceptable because it applies only a few volts which will permit some insulation defects to go undetected. Erratic behavior of the megger during the test indicates an intermittent weakness which must be corrected. Only the lowest value indicated shall be considered or recorded.

The Engineer shall log the serial number and voltage rating of the megger used by the Contractor. He shall then confirm the calibration of the megger by connecting the two leads of the megger together so that the resistance to be measured by the megger when it is turned to full speed is zero. Unless this is true, the megger will give false readings under all other circumstances as well.

Each circuit shall be permanently tagged for identification and then tested at the control centers. The full voltage of the megger shall be applied between ground and each insulated wire in each circuit. The ground shall consist of a driven copper clad rod 2.4 m x 16 mm or larger, connected

by #6 AWG wire to the power company neutral in the control cabinet. Circuits shall be isolated from each other by opening the circuit breakers.

All conductors shall be meggered pole to pole before connecting to the light fixtures.

LIGHT POLE, ALUMINUM, 30 FT. M.H., 6 FT. MAST ARM

Description: This work shall consist of furnishing all equipment, material and labor necessary to properly install the proposed light poles with mast arm mounting bracket as specified at the locations as indicated on the plans.

Materials: The materials shall be in accordance with Article 830.02 of the "Standard Specifications", plan details, and the following:

Light poles shall be 30 ft. mounting height with 6-foot mast arm. Light poles shall include all necessary wiring sufficient to reach from the connection to raceway wiring at the handhole to the luminaire depending on the length of mast arm selected. Roadway luminaire and mast arm shall be placed at a height on pole to where the luminaire is 30.75 ft above finished grade (roadway). This height placement requirement is to ensure that the luminaire height matches the Ameren provided luminaires on the project.

Light poles shall be as manufactured by Valmont or Hapco.

General. The work shall be completed in accordance with Section 830 of the "Standard Specifications", plan details, and as modified herein.

Basis of Payment. The work will be paid for at the contract unit price per EACH for LIGHT POLE, ALUMINUM, 30 FT. M.H., 6 FT. MAST ARM, regardless of the arm lengths required. The unit price shall include the cost of all materials, equipment and labor required to furnish and install the light poles with mast arm mounting bracket.

LUMINAIRE, LED, ROADWAY, OUTPUT DESIGNATION E

Description: This work shall consist of furnishing and installing the luminaire in accordance with Section 821 of the Standard Specifications, details in the plans, and the following additions or exceptions.

Materials: The full cut-off luminaire shall have a structured LED array to provide 10,500 lumens at 3000K. Distribution shall be Type III asymmetric medium distribution. Luminaire shall utilize a slip filter with +/-5 degrees of adjustment for leveling. Provide luminaire with optional level and tool less entry. Luminaire shall be suitable for use on a 240-volt system. It shall not have an individual photocell. The luminaire shall have a gray finish.

The luminaire shall be the Evolve LED Roadway Lighting Series ERL1 manufactured by GE Current, catalog number ERL1-0-11-C5-30-A-GRAY-F-G.

General: The work shall be completed in accordance with Section 821 of the “Standard Specifications,” plan details, and as modified herein.

Basis of Payment: The work will be paid for at the contract unit price per EACH for LUMINAIRE, LED, ROADWAY, OUTPUT DESIGNATION E. The unit price shall include the cost of all materials, equipment and labor required to furnish and install the luminaires.

LUMINAIRE, LED, ROADWAY, OUTPUT DESIGNATION H

Description: This work shall consist of furnishing and installing the luminaire in accordance with Section 821 of the Standard Specifications, details in the plans, and the following additions or exceptions.

Materials: The full cut-off luminaire shall have a structured LED array to provide 22,000 lumens at 3000K. Distribution shall be Type III asymmetric medium distribution. Luminaire shall utilize a slip filter with +/-5 degrees of adjustment for leveling. Provide luminaire with optional level and tool less entry. Luminaire shall be suitable for use on a 240-volt system. It shall not have an individual photocell. The luminaire shall have a gray finish.

The luminaire shall be the Evolve LED Roadway Lighting Series ERL2 manufactured by GE Current, catalog number ERL2-0-23-C5-30-A-GRAY-F-G.

General: The work shall be completed in accordance with Section 821 of the “Standard Specifications,” plan details, and as modified herein.

Basis of Payment: The work will be paid for at the contract unit price per EACH for LUMINAIRE, LED, ROADWAY, OUTPUT DESIGNATION H. The unit price shall include the cost of all materials, equipment and labor required to furnish and install the luminaires.

LIGHTING CONTROLLER (SPECIAL)

Description: This work shall consist of furnishing, transporting, and installing the Lighting Controller Combination Unit on concrete foundation and all electric cable connections in the unit in accordance with Section 825 of the Standard Specifications, the plans, and as directed by the Engineer. This work shall include an electrical service installation, including all conduits, wiring, etc. to complete this work, in accordance with Section 804 of the Standard Specifications. This work shall not be paid for separately but shall be included in the cost of this item.

Materials: The materials shall be in accordance with Article 825 of the “Standard Specifications”, plan details, and the following:

The Controller Combination Unit shall be manufactured and assembled by Milbank (Catalog #CP3B5111HA22SL1, 120/240 VAC, 3-wire; output 100 Amp, 100 Amp main circuit breaker, 2A

Pole Loadcenter, Photocell, Switched Load, Rainproof – Type 3R, Aluminum Anodized Enclosure). Ameren approval of meter components must be satisfied.

Unit exterior will be free of defects and have no sharp edges.

Basis of Payment: Work shall be paid for at the contract unit price per EACH for LIGHTING CONTROLLER (SPECIAL) for the combination unit specified, which price shall be considered payment in full for all labor, equipment, and material necessary to complete the work as specified.

WIRING TEST LOG SHEET

(One REQUIRED for each control of service center)

Control Center Number: _____

MEGGER DATA:

Volts generated _____ volts.

(Must be 500 to 1,000)

Scale used: 0 to _____ megohms.

Manufactured by: _____

Serial Number: _____

CONSTRUCTION STATUS:

Wiring complete _____ Incomplete _____

Trenches open _____ Backfilled _____

MEGOHMS TO GROUND:

| | | |
|------------------------------|-------|---------|
| Wire A to power supply | _____ | megohms |
| Wire B to power supply | _____ | megohms |
| Wire A to lighting circuit 1 | _____ | megohms |
| Wire B to lighting circuit 1 | _____ | megohms |
| Wire A to lighting circuit 2 | _____ | megohms |
| Wire B to lighting circuit 2 | _____ | megohms |

AMPERES:

| | | |
|--|-------|---------|
| Wire A to power supply, initial | _____ | amperes |
| Wire B to power supply, initial | _____ | amperes |
| Wire A to power supply, after 5 minutes on | _____ | amperes |
| Wire B to power supply, after 5 minutes on | _____ | amperes |
| Wire A, Circuit 1 - after 5 minutes on | _____ | amperes |
| Wire A, Circuit 2 - after 5 minutes on | _____ | amperes |
| Wire B, Circuit 1 - after 5 minutes on | _____ | amperes |
| Wire B, Circuit 2 - after 5 minutes on | _____ | amperes |

REGULATION: (Make following tests in order shown with lights burning after they have been on for five (5) minutes or more).

(1) Voltage in control cabinet between Wire A and Wire B to Power supply
_____ Volts.

(2) Voltage between Wire A and Wire B at most distance light (designated by Engineer)
_____ Volts.

(3) Voltage in control cabinet between Wire A and Wire B to Power supply (same as 1)
_____ Volts.

Engineer

TRAFFIC SIGNAL SPECIFICATIONS

POTHOLING FOR LOCATION OF EXISTING UNDERGROUND UTILITIES

Potholing to locate existing underground utilities shall be included in the contract bid price for the conduit pay items.

Removal and replacement of existing pavement and islands only for utility locating purposes will not be paid for separately but shall be included in the contract bid price for the conduit pay items.

AS-BUILT DOCUMENTATION

The Contractor shall locate all proposed conduit, communication vaults, handholes, light poles, traffic signal posts, mast arms, controller cabinets, and all other electrical structures every 100 feet using a GIS locating device that is accurate to the nearest foot.

The Contractor shall provide a GIS based map of the conduit route (located every 100 feet) with all traffic and lighting components listed above with a complete listing of all of map coordinates in an electronic format (Google Earth KML or KMZ shape file).

LED MODULE AND HPS LAMP RECYCLING

The Contractor shall recycle all LED modules and high-pressure sodium lamps through a certified recycling company. The Contractor shall submit detailed information pertaining to recycling to the Department for review along with the electrical material submittals. The Contractor shall submit proof of recycling to the Department.

Basis of Payment: This work will not be paid for separately but shall be included in the contract unit price for the proposed traffic signal heads.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

This work shall be in accordance with Section 895 of the Standard Specifications except as modified herein.

The Contractor shall remove the items as shown on the plan sheets.

They shall verify all removal items prior to bidding. There will be no additional compensation.

The Contractor shall dispose of all items off the Right-of-Way and reflect the salvage value of the material in the contract bid price.

Upon removal, the Contractor shall deliver all traffic signal controllers and the traffic signal cabinet from Court & Parkway to the city of Pekin.

The Contractor shall remove all LED modules and HPS lamps from luminaires prior to disposal. All HPS luminaire lamps shall be properly disposed of at a certified recycling center or alternate facility that is authorized to accept them.

Basis of Payment: The above work will be paid for at the contract unit price Each for REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT and shall be payment in full for removing and disposing of the equipment described above, complete. No additional compensation will be allowed.

HANDHOLE REMOVAL

All existing traffic signal handoles along Court Street within the project limits shall be removed. Handholes in the existing sidewalk will be paid for as sidewalk removal. Handholes at intersections outside of the sidewalk will be included in the cost of Remove Existing Traffic Signal Equipment. No additional compensation will be allowed.

SIGN PANEL – TYPE 1

This work shall be in accordance with Sections 720 and 1090, 1091, and 1092 of the Standard Specifications except as modified herein.

The Contractor shall furnish street name signs as shown on the plan sheet details and install them on the mast arms at the locations indicated on the plan sheets.

The contractor shall supply all materials required to install the sign (stainless steel banding, brackets, hardware, etc.) as a part of this pay item.

Basis of Payment: This work shall be paid for at the contract unit price per square foot for SIGN PANEL – TYPE 1 which price shall be payment in full for all labor, equipment, and materials required to furnish and install the sign panel described above, complete.

HANDHOLE, PORTLAND CEMENT CONCRETE

This work shall consist of furnishing the materials and constructing a handhole in accordance with the applicable Articles of Section 814 and 1088 of the Standard Specifications with the following modifications:

The lift ring for the cover shall consist of a solid closed ring of stainless steel at least 3/8 inch in diameter. The lift ring shall be attached to the cover by a loop of stainless steel at least 3/8 inch in diameter. The lift ring and loop shall be recessed in the cover.

The Contractor shall install heavy-duty, fully-galvanized hooks, with a minimum diameter of 1/2" in the proposed handhole. The Contractor shall submit this material to the Engineer prior to construction of the handholes.

The lid shall be marked with the legend "Traffic Signals".

Pre-cast handholes are not allowed.

All unsuitable materials shall be disposed of by the Contractor outside the job limits.

Basis of Payment: This work will be paid for at the contract unit price each for HANDHOLE, PORTLAND CEMENT CONCRETE which price shall be payment in full for all labor, materials, and equipment required to provide the handhole described above as well as any necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

DOUBLE HANDHOLE, PORTLAND CEMENT CONCRETE

This work shall consist of furnishing the materials and constructing a double handhole in accordance with the applicable Articles of Section 814 and 1088 of the Standard Specifications with the following modifications:

The lift ring for the cover shall consist of a solid closed ring of stainless steel at least 3/8 inch in diameter. The lift ring shall be attached to the cover by a loop of stainless steel at least 3/8 inch in diameter. The lift ring and loop shall be recessed in the cover.

The Contractor shall install heavy-duty, fully-galvanized hooks, with a minimum diameter of 1/2" in the proposed handhole. The Contractor shall submit this material to the Engineer prior to construction of the handholes.

The lid shall be marked with the legend "Traffic Signals".

Pre-cast handholes are not allowed.

All unsuitable materials shall be disposed of by the Contractor outside the job limits.

Basis of Payment: This work will be paid for at the contract unit price each for DOUBLE HANDHOLE, PORTLAND CEMENT CONCRETE which price shall be payment in full for all labor, materials, and equipment required to provide the handhole described above as well as any necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

SERVICE INSTALLATION, TYPE A

This work shall be in accordance with Section 805 and 1086 of the Standard Specifications except as modified herein.

The service installation shall conform to the latest Ameren requirements for an underground service and include a meter socket, disconnect switch, galvanized steel conduit, wiring, and all associated appurtenances.

The installation of the meter socket and disconnect switch on the outside of the traffic signal cabinet will not be allowed.

Galvanized steel conduit shall be used for the service riser. The use of PVC conduit will not be allowed.

A rain tight hub assembly (Myers type) shall be used when conduit enters the switch from the top of the disconnect.

The service disconnect switch shall be a stainless steel, weatherproof NEMA 4X enclosure that meets the following specifications:

60-Ampere (250 V) Minimum Fused Disconnect Switch: Unless indicated otherwise on the plan sheets, the fused disconnect switch shall be single-throw, three-wire (two poles, two fuses, and solid neutral). The switch shall provide for locking the blades in either the "On" or "Off" position with one or two padlocks and for locking the cover in the closed position. The disconnect switch and fuse rating shall be rated at the voltage and amperage required to comply with utility company and equipment requirements. All fuses shall be provided with the disconnect installation.

The service disconnect shall be installed at a maximum height of 42".

The Contractor shall furnish and install a utility service lock on the disconnect handle to prevent unauthorized access and disconnection of power.

Basis of Payment: This work shall be paid for at the contract unit price each for SERVICE INSTALLATION, TYPE A which price shall be payment in full for all labor, equipment, and materials required to provide and install the electrical service installation described above, complete.

TRAFFIC SIGNAL POST, GALVANIZED STEEL

This work shall be in accordance with Sections 878 and 1077 of the Standard Specifications except as modified herein.

The traffic signal post shall be attached to the foundation with four 3/4" x 18" galvanized anchor bolts. The post base shall be secured to the foundation using galvanized nuts and galvanized steel flat washers that have a minimum thickness of 1/4" and are trapezoidal in shape. The washers shall be sized so as to completely capture the mounting flanges of the traffic signal base. Round washers will not be acceptable.

Basis of Payment: This work will be paid for at the contract unit price each for TRAFFIC SIGNAL POST, GALVANIZED STEEL of the height specified which price shall be payment in full for all labor, material, and equipment required to provide and install the traffic signal post and base described above.

ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1/C

This work shall be in accordance with the applicable Articles of Sections 801, 806, 873, 1076, and 1088 of the Standard Specifications with the following modifications:

This work shall consist of furnishing and installing a grounding wire to bond all traffic signal handholes (lids and rings), mast arm assemblies, posts, light poles, cabinets and exposed metallic conduits.

The Contractor shall attach the proposed ground wire to the proposed traffic structures to ground and safety bond them in accordance with NEC requirements. All labor, materials, and equipment required to bond the proposed structures (wire, clamps, hardware, etc.) shall be included in the bid price for this pay item.

The Contractor shall also be responsible for locating all handholes and uncovering them as required to facilitate the work.

The proposed ground wire shall be an insulated #6 XLP copper conductor with green insulation.

Basis of Payment: This work will be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1/C which price shall be payment in full for all labor, materials, and equipment required to furnish and install the grounding cable described above.

FULL ACTUATED CONTROLLER AND TYPE IV CABINET SPECIAL

This work shall be in accordance with Sections 857, 1073, and 1074 of the Standard Specifications except as modified herein.

The controller and cabinet shall be compliant with NEMA TS-2 standards and NTCIP standards 1201 and 1202.

The traffic signal cabinet shall be equipped with a 12" aluminum riser.

The traffic signal cabinet shall have a NEMA TS-2 back panel. The cabinet shall include a malfunction management unit to allow enhanced fault monitoring capabilities. The malfunction management unit shall support flashing yellow arrow operation and be a Reno A&E model MMU-1600G equipped with a graphical display and Ethernet port.

The cabinet shall be equipped with an external pedestrian pushbutton isolation panel with functionality to provide for latching pedestrian pushbutton indication lights.

The controller shall be an Econolite Cobalt C-Series TS-2 Type 2 controller equipped with an Basic Display, Ethernet ports, USB ports, and data key.

The malfunction management unit shall be equipped with the latest software and firmware revisions. The cabinet shall be equipped with a plexi-glass shield that covers the power panel

which houses the mercury bus relay, line filter, circuit breakers, and other electrical components.

The cabinet shall be equipped with a TS-2 detector rack (rack is required only for cabinets with inductive loop detectors), load switches, flash transfer relays, bus interface units, and all other components required for operation. The cabinet shall be equipped with a plexi-glass shield that covers the thermostat and a LED lighting assembly that turns on when the door is opened. The lighting assembly shall be mounted in a location that will not interfere with cabinet maintenance.

The traffic signal cabinet shall be equipped with a sixteen load switch back panel to accommodate future expansion.

The cabinet shall be equipped with a cabinet riser that raises the cabinet approximately twelve inches above the concrete foundation. The riser shall bolt directly to the existing foundation anchor bolts and the riser shall be attached to the cabinet using galvanized steel hardware.

The riser shall be fabricated from 0.125-inch (3 mm) sheet aluminum with flanges on the top and bottom to provide rigidity. The riser shall be equipped with mounting flanges as required to connect with the controller cabinet and foundation anchor bolts. The outside surface of the riser shall have a smooth, uniform, natural finish.

The cabinet shall be furnished with a compact heater strip to be used for moisture reduction during cold weather. The heater shall be thermostatically controlled, operate at 120 volts, have a minimum wattage of 150 watts, a maximum wattage of 250 watts, have a shield to protect service personnel and equipment from damaging heat, be separately fused, and be mounted where it does not interfere with a person working in the cabinet.

The traffic signal cabinets shall be equipped with two non GFCI duplex NEMA 5-15R receptacles to be used to provide power to auxiliary equipment.

The cabinet shall be equipped with a twenty-four fiber wall-mountable interconnect center and two six-fiber bulkheads.

The cabinet shall be equipped with toggle switch guards for all switches located on the door to prevent accidental switching. The cabinet shall include a high quality deluxe pleated filter.

The cabinet shall be equipped with additional surge protection for the controller, malfunction management unit, and detector amplifiers, and/or video detection system. The surge protector shall be a Transtector model ACP100BWN3 and shall be included in addition to an EDCO SHA-1250 IRS protector. The EDCO SHA-1250 IRS surge protector is to be provided in accordance with Section 1085.47 A(4a) and shall be wired to provide surge protection for the controller, malfunction management unit, and detector amplifiers. The Transtector surge suppressor may be wired to the equipment protected power terminals of the EDCO SHA-1250 IRS unit provided that the controller, MMU, and detection system are protected.

The Contractor shall set up each cabinet in his or her shop for inspection by the Engineer. All phases that are utilized shall be hooked up to a light board to provide observation for each

signal indication. The Engineer shall be notified when the setup is complete so that all pertinent timings may be entered into each traffic signal controller. The facility shall be subject to a seven day burn-in period before installation will be allowed.

After installing the cabinet in the field, prior to resuming normal signal operation, the Contractor shall test the cabinet by connecting a jumper to the cabinet field terminals to ensure that all conflicting signals will place the cabinet into conflict flash and to verify that the cabinet, controller, and malfunction management unit are operating correctly. The Contractor shall make arrangements with the local police agency to provide traffic control during the conflict test.

Basis of Payment:

This work will be paid for at the contract unit price each for FULL ACTUATED CONTROLLER AND TYPE IV CABINET SPECIAL and shall be payment in full for all labor, materials, and equipment required to remove the existing traffic signal cabinet and furnish, install, and test the traffic signal cabinet described above, complete.

TRAFFIC SIGNAL LED MODULE SPECIFICATIONS

The material requirement shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

All traffic signal ball and arrow LED modules shall be designed for a minimum 15 year extended service life and have a 15 year replacement warranty.

It is not permissible to furnish LED modules that are not designed for a minimum 15 year service life.

The LED assemblies for the red, yellow, and green solid and arrow indications shall meet or exceed the following minimum specifications:

Solid Indication LED Module Specifications

Compliance: Fully compliant with ITE VTCSH LED Circular Signal Supplement specifications dated and adopted June 27, 2005

Compliance Verification: Intertek ETL verified compliance – Product must be listed on the “Directory of LED Modules Certified Products” list located on the ETL website at <http://www.intertek.com/lighting/performance-testing/traffic-signals/>

Diameter: 12” (300mm)

| | |
|---|---|
| <u>Lens:</u> | UV stabilized scratch resistant polycarbonate, tinted red or yellow, clear for green, uniform non-pixelated illumination, Incandescent Appearance |
| <u>LEDS:</u> | Hi-Flux |
| <u>Operating Temperature Range:</u> | -40 to +74C (-40 to +165F) |
| <u>Operating Voltage Range:</u> | 80 to 135 V (60Hz AC) |
| <u>Power Factor (PF):</u> | > 90% |
| <u>Total Harmonic Distortion (THD):</u> | < 20% |
| <u>Minimum Voltage Turn-Off:</u> | 35V |
| <u>Turn-On/Turn-Off Time:</u> | <75 ms |
| <u>Nominal Power:</u> | 10.0 W (Red), 18.0W (Yellow), 12.5 W (Green) |
| <u>Nominal Wavelength:</u> | 625-626 nm (Red), 589-590 nm (Yellow), 500-502 nm (Green) |
| <u>Minimum Maintained Intensity:</u> | 365 Cd (Red), 910 Cd (Yellow), 475 Cd (Green) |
| <u>Standard Conformance:</u> | FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection |
| <u>Warranty:</u> | 15 year replacement (materials, workmanship, and intensity) |

Arrow Indication LED Module Specifications (Red, Yellow, Green)

| | |
|---------------------------------|---|
| <u>Compliance:</u> | Fully compliant with ITE VTCSH LED Vehicle Arrow Supplement specifications adopted July 1, 2007 |
| <u>Compliance Verification:</u> | Intertek ETL verified compliance – Product must be listed on the “Directory of LED Modules Certified Products” list located on the ETL website at http://www.intertek.com/lighting/performance-testing/traffic-signals/ |
| <u>Diameter:</u> | 12” (300mm) |
| <u>Lens:</u> | Clear Frosted, UV stabilized scratch resistant polycarbonate, tinted red or yellow, clear for green, uniform non-pixelated illumination, incandescent appearance, omni-directional |

| | |
|---|---|
| <u>LEDS:</u> | Hi-flux LEDs |
| <u>Operating Temperature Range:</u> | -40 to +74C (-40 to +165F) |
| <u>Operating Voltage Range:</u> | 80 to 135 V (60Hz AC) |
| <u>Power Factor (PF):</u> | > 90% |
| <u>Total Harmonic Distortion (THD):</u> | < 20% |
| <u>Minimum Voltage Turn-Off:</u> | 35V |
| <u>Turn-On/Turn-Off Time:</u> | <75 ms |
| <u>Nominal Power:</u> | 5.0-7.0 W (Red), 6.0-12.5W (Yellow), 5.0-7.0 W (Green) |
| <u>nominal Wavelength:</u> | 625-628 nm (Red), 590 nm (Yellow), 500nm (Green) |
| <u>Minimum Maintained Intensity:</u> | 56.8-58.4 Cd (Red), 141.6-146.0 Cd (Yellow), 73.9-76.0 Cd (Green) |
| <u>Standard Conformance:</u> | FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection |
| <u>Warranty:</u> | 15 year replacement (materials, workmanship, and intensity) |

Arrow Indication LED Module Specifications (Yellow/Green Dual Mode)

| | |
|---|--|
| <u>Diameter:</u> | 12" (300mm) |
| <u>LEDS:</u> | Interconnected to minimize the effect of single LED failures |
| <u>Lens:</u> | Clear UV stabilized scratch resistant polycarbonate, uniform non-pixelated illumination, incandescent appearance |
| <u>Operating Temperature Range:</u> | -40 to +74C (-40 to +165F) |
| <u>Operating Voltage Range:</u> | 80 to 135 V (60Hz AC) |
| <u>Power Factor (PF):</u> | > 90% |
| <u>Total Harmonic Distortion (THD):</u> | < 20% |
| <u>Minimum Voltage Turn-Off:</u> | 35V |
| <u>Turn-On/Turn-Off Time:</u> | <75 ms |

| | |
|--------------------------------------|---|
| <u>Nominal Power:</u> | 8.0-10.0 W (Yellow), 8.0-10.0 W (Green) |
| <u>Nominal Wavelength:</u> | 590-592 nm (Yellow), 505-508 nm (Green) |
| <u>Minimum Maintained Intensity:</u> | 141.6-146.0 Cd (Yellow), 73.9-76.0 Cd (Green) |
| <u>Standard Conformance:</u> | FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection |
| <u>Warranty:</u> | 15 year replacement (materials, workmanship, and intensity) |

16" Pedestrian LED Module Specifications (Man/Hand with Countdown Timer)

| | |
|---|---|
| <u>Compliance:</u> | Fully compliant with ITE PTCSI Part-2 LED Pedestrian Traffic Signal Modules specification adopted August 4, 2010 |
| <u>Compliance Verification:</u> | Intertek ETL verified compliance – Product must be listed on the “Directory of LED Modules Certified Products” list located on the ETL website at http://www.intertek.com/lighting/performance-testing/traffic-signals/ |
| <u>Size:</u> | 16" x 18" |
| <u>Configuration:</u> | Man/Hand Overlay with Countdown Timer |
| <u>Lens:</u> | UV stabilized scratch resistant polycarbonate, uniform non-pixelated illumination, incandescent appearance |
| <u>Operating Temperature Range:</u> | -40 to +74C (-40 to +165F) |
| <u>Operating Voltage Range:</u> | 80 to 135 V (60Hz AC) |
| <u>Power Factor (PF):</u> | > 90% |
| <u>Total Harmonic Distortion (THD):</u> | < 20% |
| <u>Minimum Voltage Turn-Off:</u> | 35V |
| <u>Turn-On/Turn-Off Time:</u> | <75 ms |
| <u>Nominal Power:</u> | 6.0-9.0 W (Man), 7.0-9.0W (Hand), 5.0-8.0 W (Timer) |
| <u>Minimum Maintained Intensity:</u> | 1,400 Cd (Hand), 1,400 Cd (Timer), 2,200 Cd (Man) |

Standard Conformance: FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection

Warranty: 5 year replacement (materials, workmanship, and intensity)

SIGNAL HEAD, LED

This work shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

The traffic signal heads shall consist of 12" polycarbonate sections and shall be equipped with LED assemblies for all red bulb, yellow bulb, green bulb, red arrow, yellow arrow, and green arrow indications.

The Contractor shall remove the existing traffic signal heads complete with backplates and bracketing and dispose of them off of the right of way. Prior to disposal, the Contractor shall remove all LED modules and recycle them at a certified electronics recycling facility.

The traffic signal heads shall have a black finish with black doors and tunnel visors.

The LED signal faces shall be equipped with spade connectors and connected to the traffic signal head terminal block.

The LED modules shall conform to the specifications listed under the section TRAFFIC SIGNAL LED MODULE SPECIFICATIONS.

All costs associated with furnishing and installing new signal head bracketing shall be included in the cost of this pay item. The Contractor shall minimize the total number of holes drilled in a mast arm to no more than three.

Basis of Payment: This work will be paid for at the contract unit prices each for Signal Head, LED of the type specified and will be payment in full for all labor, equipment, and materials required to remove the existing signal heads and bracketing and furnish and install traffic signal heads equipped with LED indications and new bracketing as described above, complete.

TRAFFIC SIGNAL BACKPLATE, RETROREFLECTIVE

This work shall be in accordance with Sections 882 and 1078 of the Standard Specifications except as modified herein.

The traffic signal backplates shall be of the same material as the traffic signal heads as specified on the plans.

A three (3) inch wide strip of reflective sheeting shall be applied to the outside perimeter of the face of the backplates. The reflective tape shall be fluorescent yellow in color and shall consist of type AZ sheeting.

Basis of Payment: This work will be paid for at the contract unit price each for TRAFFIC SIGNAL BACKPLATE, RETROREFLECTIVE and shall be payment in full for all labor, materials, and equipment required to furnish and install a traffic signal backplate with reflective tape as described above, complete.

PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER

This work shall be in accordance with Section 881 and 1078 of the Standard Specifications except as modified herein.

The pedestrian signal head shall consist of a single 16" polycarbonate section and shall be equipped with an overlaid LED indication with countdown timer (Walking Person/Upraised Hand).

The Contractor shall furnish all bracketing and hardware required for installation.

The traffic signal head shall have a black finish with black doors and tunnel visors.

The LED signal faces shall be equipped with spade connectors and connected to the traffic signal head terminal block.

The LED signal face shall have international symbols (Upraised Hand - Color: Portland Orange, Walking Person - Color: Lunar White). Only filled indications will be allowed.

The LED modules shall conform to the specifications listed under the section TRAFFIC SIGNAL LED MODULE SPECIFICATIONS.

Combination hand/person pedestrian signal modules shall incorporate separate power supplies for the hand and the person displays.

All costs associated with furnishing and installing new pedestrian signal head bracketing shall be included in the cost of this pay item. The Contractor shall minimize the total number of holes drilled in a mast arm to no more than three.

Basis of Payment: This work will be paid for at the contract unit prices each for PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER and will be payment in full for all labor, equipment, and materials required to provide and install the pedestrian traffic signal heads equipped with LED indications described above, complete.

FLASHING BEACON ASSEMBLY

This work shall consist of furnishing, installing and connecting the single flashing beacon atop the signal ahead sign on eastbound Court Street in advance of the Allentown Road traffic signal.

The location of the sign is located on the plans.

The Flashing beacon assembly shall be low voltage and operate on 12V DC and utilize a solid state flasher.

All costs associated with furnishing and installing the beacon including but not limited to the beacon, solid state flasher, DC power supply, conduit, cable, mounting brackets, lamp visor, drilling into existing or new handhole, and energizing the beacon shall be included in the cost of this pay item.

Basis of Payment: This work will be paid for at the contract unit prices per each for FLASHING BEACON ASSEMBLY.

TRAFFIC SIGNAL BATTERY BACKUP SYSTEM

The following models of Battery Backup Systems are approved for use within District Four:

Alpha Technologies Novus XFM HP1100 (with standard IDOT cabinet or Alpha Technologies Side Mount 6 Integrated BBS Cabinet), Equipped with Ethernet SNMP Interface and Enhanced Capability Battery Monitoring System (AlphaGuard Plus)

Myers Emergency Powers Systems, Model MP2000CA, Equipped with Ethernet SNMP card and Web Based Configuration.

Multilink, EP 2200-T, 1500 Watts/2 kVA, 48 Volt, Equipped with Internal Communication Card and Monitoring Software.

The Contractor may elect to submit an alternate product for consideration (lead based battery systems only) if it meets the minimum requirements contained in this specification.

The Contractor shall be responsible for providing Battery Backup Systems that are sized appropriately for the intersection load. The total system load shall not exceed the manufacturer's specifications.

GENERAL REQUIREMENTS: The Battery Back-up System (BBS) shall include, but not be limited to the following: inverter/charger, power transfer relay, batteries, battery cabinet, a separate failsafe automatic bypass switch and all necessary hardware and interconnect wiring. The BBS shall provide reliable emergency power to a traffic signal in the event of a power failure or interruption. The transfer from utility power to battery power and vice versa shall not interfere with the normal operation of traffic controller, conflict monitor/malfunction management unit or any other peripheral devices within the traffic controller assembly.

The BBS shall provide power for full run-time operation for an "LED-only" intersection (all colors red, yellow, and green) or flashing mode operation for an intersection using Red LED's. As the battery reserve capacity reaches 50%, the intersection shall automatically be placed in all-red flash. The BBS shall allow the controller to automatically resume normal operation after the power has been restored. The BBS shall log an alarm in the controller for each time it is activated.

All 48-volt Battery Backup Systems shall include four batteries and all 36-volt Battery Backup Systems shall include six batteries.

The BBS shall be designed for outdoor applications, and shall meet the environmental requirements of, "NEMA Standards Publication No. TS 2 – Traffic Controller Assemblies," or applicable successor NEMA specifications, except as modified herein.

All line voltage terminals and connections shall be covered by plexi-glass panels to prevent injury during servicing.

The cabinet shall be equipped with a deluxe pleated air filter.

The BBS shall conform to the following specifications:

1.0 OPERATION

- 1.1 The BBS shall be on line and provide voltage regulation and power conditioning when utilizing utility power.
- 1.2 The BBS shall provide a minimum two (2) hours of full run-time operation and four (4) hours all-red flash operation for an "LED-only" intersection (minimum 1000W/1000VA active output capacity, with 80% minimum inverter efficiency).
- 1.3 The maximum transfer time from loss of utility power to switchover to battery backed inverter power shall be 150 milliseconds.
- 1.4 The BBS shall provide the user with 4-sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) relay contact closures, available on a panel-mounted terminal block, rated at a minimum 120V/1A, and labeled to identify each contact. For typical configuration, see the plan detail sheet.
- 1.5 A first set of NO and NC contact closures shall be energized whenever the unit switches to battery power. Contact shall be labeled or marked "On Batt."
- 1.6 The second set of NO and NC contact closures shall be energized whenever the battery approaches approximately 40% of remaining useful capacity. Contact shall be labeled or marked "Low Batt."
- 1.7 The third set of NO and NC contact closures shall be energized two hours after the unit switches to battery power. Contact shall be labeled or marked "Timer."
- 1.8 The fourth set of NO and NC contact closures shall be energized in the event of inverter/charger failure, battery failure or complete battery discharge. Contact shall be labeled or marked "BBS Fail or Status."
- 1.9 A surge suppression unit shall be provided for the output power if available as an option by the BBS manufacturer.

- 1.10 Operating temperature for both the inverter/power transfer relay and failsafe automatic bypass switch shall be -37°C to $+74^{\circ}\text{C}$.
- 1.11 The Power Transfer Relay shall be rated at 240VAC/30AMPS minimum and failsafe automatic bypass switch shall be rated at 240VAC/20 amps, minimum.
- 1.12 The fail safe automatic bypass switch shall be wired to provide power to the BBS when the switch is set to bypass.
- 1.13 The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of $2.5 - 4.0 \text{ mV}/^{\circ}\text{C}$ per cell.
- 1.14 The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 2 meters (6'6") of wire.
- 1.15 Batteries shall not be recharged when battery temperature exceeds $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$.
- 1.16 BBS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 100VAC to 130VAC ($\pm 2\text{VAC}$).
- 1.17 When utilizing battery power, the BBS output voltage shall be between 110 VAC and 125 VAC, pure sine wave output, $\pm 3\%$ THD, $60\text{Hz} \pm 3\text{Hz}$.
- 1.18 BBS shall be compatible with Illinois DOT's traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.
- 1.19 When the utility line power has been restored at above $105 \text{ VAC} \pm 2 \text{ VAC}$ for more than 30 seconds, the BBS shall dropout of battery backup mode and return to utility line mode.
- 1.20 When the utility line power has been restored at below $125\text{VAC} \pm 2 \text{ VAC}$ for more than 30 seconds, the BBS shall dropout of battery backup mode and return to utility line mode.
- 1.21 BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.
- 1.22 In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC state, where utility line power is reconnected to the cabinet. The BBS shall always revert to utility line power and shall be designed to revert to utility line power in the event of a BBS fault condition.
- 1.23 Recharge time for the battery, from "protective low-cutoff" to 80% or more of full battery charge capacity, shall not exceed twenty (20) hours.
- 1.24 When the intersection is in battery operation, the BBS shall bypass all internal cabinet lights, ventilation fans, heater strips, and service receptacles.

- 1.25 The fail safe automatic bypass switch shall be wired to provide power to the BBS when the switch is set to bypass.
- 1.26 A blue LED indicator light shall be mounted on the front of the traffic signal cabinet or on the side of the BBS cabinet facing traffic and shall turn on to indicate when the cabinet power has been disrupted and the BBS is in operation. The light shall be a minimum 1" diameter, be viewable from the driving lanes, and shall be large enough and visible enough to be seen from 200 ft. away.
- 1.27 All 36-volt and 48-volt systems shall include an external component that monitors battery charging to ensure that every battery in the string is fully charged. The device shall compensate for the effects of adding a new battery to an existing battery system by ensuring that the charge voltage is spread equally across all batteries. All cables, harnesses, cards, and other components that are required to provide the functionality described above shall be included in the unit bid price for the battery backup system. The following products are currently approved for use within District 4: Alpha Technologies: AlphaGuard with Charge Management Technology.
- 1.28 The BBS shall be equipped with an integrated safety switch that will interrupt inverter output power in the event of a cabinet knockdown. The safety switch may be either internal to the inverter/charger or externally mounted inside of the BBS cabinet. The safety switch shall be designed to interrupt output power in the event that the charger/inverter is tilted more than twenty degrees on any axis. The switch shall be mechanically latching to ensure that power is not automatically restored to the BBS until the charger/inverter has been "reset". The switch shall also be resettable and reusable unless it has been physically damaged.
- 1.29 The BBS shall be equipped with an Ethernet port and network management card.

2.0 MOUNTING AND CONFIGURATION

2.1 GENERAL

2.2 Inverter/Charger Unit shall be rack or shelf-mounted.

2.3 (Reserved).

2.4 All interconnect wiring provided between Power Transfer Relay, Bypass Switch and Cabinet Terminal Service Block shall be no greater than two (2) meters (6'6") of #10 AWG wire.

2.5 Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be #18 AWG wire.

2.6 All necessary hardware for mounting (shelf angles, rack, etc) shall be included in the bid price of the BBS. The swing-trays shall be screwed to the Type IV or Type V NEMA

cabinets using continuous stainless steel or aluminum piano hinge. All bolts/fasteners and washers shall be ½" diameter galvanized or stainless steel.

3.0 EXTERNAL BATTERY CABINET

- 3.1 The external cabinet shall be a rated NEMA Type 3R Cabinet.
- 3.2 Inverter/Charger and Power Transfer Relay shall be installed inside the external battery cabinet and the failsafe automatic bypass switch shall be installed inside the existing traffic signal cabinet or proposed battery backup cabinet.
- 3.3 Batteries shall be housed in the external cabinet which shall be NEMA Standard rated cabinet mounted to the side of the Type IV or Type V Cabinet (see plan sheets for details). This external battery cabinet shall conform to the IDOT Standard Specifications for traffic signal cabinets for the construction and finish of the cabinet.
- 3.4 The external battery cabinet shall mount to the Type IV or Type V NEMA Cabinet with a minimum of four (4) bolts to the satisfaction of the Engineer.
- 3.5 The dimensions of the external battery cabinet shall be 25" (L) x 16" (W) x 41" (H) and installed in accordance with the plan sheet cabinet detail and this specification.
- 3.6 The cabinet shall include heater mats for each battery shelf and/or battery. If the BBS charger/inverter does not have facilities to accommodate heater mat connections, thermostatically controlled heater mats shall be provided with the system. The heater mat thermostat shall be a separate thermostat (from the ventilation fan thermostat) and be adjustable from 0°F to 32°F for heater mat turn-on.
- 3.7 A warning sticker shall be placed on the outside of the cabinet indicating that there is an Uninterruptible Power Supply inside the cabinet.
- 3.8 The external battery cabinet shall be ventilated through the use of louvered vents (2), filters, and one thermostatically controlled fan as per NEMA TS 2 Specifications. The cabinet shall include a cleanable or replaceable cabinet filter.
- 3.9 External battery cabinet fan shall be AC operated from the same line output of the bypass Switch that supplies power to the Type IV or Type V Cabinet.
- 3.10 The BBS with external battery cabinet shall come with all bolts, conduits and bushings, gaskets, shelves, and hardware needed for mounting. The external battery cabinet shall have a hinged door opening to the entire cabinet. The cabinet shall include a bottom constructed from the same material as the cabinet.
- 3.11 The external cabinet shall be equipped with a power receptacle to accommodate the inverter/charger. The receptacle shall be wired to the line output of the manual bypass switch.

4.0 MAINTENANCE, DISPLAYS, CONTROLS AND DIAGNOSTICS

- 4.1 The BBS shall include a display and /or meter to indicate current battery charge status and conditions.
- 4.2 The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.
- 4.3 The BBS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.
- 4.4 The BBS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.
- 4.5 The BBS shall be equipped with a RS-232 port.
- 4.6 The BBS shall include a resettable front-panel event counter display to indicate the number of times the BBS was activated and a front-panel hour meter to display the total number of hours the unit has operated on battery power.
- 4.7 Manufacturer shall include two (2) sets of equipment lists, operation and maintenance manuals, and board-level schematic and wiring diagrams of the BBS, and the battery data sheets. Manufacturer shall include any software needed to monitor, diagnose, and operate the BBS. The manufacturer shall include any required cables to connect to a laptop computer.
- 4.8 The BBS shall include a data cable for the serial connection to the RS232 port and diagnostic software if it is available as an option with the unit (only two cables required for project).
- 4.9 One copy of the owner/maintenance manuals shall be provided with the BBS.

5.0 BATTERY SYSTEM

- 5.1 Individual batteries shall be 12V type and shall be easily replaced and commercially available off the shelf.
- 5.2 The batteries shall be premium gel type with a 5 year full replacement warranty.
- 5.3 Batteries used for BBS shall consist of a minimum of four (4) to eight (8) batteries with a cumulative minimum rated capacity of 280 amp-hours.
- 5.4 Batteries shall be deep cycle, completely sealed, silver alloy VRLA (Valve Regulated Lead Acid) requiring no maintenance with maximum run time.
- 5.5 Batteries shall be certified by the manufacturer to operate over a temperature range of – 40°C to +71°C.
- 5.6 The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.

- 5.7 Batteries shall indicate maximum recharge data and recharging cycles.
- 5.8 Battery interconnect wiring shall be via modular harness. Batteries shall be shipped with positive and negative terminals pre-wired with red and black cabling that terminates into a typical power-pole style connector. Harness shall be equipped with mating power-pole style connectors for batteries and a single, insulated plug-in style connection to inverter/charger unit. Harness shall allow batteries to be quickly and easily connected in any order and shall be keyed and wired to ensure proper polarity and circuit configuration.
- 5.9 Battery terminals shall be covered and insulated to prevent accidental shorting.

6.0 QUALITY ASSURANCE

- 6.1 BBS shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) Design quality assurance and (2) Production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved.
- 6.2 QA process and test results documentation shall be kept on file for a minimum period of seven years.
- 6.3 Battery Backup System designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

7.0 DESIGN QUALIFICATION TESTING

- 7.1 The manufacturer, or an independent testing lab hired by the manufacturer, shall perform design Qualification Testing on new BBS designs, and when a major design change has been implemented on an existing design. A major design change is defined as a design change (electrical or physical) which changes any of the performance characteristics of the system, or results in a different circuit configuration.
- 7.2 Burn In. The sample systems shall be energized for a minimum of 5 hours, with full load of 700 watts, at temperatures of +74°C and -37°C., excluding batteries, before performing any design qualification testing.
- 7.3 Any failure of the BBS, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.
- 7.4 For Operational Testing, all specifications may be measured including, but not limited to:
- 7.5 Run time while in battery backup mode, at full load.

- 7.6 Proper operation of all relay contact closures (“On-Batt”, “Low-Batt”, “Timer” and “BBS-Fail”).
- 7.7 Inverter output voltage, frequency, harmonic distortion, and efficiency, when in battery backup mode.
- 7.8 All utility mode – battery backup mode transfer voltage levels. See Section 1 Operation.
- 7.9 Power transfer time from loss of utility power to switchover to battery backed inverter power.
- 7.10 Backfeed voltage to utility when in battery backup mode.
- 7.11 IEEE/ANSI C.62.41 compliance.
- 7.12 Battery charging time.
- 7.13 Event counter and runtime meter accuracy.
- 8.0 PRODUCTION QUALITY CONTROL TESTING
 - 8.1 Production Quality Control tests shall consist of all of the above listed tests and shall be performed on each new system prior to shipment. Failure to meet requirements of any of these tests shall be cause for rejection. The manufacturer shall retain test results for seven years.
 - 8.2 Each BBS shall be given a minimum 100-hour burn-in period to catch any premature failures.
 - 8.3 Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.
- 9.0 WARRANTY
 - 9.1 Manufacturers shall provide a minimum two (2) year factory-repair warranty for parts and labor on the BBS from date of acceptance by the State. Batteries shall be warranted for full replacement for five (5) years from date of purchase. The warranty shall be included in the total bid price of the BBS.
 - 9.2 The Contractor shall furnish a warranty certificate for each Battery Backup System that includes the equipment description and details, serial numbers, effective dates, and the details of the warranty regarding materials and labor. The warranty period shall begin on the date of installation and the warranty certificate shall reflect this date.

Basis of Payment: The above work will be paid for at the contract unit price each for TRAFFIC SIGNAL BATTERY BACKUP SYSTEM shall be payment in full for all labor, materials, and equipment required to provide, install, and test the battery backup system described above, complete.

WIDE AREA VIDEO DETECTION SYSTEM COMPLETE

The following video detection systems are approved for use within District 4:

- Iteris VantageNext (4 Camera System)
- Econolite Autoscope Vision (4 Camera System)

The video vehicle detection system shall include all necessary electric cable, electrical junction boxes, electrical and communications surge suppression, brackets, hardware, software, programming, and all other items that are required for installation and configuration. These items should be taken into consideration and shall be included in the bid price for the video detection system.

All cameras shall be installed on traffic signal mast arms using five foot extension brackets.

All CAT 5 Ethernet cable shall meet the requirements contained in the special provisions (outdoor rated, gel-filled, shielded, etc.).

One 12" – 15" color LCD video monitor and 4-camera video selector (if required to switch camera videos) shall be included for each installation to allow for the setup and monitoring of the video detection system.

All vehicle video detection systems shall be equipped with the latest software or firmware revisions.

The video vehicle system shall be configured and installed to NEMA TS2 Standards (use of the SDLC port and BIU). Installation conforming to NEMA TS1 standards will not be allowed.

The Contractor shall remove all existing video detection cameras, camera brackets, and wiring.

The minimum requirements for a video vehicle detection system are listed below:

1.0 General

This Specification sets forth the minimum requirements for a system that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device.

1.1 System Hardware

The system shall consist of one video camera and an automatic control unit (ACU). The ACU shall process all detected calls and shall be equipped with the latest firmware revisions.

1.2 System Software

The system shall be able to detect either approaching or receding vehicles in multiple traffic lanes. A minimum of 24 detection zones shall be user-definable per camera. The user shall be

able to modify and delete previously defined detection zones. The software shall provide remote access operation and shall be the latest revision.

2.0 Functional Capabilities

2.1 Real-Time Detection

2.2 The ACU shall be capable of simultaneously processing information from up to four (4) digital video sources. The video shall be digitized and analyzed at a rate of 30 times per second.

2.3 The system shall be able to detect the presence of vehicles in a minimum of 96 detection zones within the combined field of view of the image sensors.

3.0 Vehicle Detection

3.1 Detection Zone Placement

The video detection system shall provide flexible detection zone placement anywhere and at any orientation within the combined field of view of the image sensors. In addition, detection zones shall have the capability of implementing logical functions including AND OR.

3.2 Optimal Detection

The video detection system shall reliably detect vehicle presence when the image sensor is mounted 10m (30 ft.) or higher above the roadway, when the image sensor is adjacent to the desired coverage area, and when the length of the detection area or field of view (FOV) is not greater than ten (10) times the mounting height of the image sensor. The image sensor shall not be required to be mounted directly over the roadway. A single image sensor, placed at the proper mounting height with the proper lens, shall be able to monitor six (6) to eight (8) traffic lanes simultaneously.

3.3 Detection Performance

Overall performance of the video detection system shall be comparable to inductive loops. Using standard image sensor optics and in the absence of occlusion, the system shall be able to detect vehicle presence with 98% accuracy under normal conditions, (days & night) and 96% accuracy under adverse conditions (fog, rain, snow). The ACU shall output a constant call for each enabled detector output channel if a loss of video signal occurs in any camera.

The ACU shall be capable of processing a minimum of twenty detector zones placed anywhere in the field of view of the camera.

4.0 ACU Hardware

4.1 ACU Mounting

The ACU shall be shelf or rack mountable. Nominal outside dimensions excluding connectors shall not exceed 180mm (7.25") x 475mm (19") x 260mm (10.5") (H x W x D).

4.2 ACU Environmental

The ACU shall be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. It shall meet the environmental requirements set forth by the NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170 and Type 179 controllers. The minimum operating temperature range shall be from -35 to +74 degrees C at 0% to 95% relative humidity, non-condensing.

5.0 ACU Electrical

- 5.1 The ACU shall be modular in design and provide processing capability equivalent to the Intel Pentium microprocessor. The bus connections used to interconnect the modules of the ACU shall be gold-plated DIN connectors.
- 5.2 The ACU shall be powered by 89 - 135 VAC, 60 Hz, single phase, and draw 0.25 amps, or by 190 - 270 VAC, 50 Hz, single phase and draw 0.12 amps. If a rack mountable ACU is supplied, it shall be capable of operating from 10 to 28 VDC. The power supply shall automatically adapt to the input power level. Surge ratings shall be as set forth in the NEMA TS1 and TS2 specifications.
- 5.3 Serial communications to a remote computer equipped with remote monitoring software shall be through a RJ-45 Ethernet port.
- 5.4 The ACU shall be equipped with a NEMA TS2 RS-485 SDLC interface for communicating input and output information. Front panel LEDs shall provide status information when communications are open.
- 5.5 The ACU and/or camera hookup panel shall be equipped with four RJ-45 connector based/terminal block connections for cameras so that signals from four image sensors can be processed in real-time.
- 5.6 The ACU shall be equipped with USB ports, and Ethernet ports to provide communications to a computer running the configuration and remote access software.
- 5.7 The ACU and/or camera hookup panels used for a rack mountable ACU shall be equipped with a video output port.
- 5.8 The ACU shall be equipped with viewable front panel detection LED indications.

6.0 Camera

- 6.1 The video detection system shall use a high resolution, color, camera as the video source for real-time vehicle detection. As a minimum, each image sensor shall provide the following capabilities:
 - a. H.264 video compression and transport

- b. Support video streaming that is viewable with an adjustable frame rates of 5/15/30 fps
 - c. Images shall be produced with a CCD sensing element with horizontal resolution of at least 720 lines and vertical resolution of at least 480 lines.
 - d. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as low as 0.1 lux at night.
 - e. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as high as 10,000 lux during the day.
 - f. Automatic gain, automatic iris, and absolute black reference controls shall be furnished.
 - g. An optical filter and appropriate electronic circuitry shall be included in the image sensor to suppress "blooming" effects at night.
- 6.2 The image sensor shall be equipped with an integrated zoom lens with zoom and focus capabilities that can be changed using either configuration computer software or hand-held controller. The machine vision processor (MVP) may be enclosed within the camera.
- 6.3 The image sensor and lens assembly shall be housed in an environmental enclosure that provides the following capabilities:
- a. The enclosure shall be waterproof and dust-tight to NEMA-4 specifications. The camera shall be IP-67 rated.
 - b. The enclosure shall allow the image sensor to operate satisfactorily over an ambient temperature range from -34C to +74C while exposed to precipitation as well as direct sunlight.
 - c. The enclosure shall allow the image sensor horizon to be rotated in the field during installation.
 - d. A heater shall be at the front of the enclosure to prevent the formation of ice and condensation in cold weather, as well as to assure proper operation of the lens' iris mechanism. The heater shall not interfere with the operation of the image sensor electronics, and it shall not cause interference with the video signal.
 - f. The enclosure shall be light-colored and shall include a sun shield to minimize solar heating. The front edge of the sunshield shall protrude beyond the front edge of the environmental enclosure and shall include provision to divert water flow to the sides of the sunshield. The amount of overhang of the sun shield shall be adjustable to prevent direct sunlight from entering the lens or hitting the faceplate.

- g. The total weight of the image sensor in the environmental enclosure with sunshield shall be less than 2.7 kg (6 pounds).
 - h. When operating in the environmental enclosure with power and video signal cables connected, the image sensor shall meet FCC class B requirements for electromagnetic interference emissions.
- 6.3 The video output of the image sensor shall be isolated from earth ground. All video connections from the image sensor to the video interface panel shall also be isolated from earth ground.
- 6.4 The video output, communication, and power to the image sensor shall include transient protection to prevent damage to the sensor due to transient voltages occurring on the cable leading from the image sensor to other field locations.
- 6.5 A stainless steel junction box shall be available as an option with each image sensor for installation on the structure used for image sensor mounting. The junction box shall contain a terminal block for terminating power to the image sensor and connection points for cables from the image sensor and from the ACU.
- 7.0 Software
- 7.1 The system shall include the remote access software that is used to setup and configure the video detection system. The software shall be of the latest revision.
- 7.2 All necessary cable, adapters, and other equipment shall be included with the system.
- 8.0 Installation and Training
- 8.1 The supplier of the video detection system shall supervise the installation and testing of the video and video vehicle detection equipment. A factory certified representative from the supplier shall be on-site during installation.
- 9.0 Warranty, Maintenance, and Support
- 9.1 The video detection system shall be warranted by its supplier for a minimum of three (3) years from date of turn-on. This warranty shall cover all material defects and shall also provide all parts and labor as well as unlimited technical support.
- 9.2 Ongoing software support by the supplier shall include updates of the ACU and supervisor software. These updates shall be provided free of charge during the warranty period.
- 9.3 The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to the contracting agency in the form of a separate agreement for continuing support.

Basis of Payment:

This work will not be paid for separately, but shall be included in the contract unit price each for WIDE AREA VIDEO DETECTION SYSTEM COMPLETE which price shall be payment in full for all labor, equipment, and materials required to furnish, install, and test the video vehicle detection system described above, complete.

CAT 5 ETHERNET CABLE

This work shall be in accordance with Sections 873, 1076, and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing an outdoor rated CAT5E cable in conduits, handholes, and poles.

The cable shall be rated for outdoor use and conform to the following specifications:

Outdoor CMX Rated Jacket (climate/oil resistant jacket)

- UV Resistant Outer Jacket Material (PVC-UV, UV Stabilized)
- Outer Jacket Ripcord
- Designed for Outdoor Above – Ground or Conduit Duct applications
- Cat5E rated to 350MHz (great for 10/100 or even 1000mbps Gigabit Ethernet)
- Meets TIA/EIA 568b.2 Standard
- Shielded Twist Pair
- Flooded with Water Blocking Gel
- 4 Pairs, 8 Conductors
- 24AWG, Solid Core Copper
- UL 444 ANSI TIA/EIA-568.2 ISO/IEC 11801
- RoHS Compliant

Basis of Payment: This work will be paid for at the contract unit price per Foot for CAT 5 ETHERNET CABLE and shall be payment in full for all labor, equipment, and materials required to provide, install, terminate, splice, and test the CAT 5E cable described above, complete.

CLOSED-CIRCUIT TELEVISION DOME CAMERA, HD

Description. This work shall consist of furnishing and installing an integrated Closed-Circuit Television (CCTV) Dome Camera Assembly, camera bracket, and all other items required for installation and operation. This assembly shall contain all components identified in the Materials Section and shall be configured as indicated on the plan sheets.

Materials.

The CCTV camera shall be an Axis Model Q6075-E Dome Camera Assembly for integration into the existing District 4 ITS system.

The Contractor shall provide all materials required to install the proposed camera on the proposed sign structure camera mast as shown on the plan sheets.

The Contractor shall submit catalog cut sheets to the Department for all items (mounting brackets, hardware, etc.) that will be utilized for review prior to commencing work.

The Department will program the cameras prior to installation.

The camera shall meet or exceed the following specifications:

CAMERA

| | |
|-----------------------|---|
| VIDEO: | 60 Hz (NTSC), 50 Hz (PAL) |
| IMAGE SENSOR: | 1/2.8" progressive scan CMOS |
| LENS: | 4.44–142.6 mm, F1.6–4.41 Horizontal angle of view: 62.8°–2.23° Vertical angle of view: 36.8°–1.3° Autofocus, auto-iris |
| DAY AND NIGHT: | Automatically removable infrared-cut filter |
| MINIMUM ILLUMINATION: | Color: 0.3 lux at 30 IRE F1.6 B/W: 0.03 lux at 30 IRE F1.6 Color: 0.5 lux at 50 IRE F1.6 B/W: 0.04 lux at 50 IRE F1.6 |
| SHUTTER TIME: NTSC: | 1/33000 s to 1/3 s with 50 Hz 1/33000 s to 1/4 s with 60 Hz |
| PAN/TILT/ZOOM: | Pan: 360° endless, 0.05° - 450°/s Tilt: 220°, 0.05°-450°/s 32x optical zoom and 12x digital zoom, total 384x zoom E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0°, Adjustable zoom speed |

VIDEO

| | |
|---------------------|--|
| VIDEO COMPRESSION: | H.264 (MPEG-4 Part 10/AVC), Motion JPEG |
| RESOLUTIONS: | HDTV 1080p 1920x1080 to 320x180 HDTV 720p 1280x720 to 320x180 |
| FRAME RATE (H.264): | Up to 60/50 fps (60/50 Hz) in HDTV 720p Up to 30/25 fps (60/50 Hz) in HDTV 1080p |
| VIDEO STREAMING: | Multiple, individually configurable streams in H.264 and Motion JPEG, Axis' Zipstream technology, Controllable frame rate and bandwidth, VBR/MBR H.264 |

IMAGE SETTING: Manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, fine tuning of behavior at low light, rotation: 0°, 180°, text and image overlay, 32 individual 3D privacy masks, image freeze on PTZ, automatic defog, backlight compensation
Wide Dynamic Range (WDR): Up to 120 dB depending on scene, highlight compensation

NETWORK

SECURITY: Password protection, IP address filtering, HTTPSa encryption, IEEE 802.1Xa network access control, Digest authentication, User access log, Centralized Certificate Management

PROTOCOLS: IPv4/v6, HTTP, HTTPSa, SSL/TLSa, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCIP

SYSTEM INTEGRATION

APPLICATION PROGRAM INTERFACE: Open API for software integration, including VAPIX® and AXIS Camera Application Platform; specifications at www.axis.com, AXIS Video Hosting System (AVHS) with One-Click Connection, ONVIF Profile S, specification at www.onvif.org

ANALYTICS: Video motion detection, Autotracking, Active Gatekeeper
Basic Analytics (not to be compared with third-party analytics): Object removed, Enter/Exit detector, Fence detector, Object Counter, Highlight compensation, Support for AXIS Camera Application Platform enabling installation of third-party applications, see www.axis.com/acap

EVENT TRIGGERS: Detectors: Live stream accessed, Video motion detection, Shock Detection, Object removed, Enter/Exit detector, Fence detector, Object counter; Hardware: Fan, Network, Temperature, Casing Open; PTZ: Autotracking, Error, Moving, Ready, Preset Reached; Storage: Disruption, Recording; System: System Ready; Time: Recurrence, Use Schedule; Input signal: Manual trigger, Virtual input

EVENT ACTIONS: Day/night mode, overlay text, video recording to edge storage, pre- and post-alarm video buffering, send SNMP trap
PTZ: PTZ preset, start/stop guard tour
File upload via FTP, SFTP, HTTP, HTTPS network share and Email; Notification via email, HTTP, HTTPS and TCP

DATA STREAMING Event data

BUILT IN INSTALLATION Pixel Counter
AIDS

GENERAL

CASING: IP66-, NEMA 4X- and IK10-rated
Metal casing (aluminum), polycarbonate (PC) clear dome,
sunshield (PC/ASA)

SUSTAINABILITY: PVC Ffree

MEMORY: 512 MB RAM, 128 MB Flash

POWER CAMERA: Axis High PoE midspan 1–port: 100–240 V AC, max 74 W
Camera consumption: typical 16 W, max 60 W

CONNECTORS: RJ45 10BASE-T/100BASE-TX PoE, RJ45 Push-pull Connector
(IP66) included

EDGE STORAGE: Support for SD/SDHC/SDXC card
Support for recording to dedicated network-attached storage
(NAS); For SD card and NAS recommendations see
www.axis.com

OPERATING With 30 W midspan: -20 °C to 50 °C (-4 °F to 122 °F)

CONDITIONS: With 60 W midspan: -50 °C to 50 °C (-58 °F to 122 °F)
Maximum temperature (intermittent): 60 °C (140 °F)
Arctic Temperature Control: Start-up as low as -40 °C (-40 °F)
Humidity 10–100% RH (condensing)

APPROVALS: EMC: EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN
61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B
Class A, ICES-003 Class A, VCCI Class A, RCM AS/NZS CISPR
22 Class A, KCC KN32 Class A, KN35

 Safety: IEC/EN/UL 60950-1, IEC/EN/UL 60950-22

 Environment: EN 50121-4, IEC 62236-4, IEC 60068-2-1, IEC
60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27,
IEC 60721-4-3, NEMA 250 Type 4X, IEC 60068-2-30,
IEC 60068-2-60, IEC 60068-2-78, IEC/EN 60529 IP66,
NEMA TS-2-2003 v02.06, Subsection 2.2.7, 2.2.8, 2.2.9;
IEC 62262 IK10, ISO 4892-2

 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC,
UL-AR

| | |
|-------------------|---|
| WEIGHT: | 3.7 kg (8.2 lb.) |
| INCLUDED | Axis High PoE 60 W midspan 1-port, RJ45 Push-pull Connector |
| ACCESSORIES: | (IP66), Sunshield, Installation Guide, Windows decoder 1-user license |
| VIDEO MANAGEMENT: | AXIS Camera Companion, AXIS Camera Station, Video |
| SOFTWARE: | management software from Axis' Application Development Partners available on www.axis.com/techsup/software |
| WARRANTY: | Axis 3-year warranty and AXIS Extended Warranty option |

Environmental Enclosure/Housing

The environmental enclosure shall be designed to physically protect the integrated camera from the outdoor environment and moisture via a sealed enclosure. If the option exists in the standard product line of the manufacturer, the assembly shall be supplied with an integral sun shield. The enclosure shall be fully water and weather resistant with a NEMA 4 rating or better.

The camera dome shall be constructed of distortion free acrylic or equivalent material that must not degrade from environmental conditions. The environmental housing shall include a camera-mounting bracket. In addition, the environmental housing shall include a heater, blower, and power surge protector. An integral fitting compatible with a standard 1-1/2 in (38.1 mm) NPT pipe, suitable for outdoor pendant mounting shall also be provided.

The enclosure shall be equipped with a heater controlled by a thermostat. The heater shall turn on when the temperature within the enclosure falls below 40° F (4.4°C). The heater shall turn off when the temperature exceeds 60°F (15.6°C). The heater will minimize internal fogging of the dome faceplate when the assembly is operated in cold weather.

In addition, a fan shall be provided as part of the enclosure. The fan will provide airflow to ensure effective heating and to minimize condensation.

The enclosure shall be equipped with a hermetically sealed, weatherproof connector, located near the top for external interface with power, video, and control feeds.

CCTV Dome Camera Mounting Supports

The Contractor shall furnish and install an Axis Pole Mount Bracket T91L61 (Part Number 5801-721) for camera installation on traffic signal mast arms and CCTV camera poles and stainless steel banding as required. The CAT5 cable shall be terminated inside the bracket by using the IEC punch down blocks.

Mounting supports shall be configured as shown on the camera support detail plans and as approved by the Engineer. Mount shall be of aluminum construction with enamel or polyester powder coat finish. Braces, supports, and hardware shall be stainless steel. Wind load rating

shall be designed for sustained gusts up to 90 mph (145 km/hr), with a 30% gust factor. Load rating shall be designed to support up to 75 lb (334 N). For roof or structural post/light pole mounting, mount shall have the ability to swivel inward for servicing. The mounting flange shall use standard 1-1/2 inch (38.1 mm) NPT pipe thread.

Connecting Cables

The Contractor shall furnish and install outdoor rated, shielded CAT 5E cable at the locations shown on the plan sheets. The cable shall be terminated using the terminal block inside the camera bracket and the IDC connector and pre-formed IP66 rated RJ-45 connector on the camera end and a shielded RJ-45 connector in the cabinet. The Contractor shall test the cable prior after termination.

Cable will be paid for separately as CAT 5 ETHERNET CABLE.

Construction Requirements.

General

The Contractor shall prepare a shop drawing detailing the complete CCTV Dome Camera Assembly and installation of all components to be supplied for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

The Contractor shall install the CCTV dome camera assembly at the locations indicated in the Plans. The CCTV Dome Camera Assembly shall be mounted on a pole, wall, or other structure.

Testing

The Contractor shall test each installed CCTV Dome Camera Assembly. The test shall be conducted from the field cabinet using the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets. The Contractor shall maintain a log of all testing and the results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Method of Measurement. The closed circuit television dome camera bid item will be measured for payment by the actual number of CCTV dome camera assemblies furnished, installed, tested, and accepted.

Basis of Payment. Payment will be made at the contract unit price for each CLOSED CIRCUIT TELEVISION DOME CAMERA, HD including all equipment, material, testing, documentation, and labor detailed in the contract documents for this bid item.

RELOCATE EXISTING PTZ CAMERA

This work shall be in accordance with the applicable Articles of Sections 895, 1073, and 1074 of the Standard Specifications with the following modifications:

This item shall consist of removing an existing CCTV camera from a mast arm strain pole and relocating it to a proposed mast arm.

The Contractor shall remove the existing CCTV camera and camera bracket and install it on the strain pole of a proposed mast arm at the locations shown in the plans.

The Contractor shall install new CAT 5E cabling from the existing controller cabinet to the proposed camera location. The CAT 5E cable will be paid for separately under the pay item for CAT 5 ETHERNET CABLE.

The Department will test the camera after relocation to verify that it is functioning correctly.

Basis of Payment: This work will be paid for at the contract unit price per each for RELOCATE EXISTING PTZ CAMERA which price shall be payment in full for all labor, materials, and equipment required to relocate the existing CCTV camera as described above.

FIBER OPTIC CABLE 24 FIBERS, SINGLE MODE

This work shall be in accordance with Sections 801, 864, 871, and 1076 of the Standard Specifications except as modified herein.

Each cable shall be clearly labeled in each cabinet utilizing a durable computer generated label. The label shall contain information in regard to the location where the cable is going to or coming from, buffer tube, and fiber color. The Contractor shall provide numerical foot marking data at each handhole, vault, and cabinet to the Department.

The contractor shall terminate 12 fibers from each cable end with ST connectors.

Unused buffer tubes shall remain continuous and shall be readily accessible for future use. Each buffer tube shall be neatly coiled inside each traffic signal cabinet with a minimum length of eight feet.

Fibers not being used shall be labeled "spare", and fibers not attached to a distribution enclosure shall be capped and sealed.

All ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, weather-proof splice kits, boots, cable trays, splice enclosures, termination panels, etc., shall be supplied under this pay item and will not be paid for separately. These items shall be submitted to the Department for approval.

The fiber optic cable shall be clearly marked in each handhole, communication vault, and cabinet with a brightly colored (orange or yellow) weather resistant label securely attached to the cable.

The Contractor shall provide and install an orange 12 Ga., stranded (EPR-TYPE RHW or THHN), insulated tracer cable in all conduits that contain fiber optic cable and do not contain an existing tracer wire. This work shall be done at the same time the fiber optic cable is pulled. There will be no additional compensation for this work.

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall conform to the requirements of RUS 7 CFR1755.900 (PE-90) for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture. The number of fibers in each cable shall be as specified on the plans.

Construction Requirements:

Experience Requirements.

Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

A minimum of three (3) years' experience in the installation of fiber optic cables, including splicing, terminating and testing single mode fibers.

Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.

One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Department representatives and the Engineer.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for and equipment being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures for approval by the Engineer.

Installation in Conduit.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. Fuse links and breaks can be used to ensure that the cable tensile strength is not exceeded. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer upon request.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" or "Chinese-finger type" attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

Splicing Requirements:

Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. The Contractor shall submit a splicing plan to the Department for approval.

Operation and Maintenance Documentation:

After the fiber optic cable plant has been installed, two (2) complete sets of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- Final copies of all approved test procedures.
- Complete performance data of the cable plant showing the losses at each terminal connector.
- Complete parts list including names of vendors.
- Electronic Testing Files (OTDR traces, power meter data, etc.)

Testing Requirements:

Testing shall be in accordance with Article 801.13 except where modified by this special provision.

The Contractor shall submit detailed test procedures for approval by the Engineer. All continuous fiber runs shall be tested bi-directionally at both 1310 nm and 1550 nm with a power meter and optical source and OTDR. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 days before performing the test. Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers in each link for continuity and attenuation. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Source/Power Meter and OTDR shall conduct the testing. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

At the completion of the test, the Contractor shall provide two copies of documentation of the test results to the Engineer. The test documentation shall be bound and shall include the following:

Cable & Fiber Identification:

Cable ID
Cable Location - beginning and end point
Fiber ID, including tube and fiber color
Operator Name
Date & Time
Setup Parameters
Wavelength
Pulse width (OTDR)
Refractory index (OTDR)
Range (OTDR)
Scale (OTDR)
Setup Option chosen to pass OTDR "dead zone"

Test Results:

Optical Source/Power Meter:

Total Attenuation
Attenuation (dB/km)

These results shall be provided in tabular form. The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is

detected above 0.10 dB, the Contractor shall replace or repair the proposed fiber and/or fusion splice and connector including that event point.

The total dB loss of the cable, less events, shall not exceed the manufacturer's production specifications as follows: 0.5 dB/km at both 1310 and 1550 nm.

If the total loss exceeds these specifications, the Contractor shall replace or repair that cable run at the Contractor's expense, both labor and materials. Elevated attenuation due to exceeding the pulling tension during installation shall require the replacement of the cable run at the Contractor's expense, including labor and materials.

The Contractor shall label the destination of each trunk cable onto the cable in each handhole and termination panel.

Slack Storage of Fiber Optic Cables.

A part of this pay item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes and in the traffic controller cabinets.

The amount of slack cable listed in Article 873.03 shall be revised as follows:

| <u>Location</u> | <u>Length of Slack Cable (Ft.)</u> |
|------------------------|------------------------------------|
| Prop. Double Handhole | 100.0 |
| Ex. Double Handhole | 100.0 |
| Handhole | 30.0 |
| CCTV or Signal Cabinet | 10.0 |
| Junction Box | 10.0 |
| Equipment Cabinet | 3.0 |

Basis of Payment: This work will be paid for at the contract unit price per Foot for SINGLE MODE or FIBER OPTIC CABLE 24 FIBERS, SINGLE MODE and shall be payment in full for all labor, equipment, and materials required to provide, install, terminate, splice, and test the fiber optic cable described above, complete.

FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH

The Contractor shall furnish a fiber optic drop and repeat switch complete with the accessories specified below and install it inside the proposed and relocated traffic signal cabinets.

The fiber optic drop and repeat switch shall meet or exceed the following minimum specifications:

Approved Models: Antaira (Aaxeon) Technologies Model LNX-0702C-SFP-T (7-Port (5-port 10/100T + 2 10/100/1000T SFP ports industrial Ethernet switch, wide operating temperature).

| | |
|----------------------|--|
| Features: | <ul style="list-style-type: none"> • 5-Port 10/100TX + 2-Port 10/100/1000T/Mini-GBIC Combo • Store-and-Forward Switching Architecture • 10Gbps Back-Plane (Switching Fabric) • 1 Mbits Memory Buffer • 8K MAC Address Table • Wide-Range Redundant Power Design • Power Polarity Reserve Protect • Provides EFT Protection 3000 VDC for Power Line • Supports 6000 VDC Ethernet ESD Protection • IP30 Rugged Aluminum Case Design • 5-Year Warranty |
| Standard: | <ul style="list-style-type: none"> • IEEE 802.3 10BaseT Ethernet • IEEE 802.3u 100BaseTX Fast Ethernet • IEEE 802.z Gigabit Fiber • IEEE 802.3x Flow Control and Back-Pressure |
| Protocol: | <ul style="list-style-type: none"> • CSMA/CD |
| Switch Architecture: | <ul style="list-style-type: none"> • Back-Plane (Switching Fabric): 10Gbps |
| Transfer Rate: | <ul style="list-style-type: none"> • 14,880pps for Ethernet Port • 148,800pps for Fast Ethernet Port • 1,488,000pps for Gigabit Fiber Ethernet Port |
| MAC Address: | <ul style="list-style-type: none"> • 8K MAC Address Table |
| Memory Buffer: | <ul style="list-style-type: none"> • 7,926 pps (default) |
| LED: | <ul style="list-style-type: none"> • Unit: Power 1, Power 2, Fault • 10/100 TX: Link/Activity, Full Duplex/Collision • Gigabit Copper: Link/Activity, Speed • SFP: Link/Activity |
| Connector: | <ul style="list-style-type: none"> • 10/100T: 5 x RJ-45 • 100/1000T: 2 x 100/1000 SFP Sockets |
| Network Cable: | <ul style="list-style-type: none"> • 10BaseT: 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-568 100-ohm (100m) • 100BaseTX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) |

| | |
|------------------------------|---|
| Power Supply: | <ul style="list-style-type: none"> DC 12 ~ 48V, Redundant Power with Polarity Reverse Protect Function and Removable Terminal Block |
| Power Consumption: | <ul style="list-style-type: none"> 6 Watts |
| Reverse Polarity Protection: | <ul style="list-style-type: none"> Present |
| Overload Current Protection: | <ul style="list-style-type: none"> Present |
| Mechanical: | <ul style="list-style-type: none"> Casing: IP30 Metal Case Dimension (W x H x D): 30 x 99 x 142 mm Installation: DIN-Rail/Wall Mountable |
| Weight: | <ul style="list-style-type: none"> Unit Weight: 1.3 lbs. Shipping Weight: 1.7 lbs. |
| Operation Temperature: | <ul style="list-style-type: none"> Wide Operating Temperature: -40° C to 75° C (-40° F to 176° F) |
| Operation Humidity: | <ul style="list-style-type: none"> 5% to 95% (Non-condensing) |
| Storage Temperature: | <ul style="list-style-type: none"> -40° C to 85° C |
| EMI: | <ul style="list-style-type: none"> FCC Class A CE EN6100-4-2/EN6100-4-3/EN6100-4-4/EN6100-4-5/EN6100-4-6 /EN6100-4-8/EN6100-4-11/EN6100-4-12/EN6100-6-2/EN6100-6-4 |
| Stability Testing: | <ul style="list-style-type: none"> Shock: IEC60068-2-27 Free Fall: IEC60068-2-32 Vibration: IEC60068-2-6 |
| Warranty: | <ul style="list-style-type: none"> 5-Year Warranty |

The following items shall also be included with each switch:

- SFP Fiber Optic Module – Qty. 2 (Aaxeon SFP-S20-T, 1.25Gbps Ethernet SFP Transceiver, Single Mode 10KM / LC / 1310nm, -40°C~85°C)
- Fiber Optic Patch Cable – Qty. 2 (single mode fiber, 1 meter length, duplex, LC/ST connectors)

Basis of Payment: This work will be paid for at the contract unit price per EACH for FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH.

FUSION SPLICING OF FIBER OPTIC CABLES

Description. The Contractor will splice optical fibers from different cable sheaths and protect them with a splice closure at the locations shown on the Plans. Fiber splicing consists of in-line fusion splices for all fibers described in the cable plan at the particular location.

Two types of splices are identified. A mainline splice includes selected fibers from each cable run as shown in the plan sheets. In a lateral splice, the buffer tubes in the mainline cable are dressed out and those fibers identified on the plans are accessed in and spliced to lateral cables.

Materials.

Splice Closures:

Splice closures shall be designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successfully passing the factory test procedures and minimum specifications listed below:

Physical Requirements:

The closures shall provide ingress for up to four cables in a butt configuration.

The closure shall prevent the intrusion of water without the use of encapsulates.

The closure shall be capable of accommodating splice organizer trays that accept mechanical, or fusion splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies, and space for excess or un-spliced fiber. Splice organizers shall be re-enterable. The splice case shall be UL rated.

Closure re-entry and subsequent reassembly shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.

The splice closure shall have provisions for controlling the bend radius of individual fibers to a minimum of 1.5 in. (38 mm).

Factory Testing of Splice Closures:

Compression Test: The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at a temperature of 0°F and 100°F (-18°C and 38°C). The test shall be performed after stabilizing at the required temperature for a minimum of two hours. It shall consist of placing an assembled closure between two flat parallel surfaces, with the longest closure dimension parallel to the surfaces. The weight shall be placed on the upper surface for a minimum of 15 minutes. The measurement shall then be taken with weight in place.

Impact Test: The assembled closure shall be capable of withstanding an impact of 28 N-M at temperatures of 0°F and 100°F (-18°C and 38°C). The test shall be performed after stabilizing the closure at the required temperature for a minimum of 2 hours. The test fixture shall consist

of 20 lb (9 kg) cylindrical steel impacting head with a 2 in (5 cm) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in (30 cm). The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

Cable Gripping and Sealing Testing: The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber @ 1550 nm when attached to the cables and the closure assembly. The test shall consist of measurements from six fibers, one from each buffer tube or channel, or randomly selected in the case of a single fiber bundle. The measurements shall be taken from the test fibers before and after assembly to determine the effects of the cable gripping and sealing hardware on the optical transmission of the fibers.

Vibration Test: The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition I. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

Water Immersion Test: The closure shall be capable of preventing a 10 ft (3 m) water head from intruding into the splice compartment for a period of 7 days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent to 10 ft (3 m) on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

Certification: It is the responsibility of the Contractor to insure that either the manufacturer, or an independent testing laboratory has performed all of the above tests, and the appropriate documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

Construction Requirements.

The closure shall be installed according to the manufacturer's recommended guidelines. For all splices, the cables shall be fusion spliced.

The Contractor shall prepare the cables and fibers in accordance with the closure and cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB.

The Contractor shall measure the end-to-end attenuation of each fiber optic link, from connector to connector, using an optical power meter and source. This loss shall be measured from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 1300 and 1550 nm for single mode cable. For multimode cable, power meter measurements shall be made at 850 and 1300 nm. The end-to-end attenuation shall not exceed 3.8 dB/installed kilometers at 850nm or 1.8 dB per installed kilometer at 1300nm for multimode fibers.

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the required objectives.

The Contractor shall secure the Splice Closure to the side of the splice facility using cable support brackets. All cables shall be properly dressed and secured to rails or racks within the handhole or traffic signal cabinet. No cables or enclosures will be permitted to lie on the floor of the splice facility. Cables that are spliced inside a building will be secured to the equipment racks or walls as appropriate and indicated on the Plans.

Basis of Payment. This work will not be paid for separately, but shall be included in the bid price for the fiber optic cable pay items.

TERMINATION OF FIBER OPTIC CABLES WITH FUSION SPLICED ST CONNECTORS

Description. The Contractor shall terminate a single mode fiber by fusion splicing a factory-formed ST connector (from a pre-formed fiber optic pigtail) onto a field fiber at the locations shown on the Plans.

Materials. The Contractor shall be responsible for ensuring that the pre-formed pigtail fiber is compatible with the field fiber that it will be fusion splice to.

The splice shall be protected with a protection sleeve/enclosure that will secure both cables and prevent cable movement.

The fiber optic patch cords shall meet or exceed the following specifications:

- High-quality 125um fiber optics
- 900um tight buffer construction
- Aramid yarn individually protected
- Duplex construction
- Stress relief boots color coded (Tx/Rx)
- ST connectors with high-grade zirconia ferrule
- Insertion Loss < 0.2 dB @ 1310 / 1550 nm
- Return Loss < -58 dB @ 1310 / 1550 nm

- Compliant with ANSI/TIA/EIA 568-B.3
- TIA/EIA-604, FOCIS-2

The Contractor shall submit a shop drawing of all proposed components to the Engineer for approval prior to commencing construction.

Construction Requirements.

The Contractor shall prepare the cables and fibers in accordance with the cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each connector using an Optical Time Domain Reflectometer. This loss shall not exceed the loss of the fusion splice (0.1 dB) plus the loss of the connector (typically 0.75 dB).

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice and/or connector not satisfying the required objectives.

Basis of Payment: This work will not be paid for separately, but shall be included in the bid price for the fiber optic cable pay items.

CAT 6 ETHERNET CABLE

This work shall be in accordance with Sections 873, 1076, and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing an outdoor rated CAT6E cable in conduits, handholes, and poles.

The cable shall meet the requirements for use in the installation of the wireless ethernet radios.

Approved Cable: Belden 7953A.

The cable shall be rated for outdoor use and conform to the following specifications:

- 600V Rated
- Outdoor CMX Rated Jacket (climate/oil resistant jacket)
- UV Resistant Outer Jacket Material (PVC-UV, UV Stabilized)
- Outer Jacket Ripcord
- Designed for Outdoor Above- Ground or Conduit Duct applications
- Meets TIA/EIA 568b.2 Standard

- Shielded Twist Pair
- 4 Pairs, 8 Conductors
- 23AWG, Solid Core Copper
- UL 444 ANSI TIA/EIA-568.2 ISO/IEC 11801
- RoHS Compliant
- Water Blocking Gel

Basis of Payment: This work will be paid for at the contract unit price per Foot for CAT 6 ETHERNET CABLE, which shall be payment in full for all labor, equipment, and materials required to provide and install the cable described above, complete.

WIRELESS ETHERNET RADIO

The Contractor shall furnish a wireless ethernet radio system and install it on an existing traffic signal mast arm or mast arm strain pole at the locations shown in the plans.

The Contractor shall furnish and install the wireless radio, surge arrestors, mounting brackets, hardware, and all other items required for installation.

CAT6 Ethernet cable will be paid for separately under the pay item for CAT 6 ETHERNET CABLE.

The Contractor shall install the radios in accordance with the manufacturer's recommendations and aim the radio antennas to ensure optimal signal strength and connectivity.

The wireless ethernet radio shall be an Ubiquiti Networks airFiber 60 LR 60 GHz radio to meet the following minimum specifications:

Features:

- 60 GHz radio
- Low-interference 60 Ghz spectrum
- Long range, up to 12 km
- Up to 1.9 Gbps with low latency
- Integrated GPS
- Full and half bandwidth support

Mechanical:

- Dimensions: Ø413 x 360 mm (Ø16.3 x 14.2")
- Weight: Without mount: 1.5 kg (3.3 lb), With mount: 2.7 kg (6 lb)
- Enclosure materials: Aluminum, UV stabilized polycarbonate
- Mount material: Galvanized steel
- Mounting Precision Alignment Kit (included)
- Pole compatibility: Ø25.4-76.2 mm (Ø1-3")
- Wind loading: 420 N at 200 km/h (94.4 lbf at 125 mph)

Hardware:

- Processor: Quad-Core ARM® Cortex® A7
- Memory: 256 MB DDR3
- Networking interface: GbE RJ45 port
- RF connections: Internal
- Max. power consumption: 18W
- Power method: Passive PoE 4-pairs (1, 2+; 3, 6-) (4, 5+; 7, 8-) or 2-pairs (4, 5+; 7, 8-)
- Power supply: 48VDC, 0.65A gigabit PoE adapter (included)
- Supported voltage range: 48VDC \pm 10%
- ESD/EMP protection: Air/contact: \pm 24kV
- Operating temperature: -40 to 60° C (-40 to 140° F)
- Operating humidity: 5 to 95% noncondensing
- Certifications: FCC, IC, CE

LEDs:

- Power: Flashing white: bootup in progress; White: not connected to UISP™ console; Blue: connected to UISP console
- Ethernet: Flashing blue: ethernet activity
- GPS: Blue: receiving at least (4) GPS satellite signals
- 60G: Blue: active connection

Software:

- OS: airOS®
- Operating mode: PtP only
- Ubiquiti specific features: Integrated 60 GHz radio, discovery protocol, Wave technology

Network: Bridge mode

Services: UISP, ping watchdog, NTP client, device discovery

Tools: Antenna alignment, discovery utility, ping, trace route, speed test

Software management: Bluetooth management for easy setup over UISP app, WEB UI

Minimum software requirements: Any modern WEB browser/iOS or Android based smartphone

System:

- Maximum throughput: 1.95 Gbps
- Maximum range: 12+ km
- Encryption: WPA2-PSK (AES)
- RF

- Operating Frequency: 57~71 GHz (Depends on regulatory region)

GPS: Yes

Channel Bandwidth: 2160, 1080 MHz

Installation: The Contractor shall ensure that there is a clear line of sight between radios. The Contractor shall furnish and install outdoor, shielded Category 6 (or above) cabling and shielded RJ45 connectors. The Contractor shall furnish two Ethernet Surge Protectors (model ETH-SP-G2) and install one at each end of the cabling. The Contractor shall test all CAT6 cables after installation. The Department will program and configure the radios.

The Contractor shall install the stabilizer arms on the antennas and aim them towards the receiving antenna. The Contractor shall make adjustments to the antenna aiming to ensure optimal signal strength and radio link connectivity. The Contractor shall furnish all hardware and brackets required to install the radio antennas on the existing mast arm or strain pole.

Basis of Payment: This work will be paid for at the contract unit price per Each for WIRELESS ETHERNET RADIO which price shall be payment in full for all labor, materials, and equipment required to furnish the wireless ethernet radio and install it on an existing traffic signal mast arm or strain pole at the locations shown in the plans.

MODIFY EXISTING CONTROLLER

Description: This work shall consist of modifying the existing traffic signal controller at the intersection of Court Street and Valle Vista Boulevard.

A wireless ethernet radio, per the specification described in the WIRELESS ETHERNET RADIO specification, shall be installed at a height of 43' on the traffic signal post on the northwest corner of the intersection nearest the controller. \ nearest controller.

All costs associated with furnishing and installing the wireless ethernet radio in the existing controller at Court Street and Valle Vista Boulevard including but not limited to the radio, antenna, cable, conduit, mounting brackets, and testing shall be included in the cost of this pay item.

Basis of Payment: This work will be paid for at the contract unit price per each for MODIFY EXISTING CONTROLLER which price shall be payment in full for all labor, materials, and equipment required to modify the cabinet necessary for proper operation to the satisfaction of the Engineer.

EMERGENCY VEHICLE PRIORITY SYSTEM

Revise Section 887 of the Standard Specifications to read:

It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle pre-emption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency.

All new installations shall be equipped with Confirmation Beacons. The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, or a 7 watt Par 30 LED flood lamp with a 15 degree or greater spread, maximum 7 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets. In order to maintain uniformity between communities, the confirmation beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signaled by a flashing indication at the rate specified by Section 4L.01 of the "Manual on Uniform Traffic Control Devices," and other applicable sections of future editions. The stopped pre-empted movements shall be signaled by a continuous indication.

All light operated systems shall include security and transit preemption software and operate at a uniform rate of 14.035 Hz \pm 0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the EMERGENCY VEHICLE PRIORITY SYSTEM.

Basis of Payment. This work shall be paid for at the contract unit price per each for furnishing and installing EMERGENCY VEHICLE PRIORITY SYSTEM. Furnishing and installing the confirmation beacon will not be paid for separately but shall be included in the cost of the EMERGENCY VEHICLE PRIORITY SYSTEM.

FULL ACTUATED CONTROLLER IN EXISTING CABINET

This work shall consist of placing a traffic signal controller as specified in FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL in to the relocated traffic signal cabinet placed at the Court Street and Allentown Road intersection.

All costs associated with furnishing and installing the new controller relocated cabinet including but not limited to the brackets, hardware, electrical or grounding connections and testing shall be included in the cost of this pay item.

Basis of Payment: This work will be paid for at the contract unit price per each for FULL ACTUATED CONTROLLER IN EXISTING CABINET which price shall be payment in full for all labor, materials, and equipment required to the satisfaction of the Engineer.

All costs associated with removing and installing the existing controller cabinet including but not limited to the brackets, hardware, adapters, shall be included in the cost of this pay item.

Basis of Payment: This work will be paid for at the contract unit price per each for RELOCATE CONTROLLER CABINET which price shall be payment in full for all labor, materials, and equipment required to the satisfaction of the Engineer.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL

General.

1. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof. If Contract work is started prior to a traffic signal inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection.
2. The Contractor shall have electricians with IMSA Level II certification on staff to provide signal maintenance. A copy of the certification shall be immediately available upon request of the Engineer.
3. This item shall include maintenance of all traffic signal equipment and other connected and related equipment such as flashing beacons, emergency vehicle pre-emption equipment, master controllers, uninterruptable power supply (UPS and batteries), PTZ cameras, vehicle detection, handholes, lighted signs, telephone service installations, communication cables, conduits to adjacent intersections, and other traffic signal equipment.
4. Regional transit, County and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers, radios and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.
5. Maintenance shall not include Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, or peripheral equipment. This equipment is operated and maintained by the local municipality and should be de-activated while on contractor maintenance.
6. The energy charges for the operation of the traffic signal installation shall be paid for by the Contractor.

Maintenance.

1. The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. The Contractor shall check signal system communications

and phone lines to assure proper operation. This item includes, as routine maintenance, all portions of emergency vehicle pre-emption equipment. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs. Prior to the traffic signal maintenance transfer, the contractor shall supply a detailed maintenance schedule that includes dates, locations, names of electricians providing the required checks and inspections along with any other information requested by the Engineer.

2. The Contractor is advised that the existing and/or span wire traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shut down the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.
3. The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected or otherwise removed from normal operation, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs (R1-1-36) at each approach of the intersection as a temporary means of regulating traffic. When the signals operate in flash, the Contractor shall furnish and equip all their vehicles assigned to the maintenance of traffic signal installations with a sufficient number of stop signs as specified herein. The Contractor shall maintain a sufficient number of spare stop signs in stock at all times to replace stop signs which may be damaged or stolen.
4. The Contractor shall provide the Engineer with 2 (two) 24 hour telephone numbers for the maintenance of the traffic signal installation and for emergency calls by the Engineer.
5. Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of the Standard Specifications and these special provisions.
6. The Contractor shall respond to all emergency calls from the Department or others within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the contract. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation

in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work. The Contractor shall be responsible for all of the State's Electrical Maintenance Contractor's costs and liquidated damages of \$1000 per day per occurrence. The State's Electrical Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the Electrical Maintenance Contractor to make reviews of the Existing Traffic Signal Installation that has been transferred to the Contractor for Maintenance.

7. Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.
8. Equipment included in this item that is damaged or not operating properly from any cause shall be replaced with new equipment meeting current District One traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, all as approved by the Engineer. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.
9. Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause, shall be the responsibility of the municipality or the Automatic Traffic Enforcement Company per Permit agreement.
10. The Contractor shall be responsible to clear snow, ice, dirt, debris or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.
11. The Contractor shall maintain the traffic signal in normal operation during short or long term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be paid for separately but shall be included in the contract.

expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be paid for separately but shall be included in the contract.

12. Temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

Basis of Payment.

This work will be measured for payment at the contract unit price lump sum for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION, which includes all work necessary for the project intersections as shown in the plans.

WATER MAIN SPECIFICATIONS

Illinois American Water Specifications and Standard Details should be adhered to for all proposed water main work shown in the plans. A copy of those special provisions and standard details can be found in Appendix A of these specifications.

CONTROLLED LOW-STRENGTH MATERIAL

(ILAWC SECTION 02210- TRENCHING, BACKFILLING AND COMPACTING)

Description: This work shall consist of furnishing and placing controlled low-strength material (CLSM) as backfill for water main and other excavations as specified on the Drawings. All water main and water services within two feet laterally of existing or proposed pavement, driveway pavement, sidewalk or curb and gutter shall be backfilled with controlled low-strength material (CLSM) from one foot above the pipe as shown on the water main details.

Construction Requirements: Install the flowable fill in strict accordance with the requirements contained in ILAWC Specification Section 02210.

Measurement and Payment: This work will be measured and paid for at the contract unit price per cubic yard for CONTROLLED LOW-STRENGTH MATERIAL. This work shall include all labor, equipment and material; removal of surplus material and clean-up.

WATER MAIN 8"

(ILAWC SECTION 15120 – POLYVINYL CHLORIDE (PVC) PIPE)

Description: This work shall consist of constructing a water main. Closely coordinate construction work with the Owner through the Engineer. The Engineer, in consultation with the Owner, may select the time for connection to existing pipelines, including Saturdays, Sundays, or holidays, which, in the opinion of the Engineer, will cause the least inconvenience to the Owner and/or its customers. Make such connections at such times as may be directed by the Owner, at the Contract prices, with no claim for premium time or additional costs.

Submit shop drawings and manufacturer's literature for all Contractor supplied materials promptly to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15120.

Materials: Pressure class 200 PVC pipe shall conform to the latest edition of American Water Works Association (AWWA) Standard C900/C905 with elastomeric gasket couplings in accordance with this Standard. The use of solvent cement connections shall not be allowed unless approved by the Engineer. Pipe shall be furnished with cast iron pipe equivalent outside diameter and the Dimension Ratio shall be 18. The PVC compounds shall be treated or certified suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory (NSF Standard No. 61). Restrained Joint PVC pipe shall be supplied where called for on the Drawings or herein.

All fittings shall be restrained joint ductile iron mechanical joints per AWWA C153. Two restrained joints shall be on each side of every fitting.

Acceptable Suppliers are listed in the most current version of the Supplemental Technical Specifications.

Construction Requirements: The construction of water mains, including protection from sewers, pressure testing, and disinfection shall be constructed according to ILAWC Division 15000 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

The excavated areas shall be backfilled with controlled low-strength material.

Measurement and Payment: This work will be measured for payment at the contract unit price per foot for WATER MAIN, of the diameter specified. Water mains will be measured in lineal feet along the centerline of the pipe.

This work shall include all labor, equipment and materials necessary to construct the water mains including all excavation, except rock excavation; clearing and grubbing; locating existing water main; furnishing and installing transition fittings for dissimilar pipe materials; furnishing and installing pipe, restrained joints, restrained joint pipe; polyethylene wrap; watertight plugs; No. 12 THWN single strand tracer wire, location tape, bedding and backfill (except controlled low-strength material which will be paid for separately as specified herein); thrust blocks; testing; temporary blow-off and outlets assembly with tee or tap to main; water quality sampling device; chlorination and sampling taps; disinfection; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to water main and fittings installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

DUCTILE IRON WATER MAIN FITTINGS, 8" X 8" CROSS
DUCTILE IRON WATER MAIN FITTINGS 8" 11.25 DEGREE BEND
DUCTILE IRON WATER MAIN FITTINGS 8" 45.00 DEGREE BEND
(ILAWC SECTION 15105 – DUCTILE IRON PIPE & FITTINGS)

Description: This work shall consist of constructing ancillary appurtenances to the water main. Closely coordinate construction work with the Utility Owner through the Engineer.

Submit shop drawings and manufacturer's literature for all Contractor supplied materials promptly to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15105.

Construction Requirements: The construction of water main fittings, reducers, bends tees and crosses, including protection from sewers, pressure testing, and disinfection shall be constructed according to ILAWC Division 15000 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

The excavated areas shall be backfilled with controlled low-strength material.

Measurement and Payment: Ductile Iron Water Main Cross will be measured for payment at the contract unit price per each for DUCTILE IRON WATER MAIN FITTINGS, CROSS, of the size specified.

Ductile Iron Water Main Fittings will be measured for payment at the contract unit price per each for DUCTILE IRON WATER MAIN FITTINGS, of the size and type specified.

This work shall include all labor, equipment and materials necessary to construct the water mains including all excavation, except rock excavation; clearing and grubbing; furnishing and installing transition fittings for dissimilar pipe materials; fittings, reducers, tees, crosses, bends and elbows; polyethylene wrap; watertight plugs; No. 12 THWN single strand tracer wire, location tape, bedding and backfill (except controlled low-strength material which will be paid for separately as specified herein); thrust blocks; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to fittings, reducers, tees, and crosses installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

GATE VALVE AND BOX 8"

(ILAWC SECTION 15150 – GATE VALVES)

Description: All valves shall be designed for a minimum differential pressure of 250 psi and a minimum internal test pressure of 500 psi unless otherwise noted on the plans. Valves shall be designed to operate in the vertical position.

Submit shop drawings and manufacturer's literature to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15150.

Materials: Ductile iron valves shall be used unless prior approval is obtained from the Engineer. All valve materials shall meet the requirements of NSF 61.

Valve box shall be installed per ILAWC Specification Section 15130.

Construction Requirements: Provide all materials necessary for the gate valves in strict accordance with the requirements of ILAWC Specification Section 15150 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

Measurement and Payment: This work will be measured for payment at the contract unit price each for GATE VALVE AND BOX, of the SIZE specified. This work shall include all labor, equipment and material including excavation and disposing of existing materials; valve boxes, location tape, tracer wire, bedding, earth backfill, testing, disinfection; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary work related to valve installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

TAPPING VALVES AND SLEEVES 8"

TAPPING VALVES AND SLEEVES 16"

(ILAWC SECTION 15170 – TAPPING SLEEVES, SADDLES & VALVES)

Description: All tapping sleeves, saddles and valves shall be designed for a working pressure of at least 250 psig for 12-inch and smaller. The valves shall be designed for a minimum differential pressure of 250 psi and a minimum internal test pressure of 500 psi unless otherwise noted on the plans.

Submit shop drawings and manufacturer's literature to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15170.

Materials: Ductile iron tapping sleeves and valves shall be used unless prior approval is obtained from the Engineer.

Construction Requirements: Provide all materials necessary for the tapping sleeves, saddles, and valves in strict accordance with the requirements of ILAWC Specification Section 15170 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition). All work related to connecting to existing mains shall be completed coordinated with the Owner through the Engineer. The Owner shall complete all connections to existing mains.

Measurement and Payment: This work will be measured for payment at the contract unit price each for TAPPING VALVES AND SLEEVES of the diameter specified. This work shall include all labor, equipment and material including excavation and disposing of existing materials; thrust restraint, valve boxes, location tape, tracer wire, bedding, earth backfill, testing, disinfection; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to tapping sleeve and valve installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

WATER MAIN CASING PIPE

(ILAWC SECTION 02225 – CASING INSTALLATION (PVC))

Description: This work shall consist of installing a PVC pipe for a casing around the water main in locations shown on the plans. The casing diameter shall be sufficient for the carrier pipe shown on the plans.

Submit shop drawings and manufacturer's literature to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 02225.

Construction Requirements: The construction of the PVC casing pipe shall be constructed according to ILAWC Specification Sections 02225 and 15000 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

The excavated areas shall be backfilled with controlled low-strength material.

Measurement and Payment: This work will be measured for payment at the contract unit price foot for WATER MAIN CASING PIPE of the diameter specified on the plans. Casing pipe will be measured in lineal feet along the centerline of the pipe.

This work shall include all labor, equipment and material necessary to construct the Water Main Casing Pipe including excavation, except rock excavation, and disposing of existing materials; clearing and grubbing; locating existing utilities; furnishing and installing PVC casing pipe, end seals, spacers, bedding, backfill; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to PVC Casing.

The placement of controlled low-strength material will be paid for separately as specified herein.

FIRE HYDRANTS

(ILAWC SECTION 15180 - FIRE HYDRANTS)

Description: This work shall consist of installing new fire hydrants and ancillary appurtenances at the location shown on the plans, or where designated by the Engineer. All fire hydrants shall be ductile iron and conform to the requirements of AWWA C502, traffic-model break-away type fire hydrants. All hydrant materials shall meet the requirements of NSF 61.

The Contractor shall contact the local water district and obtain written fire hydrant mechanical details for the water district and required paint color prior to ordering any fire hydrants in accordance with the drawings.

All fire hydrant material and acceptable manufacturers shall be per the ILAWC Specification Section 15180 and Supplemental Technical Specifications.

Submit shop drawings and manufacturer's literature for all Contractor supplied materials promptly to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15180.

Construction Requirements: This work shall be performed according to according to ILAWC Specification Section 15180 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

Locate hydrants on the plans or as directed by the Engineer and in compliance with local regulations.

Fire hydrants shall be tested and disinfected as specified herein.

Measurement and Payment: This work will be measured for payment at the contract unit price each for FIRE HYDRANTS. This work shall include all labor, equipment and material including excavation and bury depth of piping, locating existing water main, and valves; valve and valve boxes, hydrant lead, fire hydrant (including base and hydrant barrel), connection to an existing water main, location tape, tracer wire, bedding, earth backfill, granular fill, geotextile fabric, testing, disinfection; dewatering; cutting and removing sections of pipe, installing restrained plugs and caps, isolation valves and thrust blocks; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to fire hydrant assembly installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

FIRE HYDRANTS TO BE MOVED

(ILAWC SECTION 15180 - FIRE HYDRANTS)

Description: This work shall consist of removing and reinstalling existing fire hydrants and auxiliary valves at a new location as shown on the Drawings, or where designated by the Engineer including new hydrant lead, connection to water main, capping and removal of existing hydrant lead, and filling of voids.

Construction Requirements: This work shall be performed according to according to special provisions Fire Hydrants, Fire Hydrants to be Removed, and Water Main to be Abandoned, ILAWC Specification Section 15180, Section 564 of the Standard Specifications, and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

The hydrant shall be tied to the existing main by means of rodding or restrained joints. Rodding shall not bypass any valves or fittings.

Locate hydrants on the plans or as directed by the Engineer and in compliance with local regulations.

Fire hydrants shall be tested and disinfected as specified herein these special provisions.

Measurement and Payment: This work will be measured for payment at the contract unit price each for FIRE HYDRANTS TO BE MOVED. This work shall include all labor, equipment and material including excavation and bury depth of piping, locating existing water main, and valves; valve and valve boxes, hydrant lead, hydrant extension, fire hydrant (including base and hydrant barrel), connection to an existing water main, location tape, tracer wire, bedding, earth backfill, granular fill, geotextile fabric, testing, disinfection; dewatering; cutting and removing sections of pipe, isolation valves and thrust blocks; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to fire hydrant assembly installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

FIRE HYDRANTS TO BE REMOVED

WATER MAIN TO BE ABANDONED

(ILAWC SECTION 15195 – WATER MAIN ABANDONMENT)

Description: The Work described in this section shall not proceed until completion, testing, and satisfactory operation of the new connections, mains, hydrants, and services lines unless given written approval from the local water district.

This work shall consist of removing, plugging, capping the existing water mains (including fire hydrant leads) and service lines as shown on the Drawings and as directed by the Engineer. Abandoning of the water mains and service lines shall consist of draining and leaving the existing pipes in place except where they conflict with the new construction in which case the water mains and service lines shall be removed and disposed of. This work shall consist of coordinating with local water district for the local water district to operate water valves to isolate the abandonment of the water mains. If the local water district determines there is not convenient water valves to shut off water for disconnection from main, then this work shall also consist of installing line stops and constructing concrete dead-ends and cross blocks around water mains to prevent movement of the pipes per Illinois American Water Company standard details and specifications.

The Contractor will be responsible for exploring and determining the type, size, and depth of the water mains and service lines.

All abandoned piping remaining in place shall be drained have the ends capped or plugged with concrete as directed by the Engineer.

Existing valves that are being abandoned and do not conflict with the proposed work shall remain in place, but the valve boxes shall be removed. Existing curb stops and meter pits shall be removed when being replaced by the improvements. The void shall be filled with concrete. Domestic meter boxes and dead end and cross blocking installed for staging purposes shall be completely removed.

The removal of fire hydrants shall include the hydrant, hydrant lead, and ancillary appurtenances as directed by Engineer and Owner. The hydrant lead shall be cut, capped (with mechanical joint cap with locking glands), plug/block, braced and restrained at the location and as directed by the Engineer with consultation from the local water district. . The void shall be filled with concrete but may be filled as directed by Engineer when void is located 2 ft. outside of pavement or sidewalk improvements.

Material that is salvageable shall be stored on site and become the property of Illinois American Water Company (ILAWC). Representatives of ILAWC will make the final determination if the material is salvageable. Materials determined not to be salvaged by ILAWC shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications.

The concrete for the dead-end cross blocks shall be Class SI in accordance with Section 1020 of the Standard Specifications. The reinforcement bars shall be in accordance with Article 1006.10 of the Standard Specifications.

The excavated areas that are within proposed paved areas shall be backfilled with controlled low-strength material. The other excavated areas not within paved areas shall be backfilled with select earth material and compacted. The excavated area around the blocks shall be backfilled with controlled low-strength material to the top of the dead-end cross blocks.

Construction Requirements: This work shall be performed according to according to ILAWC Specification Section 15195 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

Measurement and Payment: This work will be measured for payment at the contract unit price lump sum for WATER MAIN TO BE ABANDONED.

Fire hydrants to be removed will be measured for payment at the contract unit price per each for FIRE HYDRANTS TO BE REMOVED.

This work shall include all labor, equipment and material necessary to complete the work, including excavation, locating existing water main, valves, hydrants and service connections; dewatering the abandoned line; cutting and removing sections of pipe, installing restrained plugs and caps, concrete plugs, line stops, dead-end and cross blocking, isolation valves and thrust blocks; removing and disposing of pipes, valve boxes, meter pits, meters, and curb stop and boxes; filling voids from removal of structures or infrastructures; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; clean-up; and any other ancillary Work related to abandoning water main.

The placement of controlled low-strength material will be paid for separately as specified herein.

WATER SERVICE LINE 1"
DOMESTIC WATER SERVICE BOXES
CURB STOP & BOX 1 INCH
WATER SERVICE CONNECTION
(ILAWC SECTION 15200 – SERVICE LINES)

Description: This work shall consist of installing water service lines from the proposed main to a new meter pit in the locations shown on the plans. Existing curb stop and box and meter pits shall be removed and replaced with proposed curb stop and box and meter pits. The contractor shall coordianteed with ILAWC regarding whether a meter shall be moved from the existing meter pit to the proposed meter pit or a new meter shall be installed in the proposed pit for each service. The contractor shall connect the proposed water service to the existing service downstream of the existing meter pit within right of way unless otherwise indicated on the plans.

Water service lines shall be connected to the proposed main with saddles including corporation stops.

Submit shop drawings and manufacturer's literature for all Contractor supplied materials promptly to the Engineer for approval in accordance with ILAWC Specification Sections 01300 and 15200.

Construction Requirements: The construction of water service lines, including protection from sewers, connections, corporation stops, curb stops and boxes, shall be constructed according to ILAWC Division 15200 and the Standard Specifications for Water and Sewer Construction in Illinois (latest edition).

The excavated areas shall be backfilled with controlled low-strength material unless otherwise noted in the plans or directed by the Engineer.

Measurement and Payment: This work will be measured for payment at the contract unit price per foot for WATER SERVICE LINE, of the diameter specified. Water service lines will be measured in lineal feet along the centerline of the pipe.

Meter pits will be measured for payment at the contract unit price per each for DOMESTIC WATER SERVICE BOXES.

Curb Stop and Box will be measured for payment at the contract unit price per each for CURB STOP & BOX, of the diameter specified.

Water service connections to proposed will be measured for payment at the contract unit price per each for WATER SERVICE CONNECTION.

This work shall include all labor, equipment and materials necessary to install the water service lines including all excavation, except rock excavation; clearing and grubbing; locating existing water service line; connection to the water main; furnishing and installing saddles, corporation stops, curb stops and boxes, meter pits; shifting meters or placing new meters (provided by Owner), furnishing and installing water service line and fittings, location tape, tracer wire; bedding and backfill; removal and replacement of landscaping, mulch, sod, and/or grass including fertilization and seeding; protection, replacement or repair of utilities, drainage systems, structures, homeowner's property and miscellaneous property; removal of surplus excavated material; clean-up; and any other ancillary Work related to water service line installation.

The placement of controlled low-strength material will be paid for separately as specified herein.

ENVIRONMENTAL PERMITTING

NPDES PERMIT

The Engineer will apply for and obtain a National Pollutant Discharge Elimination System Construction General Permit (NPDES CGP) prior to beginning construction.

The CGP has four main elements:

- Notice of Intent (NOI)
- Storm Water Pollution Prevention Plan (SWPPP)
- Incident of Non-Compliance (ION)
- Notice of Termination (NOT)

The Notice of Intent (NOI) serves as the application for the CGP. A Notice of Intent must be post-marked at least thirty days prior to the commencement of any construction activity on site. The Erosion Control Plan sheets will convey the information required for a Storm Water Pollution Prevention Plan (i.e. drainage patterns, area of soil disturbance, location of storm water discharges, etc.). The Contractor shall be responsible for having these plan sheets available for viewing during business hours at the project site. An Incident of Non-Compliance must be completed and submitted to the IEPA if, at any time, an erosion or sediment control device fails.



| | | |
|---------------------------------|--------------------|----------------------------------|
| Route Court Street (FAP 693) | Marked Route | Section Number 20-00196-00-EG |
| Project Number EMYF(921) | County Tazewell | Contract Number 89804 |

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issued by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| | | |
|---------------------------|------------------------|-------------------------|
| Signature | Date 1/25/23 | |
| Print Name Josie Esker | Title City Engineer | Agency City of Pekin |

Note: Guidance on preparing each section of BDE 2342 can be found in Chapter 41 of the IDOT Bureau of Design and Environment (BDE) Manual. Chapter 41 and this form also reference the IDOT Drainage Manual which should be readily available.

I. Site Description:

A. Provide a description of the project location; include latitude and longitude, section, town, and range:

The project is located on Court Street from west of Stadium Dr. to Hilltop Dr. in the City of Pekin, Tazewell County, IL. T24N R5W Section 1 - 40 Degrees 32'47" N / 89 Degrees 36' 13" W

B. Provide a description of the construction activity which is the subject of this plan. Include the number of construction stages, drainage improvements, in-stream work, installation, maintenance, removal of erosion measures, and permanent stabilization:

Construction activity consists of resurfacing mainline pavement, constructing new curbs, gutters, and sidewalks, median reconstruction, storm sewer improvements, water main construction, entrance pavement, and landscaping.

C. Provide the estimated duration of this project:

June 2023 to November 2024

D. The total area of the construction site is estimated to be 10.5 acres.

The total area of the site estimated to be disturbed by excavation, grading or other activities is 1.5 acres.

E. The following are weighted averages of the runoff coefficient for this project before and after construction activities are completed; see Section 4-102 of the IDOT Drainage Manual:

0.80

F. List all soils found within project boundaries; include map unit name, slope information, and erosivity:

19D2 - Sylvan silt loam, 10 to 18 percent slopes, eroded
279B - Rozetta silt loam, 2 to 5 percent slopes
280gC2 - Fayette silt loam, glaciated, 5 to 10 percent slopes, eroded

533 - Urban land
672A - Crescent loam, 0 to 2 percent slopes
802D - Orthents, loamy, 2 to 20 percent slopes

G. If wetlands were delineated for this project, provide an extent of wetland acreage at the site; see Phase I report:

N/A

H. Provide a description of potentially erosive areas associated with this project:

Side slopes

I. The following is a description of soil disturbing activities by stages, their locations, and their erosive factors (e.g., steepness of slopes, length of slopes, etc.):

Grading behind new sidewalks back to existing, 1:4 and 1:3 slopes.

J. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent offsite sediment tracking (to be added after contractor identifies locations), areas of soil disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to surface water including wetlands.

K. Identify who owns the drainage system (municipality or agency) this project will drain into:

City of Pekin

L. The following is a list of General NPDES ILR40 permittees within whose reporting jurisdiction this project is located:

City of Pekin

M. The following is a list of receiving water(s) and the ultimate receiving water(s) for this site. In addition, include receiving waters that are listed as Biologically Significant Streams by the Illinois Department of Natural Resources (IDNR). The location of the receiving waters can be found on the erosion and sediment control plans:

Meyers Lake to Lost Creek to Illinois River

N. Describe areas of the site that are to be protected or remain undisturbed. These areas may include steep slopes (i.e., 1:3 or steeper), highly erodible soils, streams, stream buffers, specimen trees, natural vegetation, nature preserves, etc. Include any commitments or requirements to protect adjacent wetlands.

For any storm water discharges from construction activities within 50-feet of Waters of the U.S. (except for activities for water-dependent structures authorized by a Section 404 permit, describe: a) How a 50-foot undisturbed natural buffer will be provided between the construction activity and the Waters of the U.S. or b) How additional erosion and sediment controls will be provided within that area.

There are no protected areas located within the project limits.

O. Per the Phase I document, the following sensitive environmental resources are associated with this project and may have the potential to be impacted by the proposed development. Further guidance on these resources is available in Section 41-4 of the BDE Manual.

303(d) Listed receiving waters for suspended solids, turbidity, or siltation.
The name(s) of the listed water body, and identification of all pollutants causing impairment:

Provide a description of how erosion and sediment control practices will prevent a discharge of sediment resulting from a storm event equal to or greater than a twenty-five (25) year, twenty-four (24) hour rainfall event:

Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

Applicable Federal, Tribal, State, or Local Programs

Floodplain

Historic Preservation

Receiving waters with Total Maximum Daily Load (TMDL) for sediment, total suspended solids, turbidity or siltation

TMDL (fill out this section if checked above)

The name(s) of the listed water body:

Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL:

If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet that allocation:

Threatened and Endangered Species/Illinois Natural Areas (INAI)/Nature Preserves

Other

Wetland

P. The following pollutants of concern will be associated with this construction project:

Antifreeze / Coolants

Concrete

Concrete Curing Compounds

Concrete Truck Waste

Fertilizers / Pesticides

Paints

Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids)

Soil Sediment

Solid Waste Debris

Solvents

Waste water from cleaning construction equipments

Other (Specify) _____

Other (Specify) _____

Other (Specify) _____

Other (Specify) _____

Other (Specify) _____

II. Controls:

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in Section I.C above and for all use areas, borrow sites, and waste sites. For each measure discussed, the Contractor will be responsible for its implementation as indicated. The Contractor shall provide to the Resident Engineer a plan for the implementation of the measures indicated. The Contractor, and subcontractors, will notify the Resident Engineer of any proposed changes, maintenance, or modifications to keep construction activities compliant with the Permit ILR10. Each such Contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

A. Erosion and Sediment Controls: At a minimum, controls must be coordinated, installed and maintained to:

1. Minimize the amount of soil exposed during construction activity;
2. Minimize the disturbance of steep slopes;
3. Maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration, unless infeasible;
4. Minimize soil compaction and, unless infeasible, preserve topsoil.

B. Stabilization Practices: Provided below is a description of interim and permanent stabilization practices, including site- specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II.B.1 and II.B.2, stabilization measures shall be initiated **immediately** where construction activities have temporarily or permanently ceased, but in no case more than **one (1) day** after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of fourteen (14) or more calendar days.

1. Where the initiation of stabilization measures is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.
2. On areas where construction activity has temporarily ceased and will resume after fourteen (14) days, a temporary stabilization method can be used.

The following stabilization practices will be used for this project:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Erosion Control Blanket / Mulching | <input type="checkbox"/> Temporary Turf (Seeding, Class 7) |
| <input type="checkbox"/> Geotextiles | <input type="checkbox"/> Temporary Mulching |
| <input checked="" type="checkbox"/> Permanent Seeding | <input type="checkbox"/> Vegetated Buffer Strips |
| <input checked="" type="checkbox"/> Preservation of Mature Seeding | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Protection of Trees | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Sodding | <input type="checkbox"/> Other (Specify) _____ |
| <input checked="" type="checkbox"/> Temporary Erosion Control Seeding | <input type="checkbox"/> Other (Specify) _____ |

Describe how the stabilization practices listed above will be utilized during construction:

During construction area of disturbance will be limited to only the area required for construction of the proposed roadway improvements to preserve and protect existing vegetation

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

After construction activities have been completed, permanent seeding will be completed. Mulch will be applied to graded slope with a slope of 1:4 or greater.

C. Structural Practices: Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

- | | |
|--|--|
| <input type="checkbox"/> Aggregate Ditch | <input type="checkbox"/> Stabilized Construction Exits |
| <input type="checkbox"/> Concrete Revetment Mats | <input type="checkbox"/> Stabilized Trench Flow |
| <input type="checkbox"/> Dust Suppression | <input type="checkbox"/> Slope Mattress |
| <input type="checkbox"/> Dewatering Filtering | <input type="checkbox"/> Slope Walls |
| <input type="checkbox"/> Gabions | <input type="checkbox"/> Temporary Ditch Check |
| <input type="checkbox"/> In-Stream or Wetland Work | <input type="checkbox"/> Temporary Pipe Slope Drain |

- | | | |
|--|--|-------|
| <input type="checkbox"/> Level Spreaders | <input type="checkbox"/> Temporary Sediment Basin | |
| <input type="checkbox"/> Paved Ditch | <input type="checkbox"/> Temporary Stream Crossing | |
| <input type="checkbox"/> Permanent Check Dams | <input type="checkbox"/> Turf Reinforcement Mats | |
| <input checked="" type="checkbox"/> Perimeter Erosion Barrier | <input type="checkbox"/> Other (Specify) | _____ |
| <input type="checkbox"/> Permanent Sediment Basin | <input type="checkbox"/> Other (Specify) | _____ |
| <input type="checkbox"/> Retaining Walls | <input type="checkbox"/> Other (Specify) | _____ |
| <input type="checkbox"/> Riprap | <input type="checkbox"/> Other (Specify) | _____ |
| <input type="checkbox"/> Rock Outlet Protection | <input type="checkbox"/> Other (Specify) | _____ |
| <input type="checkbox"/> Sediment Trap | <input type="checkbox"/> Other (Specify) | _____ |
| <input checked="" type="checkbox"/> Storm Drain Inlet Protection | <input type="checkbox"/> Other (Specify) | _____ |

Describe how the structural practices listed above will be utilized during construction:

Inlet protection will be used on existing and proposed inlets within the project limits to prevent sediment from entering local waterways. Perimeter erosion barrier will be installed where prevailing slopes could allow sediment to flow from the project site.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

D. Treatment Chemicals

Will polymer flocculants or treatment chemicals be utilized on this project: Yes No

If yes above, identify where and how polymer flocculants or treatment chemicals will be utilized on this project.

E. Permanent (i.e., Post-Construction) Storm Water Management Controls: Provided below is a description of measures that will be installed during the construction process to control volume and pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water Act.

- Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

The practices selected for implementation were determined based on the technical guidance in Chapter 41 (Construction Site Storm Water Pollution Control) of the IDOT BDE Manual. If practices other than those discussed in Chapter 41 are selected for implementation or if practices are applied to situations different from those covered in Chapter 41, the technical basis for such decisions will be explained below.

- Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of permanent storm water management controls:

F. Approved State or Local Laws: The management practices, controls and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the IEPA's Illinois Urban Manual. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under the Permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

G. Contractor Required Submittals: Prior to conducting any professional services at the site covered by this plan, the Contractor and each subcontractor responsible for compliance with the permit shall submit to the Resident Engineer a Contractor Certification Statement, BDE 2342A.

1. The Contractor shall provide a construction schedule containing an adequate level of detail to show major activities with implementation of pollution prevention BMPs, including the following items:

- Approximate duration of the project, including each stage of the project
- Rainy season, dry season, and winter shutdown dates
- Temporary stabilization measures to be employed by contract phases
- Mobilization time-frame
- Mass clearing and grubbing/roadside clearing dates
- Deployment of Erosion Control Practices
- Deployment of Sediment Control Practices (including stabilized cons

- Deployment of Construction Site Management Practices (including concrete washout facilities, chemical storage, refueling locations, etc.)
- Paving, saw-cutting, and any other pavement related operations
- Major planned stockpiling operation
- Time frame for other significant long-term operations or activities that may plan non-storm water discharges as dewatering, grinding, etc
- Permanent stabilization activities for each area of the project

2. During the pre-construction meeting, the Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a discussion of how they will comply with the requirements of the permit in regard to the following items and provide a graphical representation showing location and type of BMPs to be used when applicable:

- Temporary Ditch Checks - Identify what type and the source of Temporary Ditch Checks that will be installed as part of the project. The installation details will then be included with the SWPPP.
- Vehicle Entrances and Exits - Identify type and location of stabilized construction entrances and exits to be used and how they will be maintained.
- Material Delivery, Storage and Use - Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored for this project.
- Stockpile Management - Identify the location of both on-site and off-site stockpiles. Discuss what BMPs will be used to prevent pollution of storm water from stockpiles.
- Waste Disposal - Discuss methods of waste disposal that will be used for this project.
- Spill Prevention and Control - Discuss steps that will be taken in the event of a material spill (chemicals, concrete curing compounds, petroleum, etc.)
- Concrete Residuals and Washout Wastes - Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
- Litter Management - Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
- Vehicle and Equipment Fueling - Identify equipment fueling locations for this project and what BMPs will be used to ensure containment and spill prevention.
- Vehicle and Equipment Cleaning and Maintenance - Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.
- Dewatering Activities - Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.
- Polymer Flocculants and Treatment Chemicals - Identify the use and dosage of treatment chemicals and provide the Resident Engineer with Material Safety Data Sheets. Describe procedures on how the chemicals will be used and identify who will be responsible for the use and application of these chemicals. The selected individual must be trained on the established procedures.
- Additional measures indicated in the plan.

III. Maintenance:

When requested by the Contractor, the Resident Engineer will provide general maintenance guides (e.g., IDOT Erosion and Sediment Control Field Guide) to the Contractor for the practices associated with this project. Describe how all items will be checked for structural integrity, sediment accumulation and functionality. Any damage or undermining shall be repaired immediately. Provide specifics on how repairs will be made. The following additional procedures will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other protective measures identified in this plan. It will be the Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications.

IV. Inspections:

Qualified personnel shall inspect disturbed areas of the construction site including Borrow, Waste, and Use Areas, which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site using IDOT Storm Water Pollution Prevention Plan Erosion Control Inspection Report, BC 2259. Such inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm or by the end of the following business or work day that is 0.5 inch or greater or equivalent snowfall.

Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities are conducted, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer shall notify the appropriate IEPA Field Operations Section office by email at: epa.swnoncomp@illinois.gov, telephone or fax within twenty-four (24) hours of the incident. The Resident Engineer shall then complete and submit an "Incidence of Non-Compliance" (ION) report for the identified violation within five (5) days of the incident. The Resident Engineer shall use forms provided by IEPA and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of non-compliance shall be signed by a responsible authority in accordance with Part VI. G of the Permit ILR10.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

V. Failure to Comply:

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of a National Pollutant Discharge Elimination System/Erosion and Sediment Control Deficiency Deduction against the Contractor and/or penalties under the Permit ILR10 which could be passed on to the Contractor.

APPENDIX A: ILLINOIS AMERICAN WATER SPECIFICATIONS



AMERICAN WATER

2020 Water Main Technical Specifications

ILLINOIS AMERICAN WATER

Prepared by:

ILLINOIS AMERICAN WATER COMPANY

100 North Water Works Dr.
Belleville, IL 6223

12/12/2019

ILLINOIS AMERICAN WATER

TECHNICAL SPECIFICATIONS

Division 1 – General Requirements

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SECTION 01000

SUMMARY OF WORK

PART 1: GENERAL

1.01 WORK UNDER THIS CONTRACT

- A. Furnish all labor, materials (except as herein noted), equipment and means to construct the project as described in the Bid Documents and shown on the Drawings.
- B. The above general outline of principal features does not in any way limit the responsibility of the Contractor to perform all Work and furnish the required materials, equipment, labor and means as shown or required by the Contract Documents.
- C. Materials, equipment, labor, etc., obviously a part of the Work and necessary for the proper operation and installation of same, although not specifically indicated in the Contract Documents, shall be provided as if called for in detail without additional cost to the Owner.

1.02 LOCATION

Project Location as described in the Bid Documents and as shown on the Drawings

1.04 OWNER FURNISHED PRODUCTS

- A. Products furnished to the site and paid for by Owner:

- 1. Ductile Iron Push-on Joint Pipe
- 2. Ductile Iron Restraint Joint Pipe
- 3. Fire Hydrants
- 4. Meters

- B. Owner's Responsibilities:

- 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
- 2. Arrange and pay for product delivery to site.
- 3. On delivery, inspect products jointly with Contractor.

4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties.

C. Contractor's Responsibilities:

1. Review Owner reviewed shop drawing's product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage, jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.
5. Arrange for manufacturers inspections, service, start-up services and training.

1.07 WORK SEQUENCE

- A. Work shall be scheduled, sequenced and performed in a manner which minimizes disruption to the public and plant operations and shall not interrupt or impact the Water Company's ability to operate and maintain service of the existing facility. During the construction periods coordinate construction schedule and operations with the Water Company, Inspectors and Engineer.
- B. Allow for construction and schedule constraints in preparing the construction schedules required under Section 01300 - Submittals. The schedule shall include the Contractors activities necessary to satisfy all constraints included and referenced in the Contract Documents.
- C. The Contractor is responsible for sequencing the work. It is a requirement that the Contractor's sequence result in the minimum number and duration of total or partial outages. The listing of Schedule Requirements identified below does not mean that all constraints or special conditions have been identified. The list does not substitute for the Contractor's coordination and planning for completion of the work within the Contract Time in the Agreement. The sequence is general in nature and meant to depict a possible approach by the Contractor that would minimize plant downtime and permit timely completion of the project.

1.08 CHANGE PROCEDURES

- A. The Engineer may issue to Contractor a Proposal Request which includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Times for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 15 working days. The estimate shall contain a detailed breakdown of the labor, equipment, material, subcontract, equipment rental, contingencies, overhead, and profit costs

associated with the requested change. The estimate shall also include any requested adjustments to Contract Times including the window of time the Owner has to render a decision on the matter.

1.09 DEFINED TERMS

- A. Terms used in these Specifications which are defined in the General Conditions of the Contract Documents shall have the meanings assigned to them in the General Conditions.

1.10 ABBREVIATIONS

- A. Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth opposite each.

| | |
|--------|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| ACI | American Concrete Institute |
| AFBMA | Anti-Friction Bearing Manufacturers Association |
| AGA | American Gas Association |
| AGMA | American Gear Manufacturers Association |
| IEEE | Institute of Electrical and Electronics Engineers, Inc. |
| AISC | American Institute of Steel Construction |
| AMCA | Air Moving and Conditioning Association |
| ANS | American National Standard |
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| AWPA | American Wood-Preservers' Association |

| | |
|-----------|--|
| AWWA | American Water Works Association |
| CS | Commercial Standard |
| IBR | Institute of Boiler and Radiator Manufacturers |
| IPS | Iron Pipe Size |
| JIC | Joint Industry Conference Standards |
| NBS | National Bureau of Standards |
| NEC | National Electrical Code; Latest Edition |
| NEMA | National Electrical Manufacturers Association |
| NFPA | National Fire Protection Association |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association, Inc. |
| Fed.Spec. | Federal Specifications issued by the Federal Supply Service of the General Services Administration, Washington, D.C. |
| 125lb ANS | American National Standard for Cast-Iron Pipe |
| 250lb ANS | Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class |
| AWG | American or Brown and Sharpe Wire Gage |
| NPT | National Pipe Thread |
| OS&Y | Outside Screw and Yoke |
| Stl.WG | U.S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebing Gage |
| UL | Underwriters' Laboratories |
| USS Gage | United States Standard Gage |
| WOG | Water, Oil, Gas |
| WSP | Working Steam Pressure |

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

3.01 FIELD SURVEY WORK

- A. Unless otherwise provided in the Supplementary Conditions, the Owner shall provide engineering surveys to establish reference points for construction as provided in Article 4.05 of the General Conditions. Utilizing Owner's reference points, establish the initial control base line and all control benchmarks to be utilized throughout the project. Base line shall be set in accordance with all lines, dimensions, reference points, and elevations given in the Contract Drawings.
- B. If a discrepancy between the information as presented in the Contract Drawings and any existing survey grid work, benchmarks, structures, etc., notify the Engineer immediately. New construction shall not commence until accurate control base lines and benchmarks have been established.
- C. Throughout the course of the project, set all additional stakes which are needed for offset stakes, reference points, slope stakes, pavement and curb line and grade stakes, stakes for structures, sewers, utilities, roadway drainage, pipe underdrains, paved gutter, fence, culverts, or other structures, supplementary bench marks, and any other horizontal or vertical controls necessary to secure a correct layout and construction of the work. Stakes for line and grade for pavements, curbs, storm drains, sewers, etc., shall be set at twenty-five (25) foot maximum intervals. Base lines shall be staked in such manner as to clearly define them for the project.
- D. The finished work shall conform to the lines, grades, elevations and dimensions called for in the Contract Documents. The Work shall be subject to checking by the Engineer, but any inspection or checking of Contractor's layout by the Engineer and the acceptance of all or part of it shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades, elevations and locations on the several parts of the Work. The Contractor shall exercise care in the preservation of stakes, monuments and benchmarks and shall have them reset at his expense when they are lost or displaced.
- E. Prior to the commencement of any Work activity, the contractor shall survey and layout the Work to be performed and advise the Engineer of any conflicts, obstructions, concerns, etc. that will prevent completion of such work in accordance with the requirements of the Contract Documents. If the Contractor fails to conduct such survey and layout or if the survey and layout fails to identify a conflict, obstruction, etc., which it reasonably should have, and a conflict, obstruction, concern, etc., is discovered, the Contractor shall bear the cost of any standby time for labor and/or equipment which occurs pending the Engineer's

direction and the cost of rework of any Work installed which is affected by the conflict, obstruction, etc.

- F. Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the Work, verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

3.02 COORDINATION AND MEETINGS

- A. Coordinate work, to phase the construction operations, and provide, install and maintain any temporary connections necessary to prevent interference to operation of Owner's facilities. Any construction work requiring the shutdown of facilities must be scheduled and performed only at such times as shall be authorized by the Owner. Such Work must be completed during the specific periods authorized by the Owner. It may be necessary that Work will be performed during several shutdown periods and/or during periods of premium time payment to accomplish the desired construction. All costs to perform the Contractor's Work, including premium time payments, shall be borne by the Contractor and are included in the Contract Price

- B. Additionally:

1. Coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
2. Verify the utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
3. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
4. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

5. Coordinate completion and clean up of Work of separate sections in preparation for substantial completion and for portions of Work designated for Owner's partial occupancy.
6. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Job Progress Meetings

Progress meetings will generally be held monthly. Contractor's attendance shall be required.

1. Schedule - The Engineer will establish the meeting place, time and date, notify participants and administer the meeting. Contractor shall notify major subcontractors and suppliers, as appropriate.
2. Attendance
 - a. Engineer and/or resident project representative.
 - b. Contractor's project manager and project superintendent
 - c. Owner's representative
 - d. Subcontractor, as appropriate to the agenda
 - e. Suppliers, as appropriate to the agenda
 - f. Other parties as determined by Engineer and/or Owner
3. Agenda
 - a. Review minutes of previous meeting.
 - b. Review of work progress since previous meeting.
 - c. Review field observations, problems, and/or conflicts.
 - d. Review problems which impede construction schedules.
 - f. Review of off-site fabrication, delivery schedules.
 - g. Review corrective measures and procedures to regain projected schedule.
 - h. Review revisions to construction schedules.
 - i. Review plan progress, schedule, during succeeding work period.
 - j. Review coordination of schedules.
 - k. Review submittal schedules; expedite as required.
 - l. Review maintenance of quality standards.
 - m. Review proposed changes for:
 - Effect on construction schedule and on completion date
 - Effect on other contracts of the project
 - n. Other business

4. Minutes - Engineer will prepare and distribute copies to participants and Owner for review at the next meeting.

END OF SECTION

SECTION 01075

BASIS OF PAYMENT

PART 1: GENERAL

1.01 SCOPE

Work to be performed under this Contract shall be paid in accordance with the Bid Schedule submitted with the Bid. When applicable, and authorized by Owner, additional work will be paid for in accordance with the supplementary unit price schedule, of the Bid. The cost of labor, equipment, materials or work called for in the Specifications, shown on the Drawings, or necessary for a complete and satisfactory installation, but which are not specifically mentioned in this Section shall be included in the appropriate supplementary unit price by the Contractor at no additional expense to the Owner.

1.02 SUPPLEMENTAL UNIT PRICE ITEMS

A. Lawn Restoration

Payment will be adjusted per square foot for Lawn Restoration. The Work is described in Specification Section 02820 – Lawn Restoration

B. Service Renewal – Meter Setter

Payment will be adjusted per each for Service Renewal – Meter Setter. The Work includes replacing the meter setter as determined by the Owner/Engineer and in accordance with Specification Section 15200 – Service Lines.

C. Service Renewal – Meter Box

Payment will be adjusted per each for Service Renewal – Meter Box. The Work includes replacing the meter box as determined by the Owner/Engineer and in accordance with Specification Section 15200 – Service Lines.

D. Service Renewal – Meter Box Frame and Lid

Payment will be adjusted per each for Service Renewal – Meter Box Frame & Lid. The Work includes replacing the meter box frame and lid as determined by the Owner/Engineer and in accordance with Specification Section 15200 – Service Lines.

1.03 ALLOWANCE ITEMS

Not Used

1.04 LUMP SUM ITEMS

A. Mobilization and Demobilization

Payment will be made at the Contract Unit Price per lump sum for Mobilization and Demobilization. The work shall consist of the assembling and setting up for the project, including but not limited to the Contractor's general plant, including Contractor's general offices, shops, plants, storage areas, temporary signs, sanitary and any other facilities, as required by the Specifications Section 01500 Temporary Facilities, Section 01700 Project Closeout and special requirements of the Contract, as well as by local or State Law and regulation. The cost of any other initial expense required for the start of work will be included in the item.

B. Insurance (and Bonds)

Payment will be made at the Contract Unit Price per lump sum for Insurance and Bonding. This item includes bonds and insurance as required in the Contract Documents.

C. Traffic Control

Payment will be made at the Contract Unit Price per lump sum for Traffic Control. This item includes providing all material, labor, and equipment to provide a safe and effective traffic control, signage, flaggers, etc., as needed to serve the project and as required by local permits or regulations.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01100

ALTERNATIVES

PART 1: GENERAL

1.01 RELATED WORK

- A. Alternative equipment and/or materials must be listed in the Bid. Failure to submit information on alternative equipment and/or materials as requested by the Engineer is cause for rejection of the proposed alternative and only the specified equipment and/or materials will be permitted to be incorporated in the finished project.
- B. All alternative equipment and/or materials offered in the Bid must comply with the detailed requirements of the Drawings and Specifications and shall be covered by the specified guarantees and warranties. If it is determined that the alternative equipment and/or materials do not conform to the Specifications, such proposed alternative shall not be accepted and installation of the specified equipment and/or materials shall be required.
- C. No alternative materials and/or equipment will be incorporated in the finished project except an alternative accepted in writing by Owner pursuant to the requirements of this Section 01100. Acceptance by Owner of any such alternative shall not relieve Contractor of responsibility for assuring that any such alternative will, after installation or incorporation in the Work, conform to any performance requirements and other information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

1.02 SUBMITTALS

- A. Specified equipment and materials have been used to prepare the Drawings. Changes in piping, wiring, structure, etc., necessary to accommodate alternatives accepted by Owner shall be submitted to the Engineer for approval.

1.03 PAYMENT

- A. All installation costs necessitated by the selection of alternative equipment and material shall be included in the Contract price and any modifications as stated in the Bid.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1: GENERAL

1.01 BEFORE STARTING WORK

A. Preliminary Progress Schedule

In accordance with Section 2.05 of the General Conditions, prepare and submit to the Engineer for approval, a preliminary construction progress schedule. This submittal is to be made within ten (10) days from the Notice of Award. The construction work shall be detailed to an extent that progress can be readily monitored.

B. Shop Drawings and Samples Submittal Schedule

The preliminary progress schedule shall contain activities in the network representing submittal and review of shop drawings and material samples. The shop drawing and sample submittal schedule required per Paragraph 6.17 of the General Conditions shall be developed by sorting these activities from the progress schedule. The schedule shall be presented in a report format containing the following:

1. Activity number
2. Activity description (including reference to the appropriate specification section)
3. Early and Late start dates
4. Early and Late finish dates
5. Total and free float
6. Successor activities

C. Schedule of Values

The Bid Schedule will be used as the Schedule of Values for this project.

D. Schedule of Property Unit Values

Not Used.

E. Cash Flow Schedule

Accompanying the CPM Schedule required above, submit to the Engineer for approval a Cash Flow Schedule. The Cash Flow Schedule shall show the amounts

of money by months which will be required to reimburse the Contractor for Work performed during each month of the Contract Times. The sum of all the monthly cash requirements shall equal the Contract Price. The monthly cash requirements shall be proportioned based on the CPM Schedule. The initial cash flow schedule shall depict monthly cash requirements based on the early start dates of the CPM Schedule as well as the monthly cash requirements based on late start dates of the CPM Schedule. The approval cash flow schedule will be developed by the Engineer and will reflect the scheduled performance as of the date of approval. This process of approving cash flow schedules will occur with each required schedule update.

The approval Cash Flow Schedule will be used by the Owner to program funds for progress payments. Monthly payments will be made in accordance with the Contract Agreement, but at no time will the aggregate amount of payments exceeds the accumulated amount of payments for the same period of the approval Cash Flow Schedule.

F. Preconstruction Digital Recording

Prior to mobilization at the site, furnish to the Engineer a video recording of all planned construction areas, material storage areas, areas adjacent to these areas, including but not limited to, streets, driveways, sidewalks, curbs, ditches, fencing, railing, visible utilities, retaining structures and adjacent building structures. The purpose of the recording is to document existing conditions and to provide a fair measure of required restoration. Care should be taken to record all existing conditions which exhibit deterioration, imperfections, structural failures or situations that would be considered substandard.

The recording shall be high quality, color and in a digital format. Temporary lighting shall be provided as necessary to properly record areas where natural lighting is insufficient (indoors, shadows, etc.). The recording shall include an audio soundtrack to provide the following information:

- detailed description of location being viewed referenced to Contract Drawings (ie. station no., building designation, pipeline route etc.)
- direction (N, S, E, W, looking up, looking down, etc.) of camera view
- date, time, temperature, environmental conditions at time of taping.

Any areas not readily visible by the recording shall be described in detail. Unless otherwise approved by Engineer, recording shall not be performed during inclement weather or when the ground is covered partially or totally with snow, ice, leaves, etc.

Prepare and provide as many copies/formats as are necessary to satisfy the requirements of this section. The original recording shall be submitted to the Engineer accompanied by a detailed log of the contents of each video. The

recording will be maintained by the Engineer during construction and may be viewed at any time upon request. Upon final acceptance, the recording will become the permanent property of the Owner.

1.02 FINALIZING SCHEDULES

- A. Prepare to present and discuss at the preconstruction meeting, the schedules submitted in accordance with this specification. Unless additional information is required to be submitted, the Engineer will, within 15 working days of the preconstruction conference, provide comments. Then, resubmit the affected schedules addressing the Engineer's comments.
- B. Approval of the final schedules by the Engineer is advisory only and shall not be relief of responsibility for accomplishing the work within the Contract Times. Omissions and errors in the approved schedule shall not excuse performance less than that required by the Contract. Approval by the Engineer in no way makes the Engineer an insurer of the success of those schedules or liable for time or cost overruns flowing from shortcomings in such schedules.

1.03 REQUIREMENTS FOR CONFORMING WITH SCHEDULE

- A. If, in the opinion of the Engineer, work falls behind the progress schedule, the steps shall be taken, as necessary, to improve progress, and Engineer may require an increase to the number of shifts and/or overtime operations, days of work, and/or the amount of construction planned, and to submit for approval such supplementary schedule or schedules as may be deemed necessary to demonstrate the manner in which the agreed rate of progress will be regained, all without additional cost to the Owner. An updated cash flow schedule will be required in this occurrence and will be provided with the supplementary schedules referenced above.

1.04 UPDATING SCHEDULES

- A. Submit to the Engineer monthly updates of the schedules required per this specification section.
- B. Progress and shop drawing schedule updates shall reflect the progress to date by providing actual start dates for activities started, actual finish dates for completed activities, and identifying out of sequence work, schedule logic changes and any circumstances or events impacting the current schedule. The updates shall also contain best estimates of the remaining duration for activities not complete as of the date of the update. All graphic presentations, reports and computer discs required per the initial submittal of these schedules shall be provided with each update.

- C. Updated as necessary the schedule of values and cash flow schedules to reflect any changes.

1.05 ADJUSTMENT OF PROGRESS SCHEDULE AND CONTRACT TIMES

- A. If there is a desires to make changes to the method of operating which affect the approved progress schedule, notify the Engineer in writing stating what changes are proposed and the reason for the change. If the Engineer approves these changes, revise and submit for approval, without additional cost to the Owner, all of the affected portions of the schedule.
- B. Shop drawings and samples which are not approved on the first submittal or within the schedule time shall be immediately rescheduled, as well as any work which fails to pass specified tests or has been rejected.
- C. The Contract Times will be adjusted only for causes specified in the General Conditions. In the event a request to adjust the Contract times is desired, furnish such justification and supporting evidence as the Engineer may deem necessary for a determination as to whether such an entitled to an adjustment of Contract Times under the provisions of the General Conditions is warranted. The Engineer will, after receipt of such justification and supporting evidence, make findings of fact and will advise in writing thereof. If the Engineer finds that any adjustment of the Contract Times is entitled, the Engineer's determination as to the total number of days adjustment shall be based upon the currently approved progress schedule and on all data relevant to the adjustment. The actual delays in activities which, according to the progress schedule, do not affect the Contract completion date shown by the critical path in the network will not be the basis for an adjustment of Contract Times.
- D. From time to time it may be necessary for the progress schedule and/or Contract Times to be adjusted by the Owner to reflect the effects of job conditions, weather, technical difficulties, strikes, unavoidable delays on the part of the Owner and other unforeseeable conditions which may indicate schedule and/or Contract Times adjustments. Under such conditions, the Engineer shall require the rescheduling of the work and/or Contract Time to reflect the changed conditions, and the schedule shall be revised accordingly. No additional compensation shall be made for such changes except as provided in the General Conditions. Unless otherwise directed, take all possible actions to minimize any extension to the Contract Times and any additional cost to the Owner.

1.06 SHOP DRAWINGS

- A. Promptly supply to the Engineer for approval, shop drawings with details and schedules for all items contained in the list of required Shop Drawings included at the end of this Section, or for other items as may be required by the Engineer.

- B. A sufficient number of copies to allow the Owner to retain **four (4)** reviewed copies of all drawings, schedules and brochures shall be submitted for approval. Black line prints, blue line prints or reproducible transparencies are required. Blueprints (white lines on a blue background) are not acceptable. Each submittal shall have the job name on it and the appropriate specification section or contract drawing reference.
- C. Shop drawings shall be numbered with the Water Company's file number **XXXX-XXXX** Rev. _____. Detailed procedures for numbering will be outlined at the pre-construction meeting.
- D. Each copy of the submittals made to the Water Company for approval shall be prepared by the Contractor and shall have an identifying title stamp as follows:

_____ -American Water
 _____ Division - _____ District
 _____ **(Project Title)**
 Specification Section _____
 Shop Drawing No. ____-____-____ Rev. _____

- E. As required by the General Conditions, each copy of the submittals shall also be stamped with the Contractor's approval indicating that the shop drawing has been reviewed for conformance to the Contract Documents and has been coordinated with all other work and/or trades. Identify and bring to the attention of the Engineer any deviations to the Contract Documents contained in the submittal. For shop drawings being resubmitted, identify and bring to the attention of the Engineer any revisions other than those originally requested by the Engineer.

Submittals smaller than 8½x11 inches shall be secured to paper 8½x11 inches.

Submittals will be returned, stamped with the following classifications:

- a) "Approved" - There are no notations or comments on the submittal and, in Owner's opinion, the submittal meets the requirements of the Contract Documents and the equipment may be released for production.
- b) "Approved as Noted" - Notations have been made on the submittals to insure conformance with the Contract Documents. The equipment may be released for production in accordance with the notations.
- c) "Not Approved" - The submittal does not meet the requirements of the Contract Documents. Submit the specified product.

d) "Revise and Resubmit" - When the material submitted is incorrect or insufficient to review properly and it is necessary to see the complete package again.

e) "Resubmit Record Copy" - Used with the review action "Approved As Noted". The resubmittal shall incorporate notations.

- F. Where a submittal indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Owner not involving a change in Contract Price or extension of Contract Times, the Engineer may approve the submittal but the approval will contain, in substance, the following notation:

"The modification indicated on the attached submittal is approved in the interest of the Owner to effect an improvement for the Project and is accepted with the understanding that it does not involve any change in the Contract Price or Times; that it is subject generally to all Contract stipulations and covenants; and that it is without prejudice to any and all rights of the Owner under the Contract Bonds."

- G. It is emphasized that the Engineer's approval of submitted data is for general conformance to the Contract Drawings and Specifications, but subject to the detailed requirements of Drawings and Specifications. Although the Engineer may check submitted data in more or less detail, such checking is an effort to discover errors and omissions in Contractor's drawings and to assist in coordinating and expediting site work, and shall in no way relieve the Contractor of the responsibility to engineer the details of the Work in such manner that the purpose and intent of the Contract will be achieved, nor shall such detail check by the Engineer be construed as placing on the Engineer, any responsibility for the accuracy, and for proper fit, functioning and performance of any phase of the Work included under this Contract.

1.07 SAMPLES

- A. When required by the Engineer or where noted in other Sections of these Specifications, samples or materials shall be submitted for approval.
- B. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- C. Submit samples of finishes from the full range of manufacturer's standard colors, textures, and patterns for Engineer's selection.

Include identification on each sample, with full project information.

Submit the number or samples specified in individual specification sections; one of which will be retained by Engineer.

Reviewed samples which may be used in the Work are indicated in individual specification sections.

1.08 PROGRESS PAYMENTS

- A. The detailed arrangement for submittal of progress payments shall be discussed at the preconstruction meeting and will be in accordance with Article 14 of the General Conditions. In general, progress payments shall be submitted monthly in a format acceptable to the Engineer. The progress payment request shall be based on the approved schedule of values and should provide the number of unites completed, total dollar value completed, dollar value completed prior to the current payment, and the amount requested for this progress payment for each line item contained in the schedule of values. Progress payment requests for material and/or equipment suitably stored but not yet incorporated into the work shall be accompanied by a copy of the appropriate manufacturers invoice, shipping order, bill of lading, etc. and the progress payment amount shall be the direct cost to the Contractor, or subcontractor, for such material and/or equipment. Payment will not be made if, upon inspection by the Engineer, it is determined that the material and/or equipment does not conform to the requirements of the Contract Documents including proper storage, receipt of approved shop drawings, receipt of any special guarantees, Bonds, insurance coverage, any evidence of damage or imperfections, etc.

1.09 CONTRACTOR'S DAILY REPORTS

- A. If requested by the Engineer or the Resident Project Representative, prepare and submit daily reports containing the following information:
- number of craftsmen and hours worked of each subcontractor,
 - number of hours worked by each trade,
 - number of hours worked of each type of equipment,
 - description of work activities performed,
 - description of any material or equipment deliveries,
 - description of obstructions encountered,
 - temperature and weather conditions.
- B. The daily reports shall be submitted on a daily basis, by the end of the next business day.
- C. Information provided on the daily report shall not constitute notice of delay or any other notice required by the Contract Documents. Notice shall be as required therein.

1.10 OPERATING AND MAINTENANCE INSTRUCTION MANUALS

Not Used

1.11 CONSTRUCTION PHOTOGRAPHS

- A. Provide construction photographs taken within the first three working days of each month. Take a minimum of twelve (12) digital exposures each and submit digital copies of each exposure.
- B. When work is complete take twelve (12) additional digital photographs and submit electronic copies of each exposure.
- C. Employ a mutually acceptance commercial photographer who has shown Owner samples of his/her work. Photographer shall be equipped at all times to make either interior or exterior exposures.
- D. Digital copies shall be in JPG (Joint Photographic Experts Group) format.
- E. Consult with Engineer for instructions concerning view required at each specified visit to the site. Provide digital copies on computer disks or thumb drive.
- F. Deliver photographs monthly to Engineer.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1: GENERAL

1.01 WATER SUPPLY

- A. If reasonably available, water for the purpose of this Contract will be supplied by the Owner. All necessary meters, temporary piping and valves in connection with such water supply shall be furnish and install by the Contractor.
- B. The Owner reserves the right to impose limitations upon use of water as the Owner determines may be necessary to assure continued ability to meet the demands of its customers and the volumes and pressures required for fire protection. Any water required in excess of the quantities the Owner provides shall be furnished by the Contractor at cost.

1.02 TEMPORARY LIGHTING

- A. Provide and maintain lighting for construction operations and lighting to exterior staging and storage areas after dark for security purposes.

1.03 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings. Provide protection for plant life designated to remain. Replace damaged plant life.

1.04 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.05 SANITARY FACILITIES

- A. Provide suitable temporary facilities and enclosures for the use of workmen and shall maintain same in a sanitary condition.
- B. Be advised that the Owner is in the business of providing potable water and the Contractor's sanitary arrangements shall not endanger the Owner's facilities.

1.06 DUST CONTROL

- A. Take all necessary measure to control dust from his operations, and to prevent spillage of excavated materials on public roads.
- B. Remove all spillage of excavated materials, debris or dust from public roads by methods approved by the Engineer.
- C. Sprinkle water at locations and in such quantities and at such frequencies as may be required by the Engineer to control dust and prevent it from becoming a nuisance to the surrounding area.
- D. Dust control and cleaning measures shall be provided at not additional cost to the Owner.

1.07 USE OF PROJECT SITE

- A. Construct and maintain suitable and safe crossings over trenches or provide detours as necessary to care for public and private traffic. Provide flagmen at junctions of public traffic and Contractor vehicles and equipment.
- B. Usage, and requirements for usage, of site shall be coordinated with the local jurisdiction. Costs related to temporary usage shall be considered incidental to Traffic Control.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01600

PRODUCTS

PART 1: GENERAL

1.01 PROTECTION OF MATERIAL AND EQUIPMENT

- A. The interior of all pipe and accessories shall be kept free from dirt and foreign matter at all times.
- B. After valves and hydrants have been inspected, properly store them prior to use. In order to prevent entry of foreign material that could cause damage to the seating surfaces, the valves and hydrants shall be stored in a fully closed position unless recommended otherwise by the manufacturer. Resilient seated valves shall be stored in accordance with the manufacturer's recommendations. This may include storage with protective covers for rubber seats and in marginally open condition. Valves and hydrants should be stored indoors.
- C. If valves must be stored outdoors, protect the operating mechanism, such as gears, motor, actuators and cylinders, from weather elements. Valve ports and flanges must be protected from the weather and foreign materials. If valves are subject to freezing temperatures, all water must be removed from the valve interior and the valve closed tightly before storage, unless specifically recommended otherwise by the manufacturer. Valves shall be stored on pallets with the discs in a vertical position to prevent rainwater from accumulating on top of the disc, seeping into the valve body cavity and freezing and cracking the casting.

1.02 SERVICING EQUIPMENT

- A. Check all equipment upon acceptance to determine if oil reservoirs are full and areas to be greased are properly packed with grease. Provide the proper grease or oil for use in lubricating the required areas in the equipment. Perform any service to equipment while in storage, or installed pending acceptance, per manufacturer's requirements, industry standards or as stated specifically in the technical specifications.

1.03 MATERIAL/EQUIPMENT FURNISHED BY OWNER

- A. Certain material and equipment will be furnished by the Owner as noted in the Contract Documents. Responsibility for material and/or equipment furnished by the Owner shall begin upon the Contractor's acceptance of such material and/or equipment at the point of delivery to him. All material and equipment shall be examined and items found to be defective in manufacture and/or otherwise damaged shall be rejected at the time and place of delivery to him. The Owner will thereupon repair or replace the damaged items.

- B. After acceptance of material and/or equipment by Contractor at point of delivery to him, Contractor shall be responsible for the proper storage, handling, servicing and installation of such material and/or equipment in accordance with manufacturer's recommendations, industry standards or specific requirements of the Contract Documents. Any material and/or equipment found to be defective prior to acceptance by the Engineer shall be repaired or replaced by contractor at no additional cost to Owner unless Contractor submits proof that such defect was latent and could not have been detected by Contractor when performing his duties and responsibilities under these Contract Documents.
- C. Contractor's vs. Owner's responsibilities for providing guarantees or warranty and manufacturer's representatives for service, inspection, certification of installation, installation, field training, start-up, etc. for material and/or equipment furnished by Owner shall be as follows unless otherwise specified: The Owner will provide the warranty and Contractor is responsible for providing manufacturer's representatives for all necessary field service, start-up service, installation certifications, installation, field training of Owner's personnel, etc. for Owner furnished material and/or equipment as required for acceptance of such material and/or equipment in the completed project.

PART 2: PRODUCTS

2.01 GENERAL

- A. Unless otherwise specifically provided for in these Specifications, all equipment, materials and articles incorporated in the work shall be new, in current production and the best grade obtainable consistent with general construction usage.

2.02 COORDINATION OF DIMENSIONS

- A. Verify and make necessary corrections to construction dimensions so that all specified and/or alternative equipment, which is approved by the Engineer, can be installed and will function within the intent of the Contract Drawings and Specifications. Promptly notify the Engineer of all necessary corrections required.

2.03 SAFETY AND HEALTH REQUIREMENTS

- A. All materials, equipment, fixtures and devices furnished shall comply with applicable Laws and Regulations.
- B. All equipment furnished and installed under this Contract shall be equipped with suitable and approved safety guards and devices required for the safety of the public and operating personnel. Such guards and safety devices shall be in accord with the latest requirements of safety codes approved by the American National Standards Institute as well as the safety requirements of applicable Laws and Regulations.

Where said safety codes of the ANSI are incompatible with applicable Laws and Regulations, said Laws and Regulations shall prevail.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Material and equipment shall be installed in accordance with the appropriate Sections of these Specifications.

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART 1: GENERAL

1.01 TESTING OF FACILITIES

- A. Produce a first-class job and all Work shall be tested under operating conditions and pressures. Any leaks or malfunctions shall be repaired to the satisfaction of the Engineer at no additional expense to the Owner. This provision with reference to leakage shall also apply to water tightness of buildings.

1.02 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection. Provide submittals to Engineer that are required by governing or other authorities. Submit Application for final payment identifying total adjusted Contract sum, previous payments, and sum remaining due.

1.03 FINAL CLEANING

- A. Execute final cleaning prior to final inspection. Clean debris from drainage systems. Clean site; sweep paved areas, rake clean landscape surfaces. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change orders and other modifications to the Contract
 - 5. Reviewed shop drawings, product data, and samples
- B. Store record documents separate from documents used for construction. Record information concurrent with construction progress.
- C. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number

2. Product substitutions or alternates utilized
3. Changes made by addenda and modifications

D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

E. Submit documents to Engineer with final Application for Payment.

1.05 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

1.06 GUARANTEES AND WARRANTIES

- A. The Contractor expressly warrants that all workmanship and materials performed or furnished under this Contract will conform to the Specifications, Drawings, samples and other applicable descriptions furnished or adopted by the Contractor and with all applicable laws, provisions and requirements of the Contract Documents. The Contractor shall remedy any defects due to faulty materials or workmanship which shall appear within a period of one (1) year from the date of acceptance of the work hereunder and pay for any damage to other work resulting therefrom. The Owner shall give notice of observed defects with reasonable promptness. The Contractor warranty hereunder is in addition to, and not in limitation of, any obligations found elsewhere in the Contract Documents, any special guarantees provided by the Contractor or his suppliers, and any obligations imposed by law.
- B. In addition to the above requirements, the Contractor shall assign material and equipment guarantees and warranties from all manufacturers and suppliers to the Owner and deliver copies of such guarantees and warranties and the assignments thereof to the Owner in order to assure the Owner of the full benefit of such guarantees and warranties.

1.07 RESTORATION

- A. Restore and/or replace paving, curbing, sidewalks, gutters, shrubbery, fences, sod or other disturbed surfaces and structures to a condition equal to that before the work

began and to the satisfaction of the Engineer and shall furnish all labor and materials incidental thereto.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 02000
SITE PREPARATION

PART 1 – GENERAL

1.01. SUMMARY

This section includes preparing the site for construction including dewatering; identification, location, and protection of existing utilities and structures, exploratory excavation; and clearing and grubbing.

1.02. SCOPE OF WORK

- A. Dewatering - Should water be encountered, furnish and operate pumping equipment of sufficient capacity to dewater the trench. Dewater the trench so that the laying and joining of the pipe is made in a dry environment to prevent water from entering the pipe during construction.
- B. Existing Utilities and Structures - Certain information regarding the reputed presence, size, character, and location of existing Underground Facilities such as pipes, drains, sewers, electrical lines, telephone lines, cable TV lines, gas lines, and water lines has been shown on the Contract Drawings and/or provided in the contract documents. This information with respect to Underground Facilities is provided by the Owner in accordance with conditions described in the General Conditions and for information purposes only. Contractor is responsible to determine actual location of all utilities in proximity to the Work. Furnish all materials for temporary support, adequate protection, and maintenance of all underground and surface utility structures, supports, drains, sewer and other obstructions encountered in the progress of the Work.
- C. Exploratory Excavation – When the owner’s assets are incorrectly shown on the plans, or marked in the field, it may be necessary to utilize Exploratory Excavation in order to locate the assets required to advance the construction. Exploratory Excavation may be shown on the plans or as approved by the Engineer.
- D. Clearing and Grubbing – Provide all materials and equipment required to complete all clearing and grubbing in accordance with this Specification Section. Remove and dispose of all obstructions within the clearing limits, unless otherwise noted for replacement. Protect existing trees, shrubs and bushes located outside the clearing limits from damage for the life of this Contract.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01. PERMITS

The Contractor shall obtain and pay for any permits required for site preparation.

- A. Dewatering - Convey all trench water to a natural drainage channel or storm sewer without causing any property damage. Discharge shall be in strict accordance with State and/or Local requirements. Dispose of silt and debris which accumulates during construction in strict accordance with State and/or Local requirements.
- B. Notification of Utilities - Notify the applicable State Agency with jurisdiction over underground facilities and/or all utility companies that construction work under this Contract will pass through containing their underground facilities. Notify these parties in advance to support the construction work (**minimum 72 hours**). All excavation in the vicinity of existing underground utilities shall be performed in accordance with applicable regulations.
- C. Clearing and Grubbing - Comply with State and Local code requirements when disposing of trees, shrubs and all other materials removed under this Specification Section. Burning of logs, stumps, roots, cuttings and other material on the site will not be permitted.

3.02. OBSTRUCTIONS BY OTHER UTILITY STRUCTURES

- A. Support, relocate, remove, or reconstruct existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or drains. The obstruction shall be permanently supported, relocated, removed or reconstructed where they obstruct the grade or alignment of the pipe. Contractor must do so in cooperation with the owners of such utility structures. Before proceeding, the Contractor must reach an agreement with the Engineer on the method to work around the obstruction.
- B. No deviation shall be made from the required line or depth without the consent of the Engineer.

3.03. REPAIRS TO/RELOCATION OF EXISTING UTILITIES

- A. Repair or replace any damage to existing structures, work, materials, or equipment incurred by Contractor's operations.
- B. Repair all damage to streets, roads, curbs sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, trees, shrubs or other public or private property caused by transporting equipment, materials or personnel to or from the work site. Make satisfactory and acceptable arrangements with the persons or agencies having jurisdiction over the damaged property concerning repair or replacement.
- C. Repair or replace all utility services broken or damaged at once to avoid inconvenience to customers. Storm sewers shall not be interrupted overnight. Use temporary arrangements, as approved by the Engineer, until any damaged items can be

permanently repaired. Maintain all items damaged or destroyed by construction and subsequently repaired.

- D. Relocate existing utilities or structures, where necessary, and restore it to a condition equal to that of the original facility. Obtain approval of the owner of the utility or structure prior to relocating and/or restoring the facility.
- E. See Standard Details for requirements for repair or replacement of sanitary or storm drains removed or damaged during installation of the water main.

3.04. WATER MAIN AND WATER SERVICE LINE PROTECTION FROM SEWERS

- A. Water mains and water service lines shall be protected from sewers, sewer laterals, drains, and septic fields in accordance with Illinois Administrative Code, Title 35, Subtitle F, Chapter II, Parts 651-654 and as shown on the Drawings.
- B. Notify Engineer if existing site conditions prevent proper protection of water main and water service lines as shown in the Drawings.

3.05. EXPLORATORY EXCAVATION

- A. All Exploratory Excavation shall be in accordance with Section 02210 of these specifications and at the direction of the Engineer.

3.06. CLEARING AND GRUBBING

- A. Clear and grub the Work site within easement and/or clearing limit lines shown on the Drawings or as shown elsewhere in the Contract Documents. Remove those items that are designated for removal or obstruct construction. This includes, but is not limited to; trees, downed timber, shrubs, bushes, vines, roots, stumps, undergrowth, rubbish, paving materials, debris, and all other objectionable materials. Site objects outside clearing limits shall not be removed. Only those portions of the construction area which are absolutely necessary and essential for construction shall be cleared. Minimize the length of time of ground disturbance as much as practical, especially within environmentally sensitive areas. Ground shall not be cleared and grubbed until immediately prior to construction.
- B. Notify the Engineer of locations where additional trees and shrubs will interfere with installation of facilities. Do not remove additional trees or shrubs without written permission of Engineer. Conduct operations to minimize disturbance of trees and shrubs. Trim trees and roots in accordance with the best horticultural practices, including sealing cuts to preserve the tree.
- C. Remove site improvement objects such as signs, lawn ornaments, etc. which interfere with construction. Removed site improvement objects shall be stored in a manner protecting objects for reinstallation after construction is complete. Relocate the mailbox as necessary. Provide temporary traffic control signs when permanent signs are removed for construction. Temporary signs shall be worded to match permanent

signs, except as necessary to be compatible with construction operations.

- D. Remove pavement, curb and sidewalk in accordance with applicable State Standards for Road and Bridge Construction and as specified in these Contract Documents. Saw cuts may be eliminated where paving abuts curb or roadway expansion joints or construction joints, and pavement can be removed without damaging or disturbing curbs or remaining pavement. Remove sidewalks in full squares only. Saw cut sidewalks if no true joint exists.

3.07. BASIS OF PAYMENT

Site Preparation will be considered incidental to the water main installation. No additional compensations will be provided for Site Preparation.

No additional compensation will be allowed for any reasonably anticipated dewatering operation, overtime, equipment rental or any other expense incurred due to the occurrence of ground water, surface water or water from possible leakage of existing buildings, structures and piping in the vicinity of the Contractor's operations. If Contractor believes unreasonable, unanticipated wet conditions exist, immediately contact Engineer to decide appropriate measures and to determine whether Contractor is entitled to additional compensation.

Payment for approved exploratory excavations will be at the Contract Unit Price per each for exploratory excavation at locations as specified on the plans or as approved by the Engineer and Owner. Backfill for the exploratory excavation will be considered incidental. Exploratory Excavation that is utilized for pipe trench is not eligible for payment as it is considered incidental to the pipe installation.

END OF SECTION 02000

SECTION 02210
TRENCHING, BACKFILLING AND COMPACTING

PART 1 – GENERAL

1.01. SUMMARY

This section includes trenching, backfilling and compacting at locations and elevations shown on the Drawings and as needed to meet requirement of Contract Documents. Furnishing and installing identification tape and location wire over the centerline of water mains, hydrant branches, and trenched services as indicated in this specification or noted in the Drawings.

1.02. DEFINITIONS

Refer to the Standard Details for Trench Terminology and Definitions.

1.03. REFERENCES

Refer to current standards:

- A. ASTM: American Society for Testing and Materials
- B. AASHTO: American Association of State Highway and Transportation Officials
- C. Standard Specifications for Water and Sewer Construction in Illinois

1.04. SUBMITTALS

- A. All backfill materials (to be used for backfill, haunching, and bedding depending on local requirements), including common fill and selected fill, $\frac{3}{4}$ -inch clean granular fill, $\frac{3}{4}$ -inch modified stone, $\frac{3}{4}$ -inch minus granular fill, and sand shall be approved by the Engineer prior to placing the materials in the pipe trench. Test all backfill materials, whether obtained from the trench excavation or from an off-site source, as directed by the Engineer.
- B. Submit samples of the materials to an approved testing agency for analysis as required by the Engineer. Submit the testing agency's test results and report to the Engineer. The report must state that the materials meet the requirements of these Specifications and the Specifications of Federal, State and Local authorities (where applicable). Provide flowable fill in areas where it is required by the local street regulator and other areas specified in the Drawings.
- C. Submit in accordance with Section 01300.

1.05. SITE CONDITIONS

- A. Contours, topography and profiles of the ground shown on the Drawings are believed to be reasonable approximations and are not guaranteed.
- B. The Contractor accepts the construction site with the conditions that existed at the time of bidding.

PART 2 – PRODUCTS

2.01. COARSE AGGREGATE

- A. ¾ inch clean granular fill material shall meet the sieve analysis requirements of AASHTO as follows: 1-inch sieve passing 100%, ½-inch sieve passing 0-5%, and sieve size No 4 passing 0-1%. This material may be wrapped in filter fabric (trench bottom, side, and over top of clean granular fill), as directed by the Engineer, to prevent the migration of finer grained soils into this material or the migration of this material into the trench bottom or sidewall.
- B. ¾ inch Minus or Modified granular fill material contains additional fine material and may be used as noted in specific pipe specifications. Material shall meet the sieve analysis requirements of AASHTO as follows: 1-inch sieve passing 100%, ¾-inch sieve passing 80-90%, No 4 sieve passing 25-50%, No 10 sieve passing 0-20% No 200 passing sieve 0-5%.

2.02. FINE AGGREGATE

- A. Fine Aggregate shall be natural or manufactured sand, or a combination thereof, free from injurious amounts of salt, alkali, vegetable matter or other objectionable material. The fine aggregate shall conform to the following gradation:

| Sieve Size | % Passing |
|------------|-----------|
| ¾ inch | 100 |
| No. 200 | 0-10 |

2.03. COMMON FILL

- A. Common fill is suitable for final backfill.
- B. Common Fill shall be earth materials entirely free of: vegetation; trash; lumber; and frozen, soft or organic materials. No stones or rocks larger than the sizes listed below will be permitted in the Common Fill:

Common Fill-Type A: No stones or rocks larger than 1-inch

Common Fill-Type B: No stones or rocks larger than 4-inches (measured longest dimension). At the discretion of the Engineer and depending upon the quality of

the material, stones and rocks up to a maximum of 6 inches may be allowed on the area one foot above the pipe.

- C. Common fill material may be obtained from the trench excavation provided it has been tested in accordance with the requirements of Specification Section 02210.1.04 above and approved by the Engineer. Furnish the necessary approved common fill materials from an off-site source whenever approved material obtained from the trench excavation is insufficient to complete the backfill.

2.04. FILTER FABRIC

Filter fabric shall be porous, non-woven fabric with multiple layers of randomly arranged fibers minimum 4.0 ounce per square yard.

Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.05. FLOWABLE FILL

- A. Flowable fill is suitable for use as backfilling for utility trenches. The basic requirements for furnishing, mixing, and transporting flowable fill are as follows. Materials shall conform to the following standards: Cement ASTM C 150, Fly Ash ASTM C 618, Class C or Class F. Fine Aggregate shall be natural or manufactured sand, or a combination thereof, free from injurious amounts of salt, alkali, vegetable matter or other objectionable material. It is intended that the fine aggregate be fine enough to stay in suspension in the mortar to the extent required for proper flow. The fine aggregate shall conform to the following gradation:

| Sieve Size | % Passing |
|------------|-----------|
| 3/4 inch | 100 |
| No. 200 | 0-10 |

If a flowable mixture cannot be produced, the sand may be rejected.

- B. The following are given as typical mix designs for trial mixes. Adjustments of the proportions may be made to achieve proper solid suspension and optimum flowability. Admixtures may be used if desired to improve the characteristics of the mix. The suggested quantities of dry material per cubic yard are as follows:

- **Option 1**

- Cement 50 lbs., Fly Ash 250 lbs., Fine Aggregate 2910 lbs., Water approximately 60 gallons

- **Option 2**

- Cement 100 lbs., Fly Ash 250 lbs., Fine Aggregate 2800 lbs., Water approximately 60 gallons

- **Option 3**

- Cement 100 lbs., Fly Ash 300 lbs., Fine aggregate 2600 lbs., Water approximately 70 gallons

- C. Consistency may be tested by filling an open-ended three inch diameter cylinder six inches high to the top with flowable fill. The cylinder shall be immediately pulled straight up and the correct consistency of the flowable fill shall produce a minimum eight inch diameter circular-type spread with no segregation.

Materials are to be measured by weight and/or volumetric methods. The flowable fill may be mixed in a central concrete mixer, a ready mix truck, or by other acceptable methods. The flowable fill shall be transported to the point of placement in a revolving drum mixer or in an agitator unit.

PART 3 – EXECUTION

3.01. CONSTRUCTION EQUIPMENT

All backfilling and materials handling equipment shall have rubber tires when mains are located in or adjacent to pavements. Crawler equipment shall be permitted when there is no danger of damaging pavement. It is the Contractor's responsibility, to repair, at their expense, any damages due to the use of any equipment to complete the Work.

3.02. NOISE, DUST AND ODOR CONTROL

Conduct all construction activities so as to eliminate all unnecessary noise, dust and odors.

3.03. PROTECTION OF TREES

Take special care to avoid damage to trees and their root system. Open trenching shall not be used for areas marked on the Drawings and designated "ROOT PROTECTION ZONE". In these areas, methods to be used include tunneling or boring. In other areas where established trees are to remain with roots in the path of the trench line, the Engineer shall direct acceptable means to install pipe through tree roots. In these areas, methods to be used shall include careful cutting (not ripping or tearing) of larger tree roots. In all cases, operate equipment within the limb spread in a manner which will not injure trees, trunks, branches or their roots. Pay particular attention when employing booms, storing materials, and handling excavated materials.

3.04. TRENCH SUPPORT

Support open cut excavation for mains where trenching may cause danger to life, unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. Support the sides of the excavation by adequate and suitable sheeting, shoring, bracing or other approved means in accordance with all applicable Federal, State, County, Municipal, and OSHA rules and regulations during the progress of the Work, whenever and wherever it is necessary. Maintain the trench support materials and equipment in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering life or property.

3.05. TRENCH EXCAVATION AND BOTTOM PREPARATION

- A. General Excavation shall consist of the satisfactory removal and disposal of all material taken from within the limits of the Work contracted, meaning the material lying between the original ground line and the finished ground line as shown on the Drawings regardless of whether the original ground line is exposed to air or is covered by water. Excavation below existing ground line to enable any required construction or removals is included. It is distinctly understood that any reference to earth, rock, silt, debris or other materials on the Drawings or in the Specifications is solely for the Owner's information and shall not be taken as an indication of classified excavation or the quantity of earth, rock, silt, debris or other material encountered.

General Excavation includes excavation to the lines and grades indicated on the Drawings or established in the field by the Engineer. Backfill over-excavated areas with approved fill material. All labor and materials shall be furnished at the Contractor's expense.

Keep all excavations free from water. Maintain groundwater a minimum of 6 inches below excavations. Remove soil which is disturbed by pressure or flow of groundwater and replace with free draining material.

Remove pavement over excavations made in paved roadways by saw cutting, milling, or removal by a trench machine. Cut the full depth of the pavement with straight lines and squared edges.

Dispose of excess excavated materials and excavated materials unsuitable for backfilling off site. Furnish the Engineer with satisfactory evidence that an appropriate disposal site was used.

- B. Rock Excavation shall consist of the removal, hauling, stockpiling and/or proper disposal the rock. Rock is defined as

1. Boulders, or pieces of concrete or masonry, having a volume of one-half (1/2) cubic yard or more;
2. Material which cannot be loosened or broken down by ripping with a hydraulic ripper or other Engineer approved devices and equipment designed to remove rock; or
3. Material that requires systematic blasting, backhoe ramming, barring, or wedging for removal.

Notify the Engineer promptly upon encountering rock. The Engineer's determination as to whether the material meets the definition of rock and Engineer's measurement of the volume of rock removal for which the Contractor is entitled to payment will be final and conclusive. No payment will be made for rock removed without Engineer's approval.

Strip rock for measurements as directed by the Engineer. No payment will be made for rock excavated or loosened before measurement. Only rock actually removed will be paid for, and in no case will payment be made for rock removal beyond the payment

limits shown for a standard trench or more than 12 inches beyond the edge of a pipeline or 8 inches below its bottom for pipes of nominal OD 24 inches and less, unless such rock has been removed at the direction of Engineer.

- C. Blasting Rock is not allowed unless expressly permitted by the Engineer. Notify the Engineer in advance of blasting activity. Provide evidence to the Engineer that the proposed blasting will comply fully with Laws or Regulations.

Do not blast where limited or prohibited by any Federal, State or Local laws or regulations, or in violation of any limitation or restriction contained in any right-of-way, or wherever specifically prohibited in any Drawing or other Contract Document. Do not blast within forty (40) feet of any pipe or structure without specific permission from the Owner. Properly cover blasts and protect the pipe or structure. Warn all persons in the vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property. Secure and pay for all necessary permits. Perform whatever pre-blast surveys and investigations that may be required by the circumstances and/or by Federal, State or Local laws.

Prepare a blasting plan and submit it to the Engineer for approval prior to commencing any blasting work. The plan shall state all procedures and methods which will be used to monitor and mitigate the effect or impact of the proposed blasting work.

Employ an experienced blaster holding a blasting license issued by the applicable State to carry out the blasting work. Use, handle, and store explosives as prescribed by the applicable State and Federal regulations. Keep all explosives in a safe place at a sufficient distance from the Work so that, in case of accident, no damage will occur to any part of the Work. Contractor shall be held responsible for and shall pay for all damage caused by blasting operations or accidental explosion.

- D. Trench Width shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits. Contractor will only be compensated for the minimum trench width described below for the purposes of determining excavation and backfill pay items when items are not considered incidental:

Trench Depth

4' or less : Outside diameter of the pipe barrel plus 24 inches, i.e., 12 inches each side.

5' or more: Outside diameter of the pipe barrel plus 36 inches, i.e., 18 inches each side.

- E. Excessive Trench Width shall be provided additional backfill, haunching, and bedding material as specified in Specification Sections 02210-3.06, 02210-3.07, and 02210-3.08 as approved by the Engineer to fill any trench excavation that exceeds the trench width defined in Specification Section 02110-3.05.D. Dispose of excess excavated materials off site. Furnish the Engineer with satisfactory evidence that an appropriate

disposal site was used. The excavation, backfill, and disposal resulting from excessive trench width shall be at no additional cost to the Owner.

- F. Trench Depth shall provide prescribed minimum cover from the top of the pipe barrel to the top of the finished grade, unless otherwise authorized by the Engineer or as shown on the Drawings.
1. Earth - Excavate to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel on solid and undisturbed ground at every point between joints. It will be permissible to disturb the finished trench bottom over a maximum length of 18 inches near the middle of each length of pipe by the withdrawal of pipe slings or other lifting tackle. Provide bell holes and prepare the finished trench bottom accurately using hand tools.
 2. Rock - Excavate trenches in rock or boulders 8-inches below the pipe barrel for pipe 24-inches or less in diameter. Remove all loose material from the trench bottom. Prepare a pipe bed using bedding material as specified in Specification Section 02210-2.01.
 3. Unsuitable Bottom - Notify the Engineer whenever unsuitable material is found. Remove the material over the area and to the depth determined by the Engineer. Provide compacted bedding material as specified in Specification Sections 02210-2.01 to restore the trench bottom to the required grade.
- G. Open Trench Length shall be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, Engineer may require special construction procedures such as limiting the length of the open trench or prohibiting stacking excavated material in the street. Take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public, shall be well lighted.

3.06. TRENCH BACKFILLING - OPEN TERRAIN

All trench backfilling shall be compacted so that no settlement occurs and is stable with surrounding soil that also shall not have settled.

A. Bedding

1. Ductile Iron Pipe

- i. Undisturbed Earth
- ii. In Rock or Unsuitable Soil - When encountering rock or unsuitable material, prepare pipe bedding immediately before pipe is laid. Provide compact Coarse Aggregate as described in Specification Section 02210-2.01 from 6 inches below the pipe to the bottom of the pipe.

2. PVC or HDPE

- i. Prepare pipe bedding immediately before pipe is laid. Use compacted Coarse Aggregate as described in Specification Section 02210-2.01 from 6 inches below the pipe to the bottom of the pipe.
 - B. Haunching shall be placed from the bottom of the pipe barrel to the centerline (springline) of the pipe barrel with Coarse Aggregate as described in Specification Section 02210-2.01. Take care to avoid injuring or moving the pipe. Place the material in uniform 6 to 12 inch loose layers and compact each layer to eliminate the possibility of settlement, pipe misalignment, or damage of joints.
 - 1. Ductile Iron Pipe – Haunching fill material for Ductile Iron Pipe may also include the following:
 - i) Coarse to fine, sandy natural soil material with maximum stone size of 1-inch or local approved selected backfill materials as noted on Standard Details and defined below in Specification Section 02210.2.03. The material shall conform to ASTM D 2487 “Standard Method for Classification of Soils for Engineering Purposes” using the “Unified Soil Classification System”, except where a higher standard is required elsewhere in the Contract Documents or by rules or regulations of Federal, State or Local governmental bodies having jurisdiction over the site of the Work.
 - ii) Materials shall meet the Class II soil type designation. Class II soil types include GW, GP, SW and SP that are described as non-cohesive, well graded and containing some fines. Voids, finer grained soils or movement can allow undesirable migration of haunching material or migration of the trench sidewall material into the haunching material. In such instances place filter fabric, as directed by the Engineer, in the trench bottom and sides before placing the haunching material.
 - iii) Haunching material may be obtained from the trench excavation provided it has been approved by the Engineer who may, at their discretion, require testing in accordance with the requirements of Specification Section 02210-1.04 above. Furnish the necessary approved haunching materials from an off-site source whenever approved material obtained from the trench excavation is insufficient to complete the haunching.
- C. Initial Backfill - Backfill from the centerline (springline) of the pipe barrel to 12 inches above the pipe with Common Fill-Type A as described in Specification Section 02210-2.03 or Coarse Aggregate as described in Specification Sections 02210-2.01. See Standard Details for required initial trench backfill material. Mechanical equipment may be used to place the backfill. Place the material in such a manner that the material does not free fall, but rather flows onto the previously placed material. Consolidate the backfill in such a manner as will ensure the minimum possible settlement and the least interference with traffic. Do not compact the backfill with mechanical equipment, such as wheeled vehicles, unless sufficient cover is provided over the pipe to prevent damage to the pipe.

1. The use of common fill is permitted in some circumstances, with approval of the Engineer, as initial backfill for HDPE pipe; however the size of stone and rock for backfill is limited in accordance with the pipe diameter. The maximum stone or rock size is limited to 1/2-inch for pipes up to 4-inch diameter, 3/4-inch for pipes 6-inch to 8-inch diameter, 1-inch for pipes 10-inch to 16-inch diameter and 1-1/2-inch for larger pipes.
- D. Final Trench Backfill - Backfill trench from 12 inches above the pipe to final grade with Common Fill-Type B as described in Specification Section 02210-2.03. Mechanical equipment may be used to place the backfill. Place the material in such a manner that the material does not free fall, but rather flows onto the previously placed material. Consolidate the backfill in such a manner as will ensure the minimum possible settlement and the least interference with traffic. Do not compact the backfill with mechanical equipment, such as wheeled vehicles, unless sufficient cover is provided over the pipe to prevent damage to the pipe.
 - E. Surface Conditions - Attend to the trench surface regularly during the course of the Contract. Take prompt corrective measures to correct any settlement or washout. Maintain the trench surface in a safe condition that does not interfere with natural drainage.
 - F. Deficiency of Backfill - Any material required for backfilling the trenches or for filling depressions caused by settlement or washout shall be supplied and placed by the Contractor at no additional cost to the Owner.
- 3.07. TRENCH BACKFILLING – Under or within 24 inches of driveways, sidewalks and roads
- A. Bedding
 3. Ductile Iron Pipe
 - i. Undisturbed Earth
 - ii. In Rock or Unsuitable Soil - When encountering rock or unsuitable material, prepare pipe bedding immediately before pipe is laid. Provide compact Coarse Aggregate as described in Specification Section 02210-2.01 from 6 inches below the pipe to the bottom of the pipe.
 4. PVC or HDPE
 - i. Prepare pipe bedding immediately before pipe is laid. Use compacted Coarse Aggregate as described in Specification Section 02210-2.01 from 6 inches below the pipe to the bottom of the pipe.
 - B. Haunching shall be placed from the bottom of the pipe barrel to the centerline (springline) of the pipe barrel with Coarse Aggregate as described in Specification Section 02210-2.01. Take care to avoid injuring or moving the pipe. Place the material

in uniform 6 to 12 inch loose layers and compact each layer to eliminate the possibility of settlement, pipe misalignment, or damage of joints.

- C. Initial Backfill - Backfill from the centerline (springline) of the pipe barrel to 12 inches above the pipe with Coarse Aggregate as described in Specification Sections 02210-2.01. Mechanical equipment may be used to place the backfill. Place the material in such a manner that the material does not free fall, but rather flows onto the previously placed material. Consolidate the backfill in such a manner as will ensure the minimum possible settlement and the least interference with traffic. Do not compact the backfill with mechanical equipment, such as wheeled vehicles, unless sufficient cover is provided over the pipe to prevent damage to the pipe.
- D. Final Trench Backfill - Backfill trench from 12 inches above the pipe to final grade with Coarse Aggregate as described in Specification Section 02210-2.01. Mechanical equipment may be used to place the backfill. Place the material in uniform 6 to 12 inch loose layers and compact each layer to eliminate the possibility of settlement, pipe misalignment, or damage of joints. Consolidate the backfill in such a manner as will ensure the minimum possible settlement and the least interference with traffic. Do not compact the backfill with mechanical equipment, such as wheeled vehicles, unless sufficient cover is provided over the pipe to prevent damage to the pipe.
- E. Surface Conditions - Attend to the trench surface regularly during the course of the Contract. Take prompt corrective measures to correct any settlement or washout. Maintain the trench surface in a safe condition that does not interfere with natural drainage.
- F. Deficiency of Backfill - Any material required for backfilling the trenches or for filling depressions caused by settlement or washout shall be supplied and placed by the Contractor at no additional cost to the Owner.

3.08. SPECIAL BACKFILLING – Under roads – option to the Contractor

- A. Bedding – See Section 3.07
- B. Haunching and Initial Backfill – See Section 3.07
- C. Remaining Trench Backfill - Backfill from 12 inches above the pipe to subgrade, all cuts, excavations, or other damage done to the public right-of-way with flowable fill as described in Specification Section 02210-2.05. Use flowable fill when required as a condition of the right-of-way excavation permit.
 - 1. Placement of flowable fill - Discharge the mixture from the mixing equipment into the space to be filled by a reasonable means. The flowable fill shall be brought up uniformly to the fill line. Each filling stage shall be as continuous as practicable. Do not place concrete on the flowable fill until all bleeding water

has disappeared and the resistance, as measured by ASTM C403, is at least 60 psi, or as directed by Engineer. Do not place pavement until at least 24 hours after the fill is completely in place.

2. Limitations of flowable fill - Do not place flowable fill on frozen ground. Protect flowable fill from freezing until the material has stiffened and bleeding water has disappeared. As the temperature nears freezing, additional curing time may be needed.

D. Surface Conditions - Attend to the trench surface regularly during the course of the Contract. Take prompt corrective measures to correct any settlement or washout. Maintain the trench surface in a safe condition that does not interfere with natural drainage.

E. Deficiency of Backfill - Any material required for backfilling the trenches or for filling depressions caused by settlement or washout shall be supplied and placed by the Contractor at no additional cost to the Owner.

3.09. QUALITY ASSURANCE TESTING

The Owner reserves the right to have the Contractor provide independent quality assurance testing for the backfill material, at the Contractor's expense.

3.010. TRENCH MAINTENANCE

Contractor shall assume full responsibility for the condition of the trenches for a period of one (1) year from the date of the final acceptance of the Contractor's Work, or as required by State, County or Local authorities. Any materials required for filling depressions caused by settlement or washout shall be supplied and placed by the Contractor at no additional cost to the Owner.

3.011. BASIS OF PAYMENT

The Work included in this Section and shown on the Drawings is considered incidental to the water main installation except when special backfill materials are needed. When excavated material is not suitable for backfill, special backfill material will be measured based on the maximum trench width and depth of the water main. Payment will be made at the Contract Unit Price per ton for granular backfill. Payment will be made at the Contract Unit Price per cubic yard for flowable fill.

END OF SECTION 02210

SECTION 02220
CASING INSTALLATION (STEEL)

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing steel casing pipe at locations shown on the Drawings in accordance with any Federal, State, or Local Highway requirements or applicable Railroad requirements, whichever may be more restrictive. See Standard Details for typical casing installation details. This section does not include Horizontal Direction Drilling (HDD) installation method.

1.02. RELATED WORK

A. Specification Section 02210 – Trenching, Backfilling, and Compacting

1.03. REFERENCES

Refer to current standards:

A. AWWA C206 – Field Welding of Steel Water Pipe

B. Railroad Utility Crossing Standards

C. Illinois Department of Transportation Standard Specifications for Road and Bridge Construction

1.04. SUBMITTALS

A. Submit details of proposed installation method for information only, including, but not limited to:

- a. Working and receiving shafts.
- b. Dewatering.
- c. Method of removing soils and installation of casing and carrier pipe.
- d. Size, capacity, and arrangement of equipment.
- e. Backstop.
- f. Shaft base material.
- g. Type of cutter head.
- h. Method of monitoring and controlling line and grade.
- i. Detection of surface movement.
- j. Procedure for installing pipe supports, anchors, or placement of grout between carrier pipe and casing pipe.
- k. Bulkhead details and proposed positive method of anchoring carrier pipe to prevent flotation.
- l. Catalog data for casing spacers when used for temporary support during construction.
- m. Procedure for monitoring line and grade.

- B. Submit details of jacking or boring pits showing locations, dimensions, and details of sheeting and shoring required, if requested.
- C. Submit manufacturer’s literature for spacers, end seals, and casing vents.
- D. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. STEEL CASING PIPE

Casing pipe shall be bare wall steel pipe with a minimum yield strength of 35,000 psi and a minimum wall thickness as listed below:

| Casing Outside Diameter (inches) | Highway Crossing Casing Wall Thickness (inches) | Railroad Crossing Casing Wall Thickness (inches) |
|----------------------------------|---|--|
| 8.625 | 0.250 | 0.250 |
| 10.75 | 0.250 | 0.250 |
| 12.75 | 0.250 | 0.250 |
| 14 | 0.250 | 0.281 |
| 16 | 0.250 | 0.281 |
| 18 | 0.250 | 0.312 |
| 20 | 0.312 | 0.344 |
| 24 | 0.312 | 0.406 |
| 30 | 0.375 | 0.469 |
| 36 | 0.500 | 0.532 |
| 42 | 0.500 | 0.563 |
| 48 | 0.625 | 0.625 |
| 54 | 0.625 | 0.688 |
| 60 | 0.625 | 0.750 |
| 66 | 0.625 | 0.813 |
| 72 | 0.750 | 0.875 |

Smooth wall steel plates with a nominal diameter of over 54 inches shall not be permitted.

The inside diameter of the casing pipe shall be: at least four (4) inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe less than six (6) inches in diameter; and at least six (6) inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe six (6) inches and greater in diameter.

2.02. CASING END SEAL

- A. Casing end seals shall be a pull-over type construction and made from minimum 1/8-inch Neoprene with ½-inch wide T-304 stainless steel bands for securing the ends of the end seal to the casing pipe and carrier pipe.

- B. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.03. CASING INSULATORS

- A. The carrier pipe and casing shall be separated by an insulator or casing spacer. Timber skids are not allowed. Casing insulators shall be sized according to the manufacturer's specifications for pipe sizes.
- C. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. ALIGNMENT AND GRADE

Locate pipelines to cross sewers, roadways, or tracks as shown on the Drawings. Install the casing pipe on an even grade for its entire length and sloped to one end or as noted in a profile plan if provided. Satisfy a maximum tolerance of 1.5% (18 inches in one hundred feet) with the desired location of the casing or as otherwise required by regulation or specified on the Drawings, whichever is more restrictive.

3.02. WELDING

Connect steel casing sections by welding. Welding shall conform to AWWA Standard C206.

3.03. PROTECTION AT ENDS OF CASING

Block up both ends of casings in such a way as to prevent the entrance of foreign material, but to allow leakage to pass in the event of a carrier break.

3.04. DEPTH OF INSTALLATION

Unless the depth of casing pipe is specifically specified on the Drawings, the casing pipe depth shall be in accordance with highway or railroad requirements.

3.05. CASING INSULATORS

The insulator spacing shall be installed to support the weight of the pipe and contents. As a minimum, an insulator shall be placed a maximum of 3 foot from each side of a joint and evenly spaced along the carrier pipe with 3 insulators per each length of carrier pipe.

3.06. INSTALLATION

- A. Installation methods of casing pipes must be approved by the Engineer and governing transportation agency and or regulating authority. Prepare boring or jacking pits and receiving pits in accordance with limitations shown on the Drawings or contained in permits obtained for the Work.

- a. Jacking

This method shall be in accordance with the current American Railway Engineering Association Specifications, Chapter 1, Part 4, "Jacking Culvert Pipe Through Fills", except that steel pipe shall be used with welded joints. Conduct this operation without hand mining ahead of the pipe and without the use of any type of boring, auguring or drilling equipment.

Design the bracing, backstops, and jacks so that the jacking can progress without stoppage (except for adding lengths of pipe).

b. Drilling

This method employs the use of an oil field type rock roller bit, or a plate bit made up of individual roller cutter units, welded to the pipe casing being installed. Turn the pipe for its entire length from the drilling machine to the head to give the bit the necessary cutting action against the ground being drilled. Inject high density slurry (oil field drilling mud) through a supply line to the head to act as a cutter lubricant. Inject this slurry at the rear of the cutter units to prevent any jetting action ahead of the pipe. Advance the drilling machine on a set of steel rails (thus advancing the pipe) by a set of hydraulic jacks. The method can be used to drill earth or rock.

c. Boring

This method consists of pushing the pipe into the fill with a boring auger rotating within the pipe to remove the soil. When augers or similar devices are used for pipe placement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

- B. Provide adequate supplies to allow continuous operations to be maintained once operations begin. Additional compensation will not be allowed for problems resulting from failure of Contractor to maintain continuous operations.
- C. Provide Engineering and Owner a minimum 48-hour notice prior to starting the installation.
- D. Excavate boring or jacking pits and receiving pits to field verify existing piping locations and depths. If rock is encountered during pit excavation, follow procedures described in Specification Section 02210.
- E. Take measures required to protect roadways, railroad tracks, embankments, and other surfaces above installation from settlement or damage of any type.

- F. If an obstruction is encountered during installation that stops the forward action of the pipe, and if it becomes evident that it is impossible to advance the pipe, operations will cease and the pipe shall be abandoned in place and filled completely with grout.
- G. Bored or jacked installations shall have a bore hole essentially the same as the outside diameter of the pipe. Grout any voids that develop. Also grout around the casing pipe when the bore hole diameter is greater than the outside diameter of the pipe by more than 1 inch.

3.07. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price per linear foot of casing installed. The Contract Unit Price shall include all casing pipe, casing end seals, casing insulators, strapping, skids, anchors, harnesses, etc. as required or as necessary for a complete and satisfactory installation. The Contract Unit Price shall include all excavation (soil) dewatering, jacking, drilling or boring (rock or soil), backfilling, sheeting, bracing, shoring, temporary construction, and all safety measures as necessary for a complete and satisfactory installation. Payment for rock excavation as described in Specification Section 02210. **DOES NOT INCLUDE THE WATER MAIN.**

END OF SECTION 02220

SECTION 02225
CASING INSTALLATION (PVC)

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing PVC casing pipe at locations shown on the Drawings in accordance with any Federal, State, or Local, whichever may be more restrictive.

1.02. RELATED WORK

A. Specification Section 02210 – Trenching, Backfilling, and Compacting

1.03. REFERENCES

Refer to current standards:

A. Illinois Administrative Code, Title 35, Subtitle F, Chapter II, Parts 651-654

B. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution

C. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution

1.04. SUBMITTALS

A. Submit manufacturer's literature for spacers, end seals, and casing vents.

B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. PVC CASING PIPE

PVC casing pipe shall conform to the latest edition of American Water Works Association (AWWA) Standards C900/C905. PVC casing pipe shall have a Dimension Ratio of 25 and shall be certified suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory (NSF Standard No. 61). The size of the pipe casing shall be shown on the Drawings. Bored casings shall be restrained joint PVC.

2.02. CASING END SEAL

A. Casing end seals shall be a pull-over type construction and made from minimum 1/8-inch Neoprene with 1/2-inch wide T-304 stainless steel bands for securing the ends of the end seal to the casing pipe and carrier pipe.

- B. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.03. CASING INSULATORS

The use of casing spacers are not required in encasements of less than 30 feet. Encasements greater than 30 feet shall include casing spacers in accordance with Specification Section 02220 – Casing Installation (Steel).

PART 3 – EXECUTION

3.01. ALIGNMENT AND GRADE

Locate pipelines to cross sewers, roadways, or tracks as shown on the Drawings. Install the casing pipe on an even grade for its entire length and sloped to one end or as noted in a profile plan if provided. Satisfy a maximum tolerance of 1.5% (18 inches in one hundred feet) with the desired location of the casing or as otherwise required by regulation or specified on the Drawings, whichever is more restrictive.

3.02. PROTECTION AT ENDS OF CASING

Block up both ends of casings in such a way as to prevent the entrance of foreign material, but to allow leakage to pass in the event of a carrier break.

3.03. DEPTH OF INSTALLATION

Unless the depth of casing pipe is specifically specified on the Drawings, the casing pipe depth shall be in accordance with local requirements.

3.04. BORING INSTALLATION

- A. Installation methods of casing pipes must be approved by the Engineer and governing transportation agency and or regulating authority. Prepare boring pits and receiving pits in accordance with limitations shown on the Drawings or contained in permits obtained for the Work.
- B. Provide adequate supplies to allow continuous operations to be maintained once operations begin. Additional compensation will not be allowed for problems resulting from failure of Contractor to maintain continuous operations.
- C. Provide Engineering and Owner a minimum 48-hour notice prior to starting the installation.
- D. Excavate boring pits and receiving pits to field verify existing piping locations and depths. If rock is encountered during pit excavation, follow procedures described in Specification Section 02210.
- E. Take measures required to protect roadways, railroad tracks, embankments, and other surfaces above installation from settlement or damage of any type.

- F. If an obstruction is encountered during installation that stops the forward action of the pipe, and if it becomes evident that it is impossible to advance the pipe, operations will cease and the pipe shall be abandoned in place and filled completely with grout.
- G. Bored installations shall have a bore hole essentially the same as the outside diameter of the pipe. Grout any voids that develop. Also grout around the casing pipe when the bore hole diameter is greater than the outside diameter of the pipe by more than 1 inch.

3.05. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price per linear foot of casing installed. The Contract Unit Price shall specify and differentiate PVC Casing for separation and PVC Casing for bores. The Contract Unit Price shall include all casing pipe, casing end seals, casing insulators, strapping, skids, anchors, harnesses, etc. as required or as necessary for a complete and satisfactory installation. The Contract Unit Price shall include all excavation (soil) de-watering, drilling or boring (rock or soil), backfilling, sheeting, bracing, shoring, temporary construction, and all safety measures as necessary for a complete and satisfactory installation. Payment for rock excavation as describing in Specification Section 02210. **DOES NOT INCLUDE THE WATER MAIN.**

END OF SECTION 02225

SECTION 02230
STREAM CROSSING

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing all labor, materials, and equipment necessary to install stream crossings as shown on the Drawings, as described in the construction documents, as shown on Standard Details, and in accordance with the requirement of the regulating agency. This section includes open cut installation. If trenchless installation is required, see Supplemental Technical Specifications.

1.02. SCOPE OF WORK

- A. Install the stream crossings in such a manner as to protect the mains from erosion and to restore, as much as practicable, the stream banks and bottom to their original condition and in compliance with requirements of the regulating agency.
- B. Protect the main from erosion by concrete encasement around the pipe or by a sufficient depth of compacted backfill as shown in the Drawings.

1.03. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling, and Compacting
- B. Specification Section 03300 – Cast-in-Place Concrete
- C. Specification Section 15000 – Piping – General Provisions

1.04. SUBMITTALS

- A. Construction Procedure if not provided as a condition of the regulators stream opening permit.
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01. CONSTRUCTION PROCEDURE

The Contractor shall comply with construction procedures if provided as a condition of the regulators stream opening permit. If methodology is not provided through permitting process, provide and submit the same to the Engineer and all Federal, State and Local authorities having jurisdiction over the stream crossing for their review and approval.

3.02. STREAM BANK RESTORATION

- A. Restore the stream banks by backfilling the main trench with mechanically compacted backfill of earth or rip rap, approved by the Engineer and in compliance with regulatory requirements, to the original ground surface (unless new contours are shown on Drawings). The limits of compaction shall extend from the top of bank to top of bank on each side of the crossing as determined by the Engineer or as shown on the Standard Details provided.
- B. Immediately following the completion of a stream crossing, place straw bales or silt fence along the trench excavation on each stream bank from within two (2) feet of the edge of water to beyond the limits of the excavated trench width as shown on the Drawings and in compliance with regulatory requirements. Straw bales or silt fence shall remain in place until after the stream banks have been fine graded, fertilized and seeded, and the seeding has grown sufficiently to protect the stream banks from erosion.

3.03. STREAM BOTTOM RESTORATION

Backfill the trench within the stream bottom (high water to high water) mechanically compacted earth or riprap that has been approved by the Engineer and meeting regulatory requirements. Rip rap placement must be flush with stream bottoms from upstream to downstream.

3.04. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price (EA) for each stream crossing. The Contract Unit Price shall include all Work in excess of the normal pipeline installation as described in Sections 15000, 15105, 15120, 15122, and 15125. The Contract Unit Price shall include any specials, anchors, joint harness etc., as required by this specification. In addition, the Contract Unit Price shall include backfill, extra excavation depth, rip rap (where required), concrete encasement (where required), dewatering, bank stabilization and providing an approved means for holding the pipe in place, constructing of cofferdams, stone backfill, and all restoration. **DOES NOT INCLUDE THE WATER MAIN OR ITEMS OTHERWISE INCIDENTAL TO WATER MAIN INSTALLATION.**

END OF SECTION 02230

SECTION 02450

HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1: GENERAL

1.01 SCOPE

- A. Furnish all labor, materials, tools and equipment as necessary to construct a pipeline crossing by the horizontal directional drilling method. Furnish all labor, equipment, materials and supplies and perform all work necessary to provide OWNER with a complete, finished water main crossing. The finished work includes proper installation testing, restoration of underground utilities and environmental protection and restoration.

1.02 RELATED SECTIONS

Submittals – Section 01300
Excavation, Backfilling and Compaction – Section 02200
Piping - General Provisions - Section 15000
Disinfecting Pipelines – Section 15020

1.03 QUALITY ASSURANCE:

- A. The HDD equipment operator(s) shall be trained to operate the specific Horizontal Directional Drilling equipment for the Owner’s project with at least 3 years experience in directional drilling obtained within the last five years. All pipe and appurtenances of similar type and material shall be furnished by a single manufacturer.
- B. Perform HDD operations under the constant direction of a drilling supervisor who shall remain on site and be in responsible charge throughout the drilling operation. The Contractor’s supervisor shall have supervised directional drilling of a minimum of 5,000 linear feet of pipe of a similar or greater diameter, of similar material, over similar lengths, and with similar subsurface conditions.
- B. The requirements set forth in this Specification specify a wide range of procedural precautions necessary to insure that the basic, essential aspects of a proper Directional Bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this Specification.
- C. Perform the work in general conformance with ASTM Standard F1962-05, current revision, “Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit under Obstacles, Including River Crossings.”

- D. Adhere to the specifications; any changes must be expressly approved by the Engineer's. Approval of any aspect of any Directional Bore operation covered by this Specification shall in no way relieve the Contractor of its ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

1.04 PROFILES AND TOPOGRAPHY

- A. Contours, topography and profiles of the ground as may be shown on the Contract Drawings are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. It is the Contractor's responsibility to verify all elevations required to successfully complete the crossing.

1.05 SUBMITTALS

- A. Prior to beginning work, submit to the Engineer copies of a report of schedules, calculations, procedures and any supplemental subsurface soil condition investigations performed along the path of the proposed crossing. Number of copies of the report shall be as specified in Section 01300. The report will summarize the subsurface conditions that are known to the Contractor and that his proposed crossing procedure is based upon factual, best available information. If the subsurface conditions are known to the Contractor by previous work or geotechnical studies done in the immediate area, the information shall be recorded in the report along with any additional geotechnical studies performed by the Contractor. The report shall include the following:

- 1. Subsurface Information

- a. Record in the report subsurface conditions known to the Contractor by previous work or prior geotechnical studies performed in the immediate project area.
- b. Boring information obtained by the Owner, if any, is listed in the Supplementary Conditions section of these Specifications.
- c. Additional borings performed by the Contractor and analysis of soils along the path of the proposed crossing. The Contractor shall be responsible for obtaining and including in his bid price the cost of any additional borings along the pipe alignment which may be necessary to design the proposed directionally drilled crossing.

At a minimum any supplemental borings performed by the Contractor shall include standard classification of soils, standard penetration tests, split spoon sampling and sieve analysis. Test borings shall be performed to a minimum depth of ten (10) feet below the proposed pipe invert unless

rock is encountered in which case test borings shall penetrate at least two feet into rock.

2. Drilling Equipment and Methods

- a. Submit information on equipment and written procedure with working drawings describing in detail the proposed boring method and the entire operation to be used. This shall include, but not be limited to, entry and exit pits; settlement pit; size, capacity and arrangement of drilling and pulling equipment; layout of carrier pipe; details and spacing of pipe rollers; type of current head; method of monitoring and controlling line and grade; method of detection of surface movement; and layout of any proposed construction staging areas.
- b. In addition, submit for approval nameplate data for the drilling equipment, mobile spoils removal unit, and Material Safety Data Sheets (MSDS) information for the drilling slurry compounds. This must be submitted and reviewed by the Engineer before work can proceed.

3. Piping

Submit shop drawings showing the pipe lengths, design details, joint details, etc. for the Engineer's review. Submittals shall include, but are not limited to, the following:

- a. All welding or fusion procedures to be used in fabrication of the different pipe materials and installation methods.
- b. Certified records for hydrostatic testing of all pipe materials to be used.
- c. An affidavit stating that all pipe materials furnished under this section have been manufactured in the United States of America and comply with all applicable provisions of referenced AWWA standards.

4. Proposed Alignment

Submit a graph in plan and profile plotting the pilot drilling hole alignment to the Engineer for review, including entry/exit angles and radius of curvature. After completion of the crossing, submit a final pipe alignment.

5. Schedule

Time schedule for completing the Directional Bore, including any delays due to anticipated soil conditions.

6. Calculations

- a. Submit detailed design calculations for several representative loading conditions for the proposed crossing. If requested by the Engineer, submit calculations to support the design of any particular location of pipe anywhere along the length of the crossing at no additional cost to the Owner.
- b. Design calculations shall be presented in a neat, readable format, with all figures, values and units included to facilitate ease of verification.
- c. Calculations shall be submitted to demonstrate that the pipe thickness design is sufficient to meet all design criteria specified.
- d. Calculations shall address the following loading conditions:
 - i) Pre-installation:

Hoop and longitudinal stress during hydrostatic test; spanning stress with pipe full of water and supported on installation rollers, and maximum roller / support spacing.
 - ii) Installation/Post-Installation

Longitudinal stress from pulling force; longitudinal curvature stress at point of entry and in final position; external pressure from drilling fluid, overburden, and loads from the obstacle being crossed.
 - iii) Post-Installation/In-Service

Hoop and longitudinal stress during hydrostatic test; internal working and surge pressure; buckling with internal vacuum.
- e. Perform and submit to the Engineer fluids pressure versus overburden strength calculations. These calculations shall be performed to determine minimum acceptable cover requirements and prevent drilling fluids breakout to the ground surface.
- f. All calculations shall bear the seal of a Registered Professional Engineer. Licensure in the State that the work is performed is preferred.

B. Approval

1. No work shall commence without approval by the Engineer. Details and design calculations shall be submitted and approved well in advance of the drilling operation to prevent delays in work. All final layout work, including grades, shall be the Contractor's responsibility.

1.06 JOB CONDITIONS:

- A. Any nighttime work is strictly regulated and will be allowed only with prior approval granted by the Owner subject to regulatory agencies having jurisdiction. All crossing operations shall be accomplished during daylight hours, unless approved by the Engineer. Crossing work shall not begin after the hour pre-established as the latest starting time that will allow completion during daylight hours, unless approved by the engineer. The Contractor shall provide a Work Plan submittal indicating its proposed hours of operation and length of work week. All work plans shall be subject to compliance with all applicable regulatory requirements for construction activities and any off site impacts.
- B. When hazards of night time work are carefully considered and determined to be insignificant, night time work may be allowed only to complete a properly planned crossing, and only if in the opinion of the Engineer the delay was caused by reasonably unavoidable circumstances, and that such night time work is necessary to avoid placing an undue economic hardship on the Contractor.
- C. In emergency situations, or where delay would increase the likelihood of a failure, nighttime work may be allowed to complete a delayed crossing.
- D. All operations shall continue on a 24-hour per day basis during pipe pull back.

1.07 COORDINATION OF WORK

- A. Coordinate connections to existing pipelines that require shutdown of OWNER facilities. OWNER will designate the time for these connections that could involve work during evenings, nights, Saturdays, Sundays, or holidays. Method of connection and designated times are to cause the least amount of disruption to OWNER'S water service to its customers. The cost for connections is to be included in the contract price. No contract price adjustment will be allowed for overtime, premium time, or other related costs.

1.08 USE OF EXISTING WATER SYSTEMS:

- A. All use of existing water systems during construction by the Contractor shall be with the approval and direction of the system Owner and its representatives. The Contractor shall be responsible for all permits, fees, temporary piping, temporary meter rental/provisions, temporary backflow preventer rental/provision and other water utility requirements for supplying water during construction. The Contractor shall use the existing water system only at locations, times and conditions as set forth by the system owner or its representatives.
- B. If water is not readily available at the site or the Owner cannot provide the volume of

flow required by the Contractor, provide potable water as needed from an off-site location at no additional cost to the Owner.

PART 2: PRODUCTS

2.01 PIPE

Unless otherwise specified in the Contract Documents, pipe installed by horizontal directional drilling shall either be high density polyethylene pipe (HDPE), steel pipe, or ductile iron pipe specifically designed for directional drilling. Unless otherwise specified in the Contract Documents, the water main pipe (carrier pipe) shall be installed without a casing pipe.

A. POLYETHYLENE PIPE

1. High Density Polyethylene (HDPE) Pipe, AWWA C-906 compliant, NSF 61 Standard Listed, and furnished in fifty (50) foot lengths.
2. Polyethylene pipe shall be furnished with an outside diameter conforming to ductile iron pipe sizes. Minimum thickness of HDPE pipe shall be determined by the contractor's calculations, but shall not be considering in-service loading shall not be less than DR 11 when measured in accordance with ASTM D-2122.
3. All polyethylene pipe and fittings shall be made of a high-density polyethylene pipe compound with extra high molecular weight that meets the requirements for Type III, Grade P34 Polyethylene material as defined in ASTM D-1248, latest revision.
4. Pipes shall be jointed to one another and to polyethylene fittings by thermal butt-fusion or by socket fusion in accordance with ASTM D-3261.
5. Joining of pipe sections shall be performed in accordance with the procedures recommended by the pipe manufacturer. Joints between pipe sections shall be smooth on the inside and internal projection beads shall not be greater than 3/16-inch.
6. The tensile strength at yield of the butt-fusion joints shall not be less than the pipe. A specimen of pipe cut across the butt-fusion joint shall be tested in accordance with ASTM D-638.

7. Polyethylene pipe shall be joined to ductile iron pipe by the use of flange adapters and back-up rings. Flange adapters shall be butt fused to the polyethylene carrier pipe. The face of the flange adapter shall have a serrated sealing face to assist in holding the flange gasket in place. Flange gaskets shall be full-faced neoprene. Back-up rings shall be Class "D" steel ring flanges in accordance with AWWA C207. Flange bolts must span the entire width of the flange joint, and provide sufficient thread length to fully engage the nut.
8. Installation Curvature: The pipeline curvature shall not have a radius less than as shown in Table 2458-1.

Table 2458-1. HDPE Pipe Deflection Information.

| Pipe Diameter (inches) | Minimum Radius of Curvature (feet) | Offset per 20-ft Length (inches) |
|-----------------------------------|---|---|
| 4 | 23 | 9.3 |
| 6 | 34 | 6.1 |
| 8 | 44 | 4.6 |
| 10 | 56 | 3.5 |
| 12 | 67 | 3.0 |

9.

B. STEEL PIPE

1. Steel pipe shall meet the requirements of AWWA C-200 and Specification Section 15110.
2. Steel pipe sections shall be connected by welding. All welding shall conform to AWWA C-206, latest revision. Pipe shall be either spiral seam or longitudinally rolled pipe.
3. All steel pipe shall receive an interior and exterior factory coating of fusion-bonded epoxy, 20-mil minimum thickness. Material and application requirements shall be as specified in AWWA C213, latest edition, "Standard for Fusion - Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines".
4. The interior and exterior of field-welded joints shall receive a 25-mil minimum thickness coating of fusion-bonded epoxy, applied in accordance with AWWA C213.
5. Minimum thickness of steel pipe shall be determined by the contractor's calculations, but shall not be less than a diameter to thickness ratio of 180.

C. DUCTILE IRON PIPE

1. Utilize ductile iron pipe equipped with low profile flexible restrained joints such as Flex Ring or TR Flex. Gripping push on joint gaskets, or restrained joint gaskets are

not permitted.

2. All ductile iron pipe shall be installed per DIPRA's Horizontal Directional Drilling with Ductile Iron Pipe Handbook to include strict adherence to maximum joint deflection allowances

D. THICKNESS DESIGN

The following design criteria shall be used in calculating pipe thickness for HDPE, steel, or ductile iron pipe:

| | |
|---|--|
| Working Pressure | **insert working pressure** PSI |
| Test Pressure | **insert test pressure** PSI |
| Surge Pressure | Working pressure + 100 psi |
| Dead Load | Earth cover as shown on Drawings, but not less than 15 feet. |
| Buckling Design | Considering dead load, internal vacuum, H-20 Wheel Loading and a hydrostatic load over top of pipe to grade. |
| Max. Allowable Horizontal Deflection | 3% |
| Radius of Curvature | 90% of Actual Design Radius |
| Downhole Friction Factor | 1.0 |
| Factor of Safety for Drilling Fluid Density | 1.5 |

The stresses in the pipe shall be calculated for the pre-installation, installation, and post installation loading conditions specified in Part 1 of this Specification Section. Thickness shall be selected so that stresses do not exceed the following under any of the loading conditions.

- All conditions except internal surge pressure 50% of minimum yield point
- Internal surge pressure condition 75% of minimum yield point

The contractor shall increase the minimum "in-service" thickness as necessary to support the expected stresses and loadings which are expected to be encountered during the installation of the HDD pipeline. The final selected thickness shall be supported by calculations as required herein. No additional cost shall be considered by the Owner for pipe thickness greater than the specified minimum "in-service" thickness.

E. DEVIATIONS

Should the Contractor choose to submit a bid using material that does not meet all the requirements of these specifications, include a description of the deviation with data showing the magnitude of the deviation. Acceptance of such deviations to these specifications shall be subject to the review and approval of the Owner before a contract can be awarded.

F. INSPECTION OF PIPE

All pipe and fittings used in the work may be factory inspected by a recognized agency engaged by the Owner. Inform the Owner and the inspection agency of the name and address of the manufacturing plant or other sources of materials to be used in the work and shall coordinate with the manufacturer to assure that the inspection agency has access at the manufacturer's plant and adequate assistance and notice so that each item may be examined. All reports will be made to the Owner and the cost of the services of the inspection agency will be borne by the Owner. Such inspection by the Owner shall not relieve the Contractor of his responsibility to furnish materials in accordance with the applicable standards.

2.02 EQUIPMENT

- A. General: All equipment for the Directional Bore shall have the capacity, stability, and necessary safety features required to fully comply with the specifications and requirements of this section without showing evidence of undue stress or failure. It shall be the responsibility of the Contractor to assure that the equipment to be used in the Directional Bore is in sound operating condition. Backup equipment shall be required in the event of an equipment breakdown and where the condition of the equipment to be used indicates that routine component replacement or repair will likely be necessary during the Directional Bore.
- B. Directional Drilling System: The directional drilling system shall consist of over the road transportable field power unit, mud-mixing and recycling unit, a trailer or carriage-mounted drill unit, and all other support accessory vehicles and equipment. All system components shall be in sound operating condition with no broken welds, excessively worn parts, badly bent, or otherwise misaligned components. All drill pipe, reamers, pull back heads, swivels, drill heads and collars, pipe cradles, pipe rollers, ropes, cables, clamps, and other non-mechanical but essential items shall be in sound condition and replaced immediately when need is apparent. The equipment must be capable of drilling the specified length in a single bore.
 - 1. Mud-Mixing and Recycle Units: The mud-mixing and recycle unit shall be a self-contained system designed to provide a supply of high-pressure Bentonite based cutting fluid to the drill unit. It shall contain a fluid storage tank and a complete Bentonite and drilling fluid additive(s) mixing system. The cutting fluid is to be mixed on site. The cutting fluid shall be formulated for this specific project and anticipated conditions. It shall permit changes to be made to the Bentonite and drilling fluid additive(s)

concentrations during drilling in response to changing soil conditions. The field power unit shall contain the power-taken off-driven high pressure cutting fluid pumping system. The recycle units shall be of a capacity to minimize the production of new cutting fluid and maximize the reuse and recirculation of original cutting fluid produced.

2. Directional Drill System: A carriage-mounted version of the drill system shall include a thrust frame. Both the trailer-mounted and carriage-mounted drill system shall be designed to rotate and push 10-foot (3-meter) minimum hollow drill sections into the tunnel being created by the boring head. The drill sections shall be made of a high strength S-grade steel that permits them to bend to a 30-foot (9-meter) radius without yielding. Drill end fittings shall permit rapid makeup of the drill sections while meeting the torque, pressure and lineal load requirements of the system. The boring head itself shall be capable of housing a probe used by the Magnetic Guidance System (MGS) to determine tool depth and location from surface and to orient the head for steering. The MGS shall have a minimum accuracy of plus (+) or minus (-) two (2) percent of the vertical depth.

The drilling equipment must be fitted with a permanent alarm system capable of detecting an electric current. The system will have an audible alarm to warn the operator when the drill head nears electrified cables. The drilling equipment shall be grounded, protected, and operated in accordance with manufacturer's requirements for electric strike safety.

The control console shall contain a calibrated display of inclination, azimuth, tool face location, mud pump rates, and torque pressures. The downhole steering system accuracy shall be plus or minus one percent ($\pm 1.0\%$) of the horizontal bore length such that the difference between actual depth and machine calculated depth is not more than 1 foot per hundred feet.

3. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the pipe placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular condition of the project. Water sluicing methods, jetting with compressed air, or boring or tunneling devices with vibrating type heads that do not provide positive control of the line and grade shall not be allowed.

- C. Spoils Equipment: The cutting fluid removal system shall include a self-contained vacuum truck which has sufficient vacuum and tank capacity to remove excess cutting fluid mixture and cuttings from the project site as required or directed by the Engineer. Spoils are not to be discharged into sewers or storm drains.

The Contractor will contain all drilling and pipe lubricating mud by taking special

measures to prevent run-off into adjacent properties and/or waterways. All surplus drilling and pipe lubricating mud will be removed from the site and properly disposed of by the Contractor. The Contractor will also be responsible for all required erosion control measures.

- D. Magnetic Guidance System: A Magnetic Guidance System (MGS) probe and location of the drill head during the drilling operation. The tracker shall be capable of tracking at all depths up to one hundred feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The tracker shall be accurate to +/-2% of the vertical depth of the borehole at sensing position at depths up to one hundred feet. Ferrous materials shall not influence or affect the MGS readings or accuracy.

Components: The Contractor shall supply all components and materials to install, operate, and maintain the MGS. This shall include, but not be limited to the following:

- MGS Probe and Interface
- Computer, Printer, and Software
- DC Power Source, Current Control Box, and Coil/Tracking Wire.

The Magnetic Guidance System (MGS) shall be a Tensor TruTracker MGS, or other licensed and industry approved wire guidance system. The Engineer shall be advised of the unit to be used and is subject to his approval. Set up and operate the MGS using personnel experienced with this system. A Walk-over” tracking systems shall not be used, except as approved by the Engineer. Contractor shall provide Engineer with current calibration certification of MGS in accordance with manufacturer’s specifications.

- E. If equipment breakdown or other unforeseen stoppages occur and forward motion of the directional cutting head is halted at any time other than for reasons planned in advance (addition of drill stems, etc.), the boring path shall be filled with a proper Bentonite solution immediately, or as directed by the Engineer.
- F. The boring tool shall have steering capability and have an electronic tool detection system. The position of the tool during operation shall be capable of being determined accurately, horizontally within 1% of the horizontal distance of the borehole and vertically within 2% of the vertical depths of the borehole. The boring tool shall have a nominal steering radius of 9 meters (30 feet).
- G. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be

self-contained with sufficient pressure and volume to power drilling operations.

- H. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pullback pressure during pullback operations. The rig shall be grounded during drilling and pullback operations. There shall be a system to detect electrical current from the drilling string and an audible alarm that automatically sounds when an electrical current is detected.

2.03 DRILLING FLUIDS:

- A. A mixture of Bentonite drilling clay, project specific cutting fluid additives, and potable water is to be used as the cutting fluid (MUD) and over ream hole filler for the Directional Bore. The drilling fluid mixture used shall have the following minimum viscosities as measured by a March Funnel:

| | |
|-------------|----------|
| Rock Clay | 60 sec. |
| Hard Clay | 40 sec. |
| Soft Clay | 45 sec. |
| Sandy Clay | 90 sec. |
| Stable Sand | 120 sec. |
| Loose Sand | 150 sec. |
| Wet Sand | 150 sec. |

These viscosities may be varied to best fit the soil conditions encountered as recommended by the drilling mud and fluid additive manufacturer, and as approved by the Engineer.

- B. Where sandy or granular materials are encountered, a cement slurry or polymer supplement shall be considered for added strength and stability of the bore and over ream hole.
- C. No chemicals or polymer surfactant shall be used in the drilling fluid without written consent of the Engineer, and after a determination is made that the chemicals to be added are not harmful or corrosive to the facility and are environmentally safe. Clay must be totally inert and contain no risk to the environment.
- D. Provide Owner, Engineer and have on site at all times the Material Safety Data Sheets (MSDS) for all drilling compounds and chemicals.

2.04 TRACER WIRE

- A. Tracer wire shall be as Specified in Section 15130. The wire shall be contiguous except at test stations, valve boxes, and where splicing is required.

- B. Tracer wire shall be installed simultaneously with pullback of the HDPE pipe. Wire shall either be wrapped around the pipe or taped to the pipe at 10 foot minimum intervals before installation.

PART 3: EXECUTION

3.01 SITE DISTURBANCE AND SOIL EROSION

- A. Sediment barriers shall be constructed as shown on the Drawings or where directed by the Engineer. All soil erosion and sediment control work shall be done in accordance with the Standards for Soil Erosion and Sediment Control for the location where the work is performed. Contractor shall maintain sediment barriers until the project is deemed complete.
- B. The Contractor shall be responsible for the preservation of all existing trees, plants, and other vegetation that are to remain within or adjacent to the construction site and shall also be responsible for protecting existing concrete curb, fence, utilities, and other structures that are located within or adjacent to the construction site.
- C. The Contractor assumes all liability for environmental damage and cleanup due to inadvertent discharges of slurry or other causes. Slurry materials shall be selected based on the soil conditions encountered to minimize the risk of mud returns.

3.02 PERSONNEL REQUIREMENTS:

- A. Provide a competent and experienced supervisor representing the Drilling Contractor who must be present at all times during actual operations. A responsible representative, who is thoroughly familiar with the equipment and type work to be performed, must be in direct charge and control of the operation at all times. In all cases the supervisor must be continually present at the job site during the actual Directional Pilot Hole, over reaming and pullback operations.
- B. Have a sufficient number of competent workers on the job at all times to insure the Directional Bore is made in a timely and satisfactory manner. Adequate personnel for carrying out all phases of the actual Directional Bore operation must be on the job site at the beginning of work.
- C. If HDPE is specified for the carrier pipe, HDPE pipe thermal butt fusion welding is to be completed by a welder certified by the manufacturer of the pipe or pipe welding equipment, in accordance with the Plastic Pipe Institute "Handbook of Polyethylene Pipe," Polyethylene Joining Procedures, and 49 CFR 192, Subpart F, latest edition.
- D. If steel pipe is specified for the carrier or casing pipe, welding shall be performed by certified welders. The CONTRACTOR shall be responsible for the qualification of welders with qualification testing conducted by an independent testing agency in

accordance with American Welding Society D1.1 requirements. Results of qualification testing shall be submitted to the ENGINEER for approval. Results of previous qualification tests performed within six months from the date of pipe installation will be acceptable. Results from qualification tests performed prior to six months from the date of pipe installation will not be acceptable. All costs associated with qualification testing shall be included in the unit prices bid.

- E. The Engineer and Owner must be notified 48 hours in advance of starting each phase of the work. The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer's approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. It shall be the responsibility of Owner to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.
- F. If the Contractor fails to begin the Directional Bore at the agreed time, the Owner will establish the next mutually convenient time to begin. To avoid undue hardship of either party, reasonable and mutual cooperation should be exercised where starting times are concerned. If one party fails to meet the agreed schedule, the other party is expected to consider a delayed start if the installation cannot be completed during daylight hours.

3.03 ALIGNMENT AND GRADE

- A. Determine and physically locate the depth, location, and size of all existing underground facilities in the vicinity of the proposed crossings and provide the ENGINEER with a comprehensive report of these facilities before starting any construction. The Contractor shall be held completely and solely responsible for any damages incurred. The kinds, locations and sizes of the existing underground utilities which may be shown on the Contract Drawings are intended only as a guide to the Contractor and are not guaranteed to be even approximately correct. Notify the owners of all existing utilities along the route and in the vicinity of the crossing prior to the construction to include all test borings and excavations.
- B. If utilities of unknown depth or other obstructions require grade or alignment deviations from the Plans, the grade and/or alignment may be adjusted with Engineer's approval. All adjustments shall permit gradual bends of the pipe to the original alignment beyond the directional bore section. At unusual site conditions, the Contractor may request a review of site conditions by the Engineer for additional adjustment, and such determination shall be final. An adjustment in alignment, position, or elevation approved by Engineer shall not be cause for an adjustment of costs.
- C. Pipe entry and exit points are to be allowed no more than five (5) feet of deviation from the staked centerline. The entry point may be moved up to twenty-five (25) feet

further from the original entry point only with Engineer's approval. Exit point lengths greater than twenty-five (25) feet from the original point require Engineer's approval. Entry and exit points normally will not be allowed closer to the banks of a waterway being crossed. Any installation that deviates from the plan may be rejected and any rejected installation shall be reconstructed at the Contractor's expense.

- D. The vertical profile as shown on the drawings is the minimum depth to which the pipeline shall be installed. Contractor may, at his option and with the permission of Owner, elect to install the pipe at a greater depth than shown on the drawings, at no additional cost to the Owner.

3.04 INSTALLATION:

- A. The Contractor shall be responsible for providing a Maintenance of Traffic Plan to the Engineer and local traffic law enforcement agency for review. The Maintenance of Traffic Plan shall show the location of all barricades, signs, devices and alternate routes for local traffic and pedestrian safety. Erection of the appropriate safety and warning devices in accordance with the USDOT "Manual of Uniform Traffic Control Devices" (MUTCD) shall be completed prior to beginning work and maintained until all construction is completed and the site restored.
- B. Specifically note in the Maintenance of Traffic Plan street intersections that are to remain open as required during the pipe pull-back operation, or traffic detours implemented. Install a temporary sleeve across the street intersections through which the pipe can be pulled or to construct a temporary bridge for the pipe over the intersections as required. No additional payment will be made for temporary structures required in order to permit access through street intersections or the implementation of traffic detours.
- C. The cost of restoring pavement, curb, sidewalk, driveways, lawns, storm drains, etc., and other landscaped facilities shall be borne by the Contractor unless otherwise noted.
- D. The following is a general outline of steps for the Directional Bore operation:
 - 1. Clear the right-of-way and temporary work space as shown on the drawings. Contractor to install and maintain all soil erosion and sediment control devices, until project completion with approved permanent site stabilization.
 - 2. Lay out the pipe crossing alignment using a qualified land survey team to confirm accurate horizontal distances, either physically measured or shot by Electric Distance Measurement. Entry and exit points shall be located and marked with survey hubs or markers. Payment for survey mark-out shall be included in the price bid under horizontal directional drilling.

3. Haul, string, and assemble restrained pipe. Joint air test the section prior to installation and hydrostatically test the assembled pipeline section, unless otherwise approved by Engineer. If sufficient linear footage of lay down area for the pipe string is not available, the finished pipeline may be assembled in no more than two sections, with each section joint air tested separately and hydrostatically tested when fully assembled as one piece. The CONTRACTOR will be responsible for ensuring that the drill rig has adequate pullback capacity to overcome the increased frictional resistance resulting from the stoppage of pipe pullback to perform the final weld or fusion of pipe sections. Provide adequate site security and shall be responsible for the integrity of the pipe until after the pullback, final test of the pipeline, and acceptance of the work by the Owner.

All assembled pipe sections shall be securely plugged at the end of each work day. The pipe interior is to be protected at all times against dirt, dust, drilling mud, pipe cuttings, debris, animal access, and other sources of contamination.

4. Provide adequate support rollers for the pipeline during pullback of the pipe string into the pre-drilled hole. The rollers and cradles shall be of a type that will prevent damage to the pipe and will be of sufficient number, as recommended by pipe manufacturer, to prevent over stressing due to sag bends during the pullback procedure. The pipe shall be supported at all times, including pullback, to maintain a free stress arc which limits pipe bending and internal hoop stresses to within manufacturer's limits.

Pipe which is not properly protected and supported and shows indications of excessive stressing, gouges, cuts, abrasions or other damage which may affect the operational performance intended for the pipe, as recommended by pipe manufacturer, shall be removed from the site and replaced at no additional cost as directed by the Owner or Engineer.

5. Mobilize the drilling equipment, erect the rig, drill a pilot hole, enlarge the hole as necessary to a minimum diameter of 1.5 times the nominal diameter of the pipe, and pullback the prefabricated pipe string under the crossing.

Prior to beginning the Pilot Hole over reaming, furnish to the Engineer with an as-built plan and profile of the actual crossing to confirm the installation is in compliance with the Contract Documents. Pilot hole alignment shall be accepted by Owner in writing prior to reaming and pipe installation.

The Contractor shall be responsible for selecting the reaming process to be utilized, whether forward and/or back reaming will be undertaken, and the

number of reaming passes to be made.

6. Supply portable mud tanks or construct temporary mud pits to contain excess drill fluids during construction and slurry material displaced by the pipe during installation. Mud pits are to be protected at all times against unauthorized access and be stabilized at all times against surface water runoff and containment berm failure. Pump, haul and dispose of any drill cuttings and excess drill fluids to a receiving site permitted to accept the spoils, all in a manner consistent with the local and state regulations at no additional cost to the Owner.
7. Pull back the bore pipe in one continuous section and contractor using a swivel to minimize the rotation of the product pipe during pullback. Swivel shall utilize lubricated internal bearings which are fully protected from external contamination and over lubrication. Demonstrate the swivel operation prior to pullback to the Engineer prior to the operation.
8. Use potable water and disinfect all piping and hoses used for water addition to the carrier pipe to counter the pipe flotation during pullback.
9. During pullback, maintain records for submission to Owner indicating job, date, time, constant pipe footage progress, mud flow rates, pulling forces required and torque readings. Document the pull head location for each length of drill stem pipe for as build records.
10. Unless not permitted by the right of way owner, inject a low strength cement slurry into the bore hole for approximately 50 feet at each end of the drilled pipeline. Where cement slurry cannot be used, provide restraint at either end of the pipeline outside the bore to hold the pipe in place. The type of restraint shall be submitted to the Engineer in advance of the work and must be approved by the Engineer prior to the start of construction.
11. Owner and Engineer shall have access at all times to any measuring or gauging devices used for the horizontal drill as well as any drilling logs maintained by the Contractor.
12. In the event that the Contractor must abandon the drill hole before completion of the crossing, the Contractor will seal the borehole with neat cement grout starting at the low point or end of the drill hole and redrill the crossing at no extra cost to Owner.

3.05 PRESSURE TESTING AND LEAKAGE

- A. Prior to pullback, perform an allowable leakage test on the full length of pipe after all sections have been welded or fused in accordance with ANSI/AWWA C600, latest revision and as described in Specification Section 15030. A hydrostatic pressure test shall also be performed on the installed pipe in accordance with

ANSI/AWWA C600, latest revision and as described in Specification Section 15030.

3.06 CONNECTION TO ADJOINING PIPE

- A. Install flange connections from the directionally drilled pipe to adjacent pipe installed by open cut with support by backfill material as per Specification Section 2210. Flange bolts shall be carefully tightened in increments, with a final torque value not exceeding the manufacturer's recommendations. Tightening torque increments shall not exceed 15 foot pounds.
- B. Polyethylene and flange gasket will undergo some compression set. Therefore, the flange bolts shall be retightened one hour after the initial assembly, and a second time at least four hours after the second tightening.

3.07 DISINFECTION

- A. The carrier pipe shall be disinfected as described in Specification Section 15020 or as otherwise approved in advance by the Engineer.
- B. The carrier pipe can be filled with potable water, pressure tested and disinfected prior to insertion. Provide Engineer with full work plan to employ this alternative.

3.08 AS-BUILT RECORDS:

- A. The MGS pullback data shall be recorded every pilot hole drill stem length during the actual crossing operation. The Contractor shall furnish "as-built" plan and profile drawings, on the same horizontal and vertical control datum shown on the contract documents, based on these recordings showing the actual location horizontally and vertically of the installation, and all utility facilities found during the installation.

3.09 BASIS OF PAYMENT

- A. The Work included in this Section will be paid at the Contract Unit Price per linear foot measured without deducting for length of fittings for various sizes of water main installation. The unit price includes furnishing labor, material (except when provided by Owner), and equipment to install water main. Items specified in other Specification Sections that are considered incidental to water main installation shall be included in this Contract Unit Price including, but not limited to, excavation, backfill, shoring, tracer wire, location tape, testing, and disinfection, thrust restraint, and temporary blow-off outlets.

END OF SECTION

SECTION 02540
EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing all labor, materials, and equipment necessary to provide erosion and sedimentation control including, but limited to, temporary and permanent vegetation covers, mulching, silt fence, and baling at the construction site and all areas disturbed during construction, including borrow areas. In addition to the requirements of these Specifications, comply with all local Conservation District laws, rules and regulations and all other Federal, State, County and local requirements for erosion and sedimentation control.

1.02. RELATED WORK

A. Specification Section 02820 – Lawn Restoration

1.03. REFERENCES

A. Association of Illinois Soil and Water Conservation Districts - Illinois Urban Manual Practice Standards

B. Storm Water Pollution Prevention Plan (SWPPP), if required.

C. Comply with the highest erosion and sedimentation control standards, whether Conservation District, Federal, State or Local. If in doubt as to the applicable standard, notify the Engineer and comply with the Engineer's directions concerning the prevailing jurisdiction.

1.04. SUBMITTALS

A. Submit plan to comply with regulators and Engineer for approval using established best practices.

B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. MATERIALS - GENERAL

All materials such as seeds, mulch, silt fencing and bales shall conform to the Specifications of the local Conservation District and all other applicable Federal, State, County and Local requirements.

PART 3 – EXECUTION

3.01. GENERAL

- A. Construct silt fences, diversion ditches with catch basins and drains as shown on the Drawings prior to any other construction activity.
- B. Take precautions to prevent sediment from being tracked onto public or private roadways. Any sediment reaching a public or private road shall be removed before the end of each workday.
- C. Drain the settled water from the catch basins to the natural local drains. Clean the catch basins regularly.

3.02. BASIS OF PAYMENT

The Work included in this Section and shown on the Drawings is considered incidental to the water main installation.

END OF SECTION 02540

SECTION 02610
PAVEMENT RESTORATION

PART 1 – GENERAL

1.01. SUMMARY

This section includes providing all labor, tools, material and equipment to saw cut, remove, and replace pavement which is damaged or disturbed during the course of the Work and as shown on the Drawings. Pavement includes, but is not limited to, roadways, curbs, gutters, ADA ramps, driveways, and sidewalks. Pavement restoration will be at least equal to the type of pavement which existed before the Work began and as required by Local, State or Federal regulations or as directed by Owner.

1.02. RELATED WORK

A. Specification Section 03300 – Cast-in-Place Concrete

1.03. REFERENCES

Refer to current standards:

A. Illinois Department of Transportation (IDOT) Standard Specifications for Road and Bridge Construction

PART 2 – PRODUCTS

2.01. MATERIAL - GENERAL

Materials of construction for pavement restoration shall be furnished in accordance with applicable Federal, State and Local standards. The Contractor shall use materials which comply with IDOT Standards for Asphalt Pavement. Portland Cement Pavement material shall comply with Specification Section 03300.

PART 3 – EXECUTION

3.01. INSTALLATION

- A. Saw or line cut the existing pavement as shown on Standard Details or as required by Local, State or Federal regulations. If saw cut location is within 2 feet of an existing joint, remove the pavement to the joint. The edges of the face of the old pavement or base shall be left vertical. Ragged edges shall be trimmed so as to provide a substantially straight line juncture between the old and new surfaces.
- B. Place the pavement replacement to conform in grade to the existing streets, drives or sidewalks. The type of pavement replacement shall be as shown on the pavement replacement details in accordance with applicable Federal, State or Local standards. If there are no such applicable standards, replacement will be made to the depth and type of existing pavement.

- C. Roll and tamp in place a 2-inch thick (minimum) course of bituminous material over trenches where temporary pavement is required. Remove temporary pavement prior to placing permanent pavement. The finished temporary surface shall be flush with the adjacent undisturbed surface. Maintain the temporary bituminous surface until the temporary surface is replaced.
- D. Before the completion of each day's work, in traveled areas, the pipe trench shall be paved with 6 inches of stabilized base unless another method of pavement restoration is required by the authorized governing body. Final paving shall be placed over the stabilized base and overlapping each side of the trench a minimum of 12 inches and feathered to meet the existing pavement unless another method of pavement restoration is required by the authorized governing body. Final pavement shall not be placed within 20 days after the backfilling has been completed and shall be placed no longer than 45 days after the backfilling has been completed, unless otherwise ordered by the Engineer.
- E. If an excavation within traveled areas is subject to repeated access prior to backfill/final pavement, then the use of steel roadway plates may be required. The use of steel roadway plates shall be in strict accordance all applicable regulations with the Federal, State, County, and/or Local Agency having jurisdiction. Steel roadway plates shall be properly secured such that they are not subject to being "dragged" from place by a braking truck or "pushed" from place by a snowplowing vehicle. When requested the Contactor shall submit load bearing calculations sealed by a Professional Engineer, licensed to practice in the applicable State, demonstrating that the steel roadway plate is properly designed and installed to accommodate HS-20 vehicular loadings.

3.02. MAINTENANCE

Following the certification of completion by the Engineer, the Contractor shall maintain the pavement restoration areas for a period of one year thereafter, or for such greater period as may be required by Federal, State or Local authorities. All material and labor required for such maintenance shall be supplied by the Contractor, and the Work shall be done in a manner satisfactory to the Owner at no additional cost to the Owner.

3.03. BASIS OF PAYMENT

- A. Roadways and Driveways. The Work included in this Section will be paid at the Contract Unit Price per square foot (or square yard) of various pavement types at various depths. For example "Concrete Pavement – 6-inch depth" or "Asphalt Pavement – 6-inch depth" or "Driveway Pavement – 4 inch depth." The Contract Unit Price shall include saw cutting and removing existing pavement to the limits shown on the Drawing and Standard Details; furnishing, installing and removing temporary pavement required; bedding; steel reinforcement; permanent pavement; and finishing complete in place conforming to the requirements of this Specification Section and/or required by Federal, State or Local agencies. **Pavement removed beyond the specified limits will be at the Contractor's expense.**

- B. Sidewalks and ADA Ramps. The Work included in this Section will be paid at the Contract Unit Price per square foot (or square yard) of various pavement types at various depths. For example “Sidewalk – 4-inch depth” or “ADA Accessibility Ramp – 6-inch depth.” The Contract Unit Price shall include saw cutting and removing existing pavement to the limits shown on the Drawing and Standard Details; furnishing, installing and removing temporary pavement required; bedding; steel reinforcement; permanent pavement; and finishing complete in place conforming to the requirements of this Specification Section and/or required by Federal, State or Local agencies.
- C. Curb & Gutter. The Work included in this Section will be paid at the Contract Unit Price per linear foot for curb and gutter installed. The Contract Unit Price shall include saw cutting and removing existing pavement to the limits shown on the Drawing and Standard Details, bedding, steel reinforcement, curb & gutter pavement, and finishing complete in place conforming to the requirements of this Specification Section and/or required by Federal, State or Local agencies.

END OF SECTION 02610

SECTION 02820
LAWN RESTORATION

PART 1 – GENERAL

1.01. SUMMARY

This section includes providing all labor, tools, material and equipment to prepare the ground surface, restore, replace, and maintain lawn areas where surfaces are disturbed as part of the Work. Surfaces shall be restored to conditions equal to that before the Work began and in accordance with local requirements.

1.02. REFERENCES

Refer to current standards:

- A. Illinois Department of Transportation (IDOT) Standard Specifications for Road and Bridge Construction

PART 2 – PRODUCTS

2.01. TOPSOIL

Topsoil shall not contain more than 40 percent clay in that portion passing a No. 10 sieve and shall not contain less than 5 percent or more than 20 percent organic matter as determined by loss on ignition of samples oven-dried to constant weight at 212 degrees Fahrenheit.

2.02. FERTILIZER

Fertilizer shall be lawn or turf grade 12-12-12 unless otherwise specified by the Engineer.

2.03. SEED AND SOD

Lawn Areas include all areas, whether residential, commercial or office areas, where lawns are, or have been regularly maintained. Lawn areas shall be seeded to match the existing grass as closely as possible.

Where sod is required, the sod shall be green, freshly cut and of good quality with grass free from all noxious weeds. It shall contain all the dense root system of the grass and shall not be less than 1-1/2 inches thick.

2.04. MULCH

Mulch shall be straw reasonably free of weed seed and any foreign materials which may affect plant growth. Other materials may be used if approved by the Engineer.

2.05. ASPHALT EMULSION

Emulsion shall be non-toxic to plants and shall conform to AASHTO M140 or AASHTO M208.

PART 3 – EXECUTION

3.01. APPROVED RESTORATION CONTRACTORS

An approved Lawn Restoration Contractor shall be used for lawn restoration. A list of approved Lawn Restoration Contractors is included in Bidding Documents.

3.02. PREPARATION OF SURFACE

- A. If suitable topsoil is available as part of the excavated material it shall be removed, stored, and used to backfill the top 4 inches of the excavation. All grass, weeds, roots, sticks, stones, and other debris shall be removed and disposed of by the Contractor and the topsoil carefully brought to the finished grade by raking.
- B. When there is insufficient topsoil available from the site excavated materials, furnish 4 inches of topsoil to be used as a seed bed in lawn areas as described in Part 2.03 of this Specification Section.
- C. The trench backfill may be used as a seed bed where approved by the Engineer.
- D. After the backfill has been given a reasonable time to settle, it shall be graded off to the finished grade and harrowed to a depth of 3 inches. All grass, weeds, roots, sticks, stones and other debris 2-inches or greater in diameter are to be removed and disposed of by the Contractor and the soil carefully brought to the finished grade by raking.

3.03. FERTILIZING

Apply fertilizer uniformly to all areas to be seeded at the rate of 1 pound per 100 square feet in topsoil, or 2 pounds per 100 square feet in non-topsoil, or according to manufacturer's recommendations, whichever is greater. Disk, harrow, or rake the fertilizer thoroughly into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, rework the surface until it is a fine, pulverized, smooth seed bed varying not more than 1 inch in 10 feet.

3.04. SEEDING

Seed immediately after the preparation and fertilization of the seed bed. Mix the seed thoroughly and sow it evenly over the prepared areas at the rate of 3 pounds per 1,000 square feet. Sow the seed dry or hydraulically. After sowing, rake or drag the area to cover the seed to a depth of approximately ¼ inch.

3.05. SODDING

Sod all areas with slopes greater than 10% unless otherwise noted on the Drawings. Sod all areas as noted on the Drawings. Lay sod with tight staggered joints. On slopes, start placement at the foot of the incline. Use wood pegs driven flush to hold sod in place on slopes 4:1 or greater. Use two wood pegs per strip of sod. Roll the sod lightly after placement. Fill any open joints with topsoil and/or sod.

3.06. MULCHING

Place mulching material evenly over all seeded areas within 48 hours of seeding. Place mulch at the rate of approximately 2 tons per acre, when seeding is performed between the dates of March 15 and October 15 of the same year, and at the approximate rate of 3 tons per acre when seeding is performed between the dates of October 15 and March 15 of the succeeding year.

3.07. EMULSION

Keep mulching materials in place with asphalt emulsion applied at a minimum rate of 60 gallons per ton of mulch or by other methods approved by the Engineer. When mulch is displaced, immediately repair any damage to the topsoil and fertilizer, re-seed, and re-mulch per the requirements of this Specification Section.

3.08. MAINTENANCE

Carefully maintain, tend, and water all seeded and sodded areas necessary to secure a good turf. Fill, grade, and re-seed or re-sod settled areas. Maintain the condition of the restored areas of vegetation in accordance with the requirements of this Specification Section for a period of one year from the date of final completion.

3.09. BASIS OF PAYMENT

The Work included in this Section will be paid as a Lump Sum Contract Price for Lawn Restoration. The Lump Sum price shall include preparing the ground surface, fertilizing, seeding or sodding, mulching, and maintenance. Lawn restoration requiring specialty grasses or care will be paid as a Contract Unit Price per square foot, as determined by the Engineer, as Lawn Restoration – Special.

END OF SECTION 02820

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01. SUMMARY

This section includes providing all labor, tools, material and equipment to install concrete for thrust blocks, cross blocks, curbs, gutters, sidewalks, driveways and pavement as shown on the Drawings and Standard Details.

1.02. RELATED WORK

A. Specification Section 02610 – Pavement Restoration

1.03. REFERENCES

Refer to current standards:

A. Illinois Department of Transportation (IDOT) Standard Specifications for Road and Bridge Construction

B. ASTM C150 - Standard Specification for Portland Cement

C. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete

D. ASTM C33 – Standard Specification for Concrete Aggregates

E. ASTM A615 – Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

F. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

G. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

H. ASTM C94 – Standard Specification for Ready-Mixed Concrete

I. American Concrete Institute (ACI) Standard 318 – Building Code Requirements for Reinforced Concrete

J. American Concrete Institute (ACI) Standard 306 – Guide to Cold Weather Concreting

K. American Concrete Institute (ACI) Standard 308 – Guide to Curing Concrete

PART 2 – PRODUCTS

2.01. MATERIALS

- A. Portland Cement shall be Type I or Type III and conform to "Specification for Portland Cement" ASTM C150.
- B. Air-Entraining Agent shall be added in accordance with manufacturer's directions to the normal Portland cement to entrain 4½ percent air ± 1 percent with all other ingredients and strength as specified. Air-entraining admixtures shall conform to "Specifications for Air-Entraining Admixtures for Concrete" ASTM C260.
- C. Concrete Aggregates shall conform to "Specifications for Concrete Aggregates" ASTM C33. Coarse aggregates shall be maximum of 1½ inches in size in footings and plain concrete. Pea gravel shall be used for sections 3 inches or less in thickness.
- D. Water used in mixing concrete shall be potable water.
- E. Reinforcing Bars shall be billet steel grade (60,000 psi minimum yield) and conforming to the requirements of ASTM A615, Grade 60. Reinforcing bars shall be new stock, free from rust, scale or other coating tending to destroy or reduce bond.
- F. Welded Wire Mesh shall conform to "Specifications for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete" ASTM A1064.
- G. Premolded Expansion Joint Material shall be non-extruding compressible joint material conforming to the requirements of "Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction", ASTM D1751.

2.02. CONCRETE MIXES

Ready-mixed concrete shall conform to "Specifications for Ready-Mixed Concrete", ASTM C94.

- A. All concrete mixes shall be capable of producing a dense durable concrete. The compressive strength of the concrete shall be able to attain the following minimum strengths within 28 days:
 - 1. 3,000 psi for sidewalks, driveways, curbs, gutters, thrust blocks, and cross blocks
 - 2. 4,000 psi for roadway pavement
- B. Water/cement ratio for the concrete shall not exceed a maximum as shown in the ACI Standard 318, "Building Code Requirements For Reinforced Concrete", when strength data from field experience or trial mixtures are not available. A workable concrete with minimum slump of 3 inches and a maximum slump of 5 inches shall be produced not exceeding the water/cement ratio.

PART 3 – EXECUTION

3.01. FORMWORK

- A. Build all forms to be mortar tight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other loads incident to the construction operations. Construct and maintain forms to prevent warping and the opening of joints.
- B. The forms shall be substantial and unyielding. Design the forms so that the finished concrete will conform to the proper dimensions and contours. Design the forms to take into account the effect of vibration of concrete as it is placed.

3.02. PLACING REINFORCING STEEL

- A. Place all steel reinforcement accurately in the positions shown on the Drawings and Standard Details. Secure the steel reinforcement firmly in place during the placing and setting of concrete. When placed, it shall be free from dirt, detrimental rust, loose scale, paint, oil or other foreign material. Tie bars at all intersections when spacing is one foot or more. When spacing is less than one foot in each direction, tie alternate intersections of bars.
- B. Maintain distances from the forms by means of stays, blocks, ties, hangers or other approved supports. Continuous high chairs will not be permitted. Furnish all reinforcement in full lengths as indicated on the Drawings and Standard Details. Splicing of bars will not be permitted without the approval of the Engineer, except where shown on the Drawings and Standard Details. Stagger splices as far as possible. Unless otherwise shown on the Drawings, bars shall be lapped 36 diameters to make the splice.
- C. Lap welded wire mesh at least 1½ meshes plus end extension of wires but not less than twelve (12) inches in structural slabs. Lap welded wire mesh at least ½ mesh plus end extension of wires but not less than six (6) inches in slabs on the ground.

3.03. CONVEYING AND PLACING CONCRETE

- A. Convey concrete from the mixer to the forms as rapidly as practical by approved methods which will prevent segregation and loss of ingredients.
- B. Clean formwork of dirt and construction debris, drain water, and remove snow and ice. After the forms have been inspected, deposit the concrete in approximately horizontal layers to avoid flowing along the forms. Deposit all concrete continuously or in layers of a thickness such that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the sections. Place the concrete to create a monolithic structure, the component parts of which are securely bonded together. Compact the concrete during placement by suitable means. Work the concrete around the reinforcement and embedded fixtures and into corners and angles of forms, taking care to avoid overworking which may result in segregation.
- C. Concrete shall not be dropped into forms from a height greater than 5 feet. If depositing from a greater height, a spout shall be used, or the forms shall be provided with

openings to limit the height of drop. Obtain the approval of the Engineer before using any method of placing concrete from a height greater than 5 feet.

- D. Direct the concrete through chutes to prevent it from striking reinforcement or sides of the form above the level of placement. Avoid segregation and coating of the surfaces with paste which may dry before concrete reaches its level.
- E. Submit a concrete mix design to the Engineer for approval prior to placing any concrete by pumping.

3.04. THRUST BLOCKING

- A. See the thrust blocking Standard Details. Notify the Engineer whenever field conditions are noted which are more restrictive than the thrust block design data included on Standard Details.
- B. Construct blocking against the vertical face of undisturbed earth or sheeting left in place. Prevent the concrete from enclosing more than half the circumference of the pipe and keep the concrete away from joints or bolts in the piping.

3.05. PLACING CONCRETE IN COLD WEATHER

- A. No concrete shall be placed when the atmospheric temperature is below 35 degrees F unless the Contractor encloses the structure in such a way that the concrete and air within the enclosure can be kept above 60 degrees F for a period of seven (7) days after placing the concrete.
- B. If high early strength cement is used, these periods may be reduced, if approved by the Engineer.
- C. Alternate placement methods may be submitted to the Engineer for approval. Alternate methods of placing concrete in cold weather should follow the provisions of ACI 306 and ACI 308.

3.06. OWNER'S FIELD CONTROL TESTING

- A. Field control tests shall be performed by Engineer or Owner's testing laboratory personnel, at the expense of the Owner. Contractor shall provide access to all facilities and the services of one or more employees as necessary to assist with the field control testing.
- B. Air Content. An air content test shall be made on concrete from each batch of concrete from which concrete compression test cylinders are made. Air content shall be determined in accordance with ASTM C2331.
- C. Slump. A slump test shall be made on concrete from each batch of concrete from which concrete compression test cylinders are made. Slump shall be determined in accordance with ASTM C143.

- D. Test Cylinders. Compression test specimens shall be made, cured, stored, and delivered to the laboratory in accordance with ASTM C31 and C39. Compressive strength tests will be evaluated in accordance with ACI 318 and as specified herein.
- E. One set of concrete test cylinders shall be cast for each concrete pour. A set of test cylinders shall consist of four or six cylinders depending on the cylinder size selected. Half of the cylinders shall be tested at 7 days, and the remaining half shall be tested at 28 days. All concrete required for testing shall be furnished by, and at the expense of, Contractor.

3.07. BASIS OF PAYMENT

The basis of payment for pavement replacement is described in Specification Section 02610 – Pavement Restoration. Thrust blocks are considered incidental to the installation of the water main. Cross Blocks will be paid at a Contract Unit price for each.

END OF SECTION 03300

SECTION 15000
PIPING – GENERAL PROVISIONS

PART 1 – GENERAL

1.01. SUMMARY

This section includes general provisions for handling material, general installation requirements, and installation methods to avoid contamination.

1.02. RELATED WORK

- A. Specification Section 01600 – Products
- B. Specification Section 02000 – Site Preparation
- C. Specification Section 15025 – Cleaning Pipelines

1.03. REFERENCES

Refer to current standards:

- A. AWWA C600, C605, C906, C105
- B. AWWA C217 – Petrolatum and Petroleum Wax Tape Coatings

PART 2 – PRODUCTS

2.01. CONTRACTOR’S RESPONSIBILITY FOR MATERIAL

- A. Examine all material carefully for defects. Do not install material which is known, or thought to be defective.
- B. The Engineer reserves the right to inspect all material and to reject all defective material shipped to the job site or stored on the site. Failure of the Engineer to detect damaged material shall not relieve the Contractor from the total responsibility for the completed Work if it leaks or breaks after installation.
- C. Lay all defective material aside for final inspection by the Engineer. The Engineer will determine if corrective repairs may be made, or if the material is rejected. The Engineer shall determine the extent of the repairs.
- D. Classify defective pipe prior to Engineer's inspection as follows:
 - 1. Damage to interior and/or exterior paint seal coatings.
 - 2. Damage to interior cement-mortar or epoxy lining.
 - 3. Insufficient interior cement-mortar lining or epoxy thickness.
 - 4. Excessive pitting of pipe.
 - 5. Poor quality exterior paint seal coat.
 - 6. Pipe out of round.

7. Pipe barrel area damaged to a point where pipe class thickness is reduced (all pipe).
 8. Denting or gouges in plain end of pipe (all pipe).
 9. Excessive slag on pipe affecting gasket seal (DI).
 10. Any visible cracks, holes.
 11. Embedded foreign materials.
 12. Non-uniform color, density and other physical properties along the length of the pipe.
- E. The Contractor shall be responsible for all material, equipment, fixtures, and devices furnished. These materials, equipment, fixtures and devices shall comply with the requirements and standards of all Federal, State, and Local laws, ordinances, codes, rules, and regulations governing safety and health.
- F. The Contractor shall take full responsibility for the storage and handling of all material furnished until the material is incorporated in the completed project and accepted by the Engineer. Contractor shall be solely responsible for the safe storage of all material furnished to or by the Contractor until incorporated in the completed project and accepted by the Engineer.
- G. Load and unload pipe, fittings, valves, hydrants and accessories by lifting with hoists or skidding to avoid shock or damage. Do not drop these materials. Pipe handled on skidways shall not be skidded or rolled against other pipe. Handle this material in accordance with AWWA C600, C605 or C906 whichever is applicable.
- H. Drain and store fittings and valves prior to installation in such a manner as to protect them from damage due to freezing of trapped water. Drain, store, and protect fittings and valves in accordance with Specification Section 01600.

2.02. PETROLATUM TAPE COATING

- A. The tape coating shall be in accordance with AWWA Standard C217. The tape coating shall be a cold applied, saturant tape made from either petrolatum or petroleum wax with a noncellulosic synthetic fiber fabric. The fabric shall be encapsulated and coated on both sides with the petrolatum or petroleum wax. The thickness of the tape shall be no less than 40 mil. The petrolatum or petroleum wax shall be at least 50% of the product by weight. Follow manufacturer's recommendations for storage and application.
- B. The tape coating shall be supplied in sheets, pads or rolls. Pads and sheets shall be sized to fit the area that is to be covered, allowing for an overlap per AWWA Standard C217.
- C. Acceptable manufacturers are listed in the most current version of the Supplementary Technical Specifications.

2.03. RUBBERIZED-BITUMEN BASED SPRAY-ON UNDERCOATING

Subject to approval by the Engineer, an alternative corrosion protection for exposed buried metal is an aerosol applied rubberized coating. The material shall be rapid dry and specifically designed for corrosion protection. Follow manufacturer's recommendations for storage and application.

Acceptable manufacturers are listed in the most current version of the Supplementary Technical Specifications.

PART 3 – EXECUTION

3.01. INSTALLATION – GENERAL REQUIREMENTS

- A. Lay and maintain all pipe to the required lines and depths. Install fittings, valves and hydrants in strict accordance with the Specifications at the required locations with joints centered, spigots home, and all valve and hydrant stems plumb. Do not deviate from the required alignment, depth or grade without the written consent of the Engineer.
- B. Buried steel lugs, rods, brackets, and flanged joint nuts and bolts are not permitted unless specifically shown on the Drawings or approved in writing by the Engineer. Cover any and all buried steel lugs, rods, brackets, and flanged joint nuts and bolts with approved coating in accordance with AWWA Standard C217 prior to backfilling. Encase the same in polyethylene encasement if the specifications require polyethylene encasement of the pipe.
- C. Do not lay pipe in a wet trench, on subgrade containing frost, or when trench conditions are unsuitable for such work. If all efforts fail to obtain a stable dry trench bottom and the Engineer determines that the trench bottom is unsuitable for such work, the Engineer will order the kind of stabilization to be constructed, in writing. In all cases, water levels must be at least 6 inches below the bottom of the pipe. See Specification Section 02000, Site Preparation.
- D. Thoroughly clean the pipes and fittings before they are installed. Keep these materials clean until the acceptance of the completed Work. Lay pipe with the bell ends facing in the direction of laying, unless otherwise shown on the Drawings, or directed by the Engineer. Exercise care to ensure that each length abuts the next in such a manner that no shoulder or unevenness of any kind occurs in the pipe line.
- E. Do not wedge or block the pipe during laying unless by written order of the Engineer.
- F. Before joints are made, bed each section of pipe the full length of the barrel, at the required grade, and at the invert matching the previously laid pipe. Dig bell holes sufficiently large to permit proper joint making. Do not bring succeeding pipe into position until the preceding length is embedded and secure in place.
- G. Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying. Take up, such in-place pipe sections found to be defective and replace

- them with new pipe. Take up, relaying, and replacement will be at the Contractor's expense.
- H. Place enough backfill over the center sections of the pipe to prevent floating. Take all other necessary precautions to prevent the floating of the pipeline by the accumulation of water in the trench, or the collapse of the pipeline from any cause. Place enough backfill over the center sections of the pipe to prevent floating. Should floating or collapse occur, restoration will be at the Contractor's expense.
 - I. Bedding materials and concrete work for the pipe bedding and thrust restraint shall be as specified in Divisions 2, 3, and 15 as well as Standard Details.
 - J. Prevent foreign material from entering the pipe while it is being placed. Do not place debris, tools, clothing, or other materials in the pipe during laying operations. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work, or for other reasons such as rest breaks or meal periods.
 - K. Cut pipe in accordance with the latest edition of the American Water "Cut-off and Ring Saw Safety Operations Practice." Grind cut ends and rough edges smooth. Bevel the cut end slightly for push-on connections in accordance with manufacturer's recommendations.
 - L. In distributing material at the site of the Work, unload each piece opposite or near the place where it is to be laid in the trench. If the pipe is to be strung out, do so in a straight line or in a line conforming to the curvature of the street. Block each length of pipe adequately to prevent movement. Block stockpiled pipe adequately to prevent movement. Do not place pipe, material, or any other object on private property, obstructing walkways or driveways, or in any manner that interferes with the normal flow of traffic.
 - M. Exercise special care to avoid damage to the bells, spigots or flanged ends of pipe during handling, temporary storage, and construction. Replace damaged pipe that cannot be repaired to the Engineer's satisfaction, at the Contractor's expense.
 - N. Remove all existing pipe, fittings, valves, pipe supports, blocking, and all other items necessary to provide space for making connections to existing pipe and installing all piping required under this Contract.
 - O. Maintain the minimum required distance between the water line and other utility lines in strict accordance with all Federal, State, and Local requirements and all right-of-way limitations.
 - P. Provide and install polyethylene encasement for ductile iron pipe in accordance with Specification Section 15130 and Standard Details.
 - Q. Joint deflection is only allowed on ductile iron pipe. The maximum allowable deflection at the joints for push-on joint pipe shall be the lesser of manufacturer's

recommendations or as described in the DIPRA Guideline, Ductile Iron Pipe Joints and Their Uses, as follows:

| Size of Pipe (inches) | Deflection Angle | Maximum Deflection (inches) | |
|-----------------------|------------------|-----------------------------|----------------------|
| | | 18-ft Length of Pipe | 20-ft Length of Pipe |
| 3 – 12 | 5° | 19 | 21 |
| 14 – 42 | 3° | 11 | 12 |
| 48 – 64 | 3° | N/A | 12 |

- R. Use short lengths of pipe (minimum length 3 feet, no more than three short sections), when approved by the Engineer, to make curves that cannot be made with full length sections of pipe without exceeding the allowable deflection. Making these curves will be at no additional cost to the Owner.
- S. Furnish air relief valve assemblies in accordance with Standard Details and at locations shown on the Drawings. Any deviation from the standard detail proposed by the Contractor must be approved in advance.
- T. Exercise particular care so that no high points are established where air can accumulate. If the Contractor requests a change in the pipe profile solely for ease of construction, and the requested change requires the installation of an air release valve and manhole as determined by the Engineer, the cost of furnishing and installing the air release valve and manhole will be at the expense of the Contractor.
- U. Connection to existing pipelines may require shutdown of Owner facilities. Closely coordinate construction work and connections with the Owner through the Engineer. The Engineer, in consultation with the Owner, may select the time for connection to existing pipelines, including Saturdays, Sundays, or holidays, which, in the opinion of the Engineer, will cause the least inconvenience to the Owner and/or its customers. Make such connections at such times as may be directed by the Owner. If not identified in the Bidding documents, this will be considered extra Work to the Contract.

3.02. CONSTRUCTION METHODS TO AVOID CONTAMINATION

- A. Heavy particulates generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing such organisms. It is essential that the procedures of this Specification Section be observed to assure that a water main and its appurtenances are thoroughly clean for the final disinfection by chlorination.
- B. Take precautions to protect the interior of pipes, fittings, and valves against contamination. String pipe delivered for construction so as to keep foreign material out of the pipe. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Use rodent-proof plugs approved by Engineer, where it is determined that watertight plugs are not practical and where thorough cleaning will be performed.
- C. Delay in placement of delivered pipe invites contamination. The more closely the rate

of delivery is correlated to the rate of pipe laying, the lower the likelihood of contamination. Complete the joints of all pipe in the trench before stopping work. If water accumulates in the trench, keep the plugs in place until the trench is dry.

- D. Do not use contaminated material or any material capable of supporting prolific growth of microorganisms for sealing joints. Handle sealing material or gaskets in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. Deliver the lubricant to the job in closed containers and keep it clean.
- E. If dirt enters the pipe, and in the opinion of the Engineer the dirt will not be removed by the flushing operation, clean the interior of the pipe by mechanical means, then swab with a 1% hypochlorite disinfecting solution. Clean using a pig, swab, or "go-devil" only when the Engineer has specified such and has determined that such operation will not force mud or debris into pipe joint spaces. Clean the pipeline in accordance with Specification Section 15025.
- F. If the main is flooded during construction, the flooded section must be isolated from the remainder of the installation as soon as practical. Submit a plan to the Engineer on correcting the condition and do not proceed until authorized by the Engineer. Replace or fully clean and disinfect the affected pipe at no additional cost to the Owner.

3.03. VALVE INSTALLATION

- A. Prior to installation, inspect valves for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting, cleanliness of valve ports, cleanliness of seating surfaces, handling damage, and cracks. Correct defective valves or hold for inspection by the Engineer.
- B. Set valves and join to the pipe in the manner specified in Specification Section 3.01. Provide valves with adequate support, such as crushed stone and concrete pads, so that the pipe will not be required to support the weight of the valve. Set truly vertical. After field installation of the valve all exposed ferrous restraint materials and external bolts except the operating nut shall receive a layer of petrolatum tape coating or, where approved, rubberized-bitumen based spray-on undercoating applied before backfill. If polyethylene is applied to the pipe, the entire valve shall be encased in polyethylene encasement prior to backfill. The polyethylene encasement shall be installed up to the operating nut leaving the operating nut exposed and free to be operated.
- C. Provide a valve box for each valve. Set the top of the valve box neatly to existing grade, unless directed otherwise by the Engineer. Do not install in a way that allows the transfer shock or stress to the valve. Center and plumb the box over the wrench nut of the valve. Do not use valves to bring misaligned pipe into alignment during installation. Support pipe in such manner as to prevent stress on the valve. See Standard Details for a typical valve box installation detail.
- D. Provide valve marking posts, when required by the Owner, at locations designated by

the Engineer.

3.04. THRUST RESTRAINT

- A. Provide all plugs, caps, tees, and bends (both horizontal and vertical) with concrete thrust blocking and/or restrained joint pipe as represented on the Drawings and Standard Details.
- B. Place concrete thrust blocking between undisturbed solid ground and the fitting to be anchored. Install the concrete thrust blocking in accordance with Specification Section 03300 and Standard Details. Locate the thrust blocking to contain the resultant thrust force while keeping the pipe and fitting joints accessible for repair, unless otherwise shown or directed.
- C. Provide temporary thrust restraint at temporary caps and plugs. Submit details of temporary restraint to the Engineer for approval.
- D. At connections with existing water mains where there is a limit on the time the water main may be removed from service, use metal harnesses of anchor clamps, tie rods and straps; mechanical joints utilizing set-screw retainer glands; or restrained push-on joints as permitted by Engineer. No restraining system can be installed without the approval of the Engineer. Submit details of the proposed installation to the Engineer for approval. For pipe up to 12 inches in size, use a minimum of two 3/4-inch tie rods. If approved for use, install retainer glands in accordance with the manufacturer's instructions. Material for metal harnessing and tie-rods shall be ASTM A36 or A307, as a minimum requirement.
- E. Protection of Metal Harnessing: Protect ties rods, clamps and other metal components against corrosion by hand application of petrolatum tape and by encasement of the entire assembly with 8-mil thick (12 mil thick in corrosive soils) loose polyethylene film in accordance with AWWA C105. Apply tape on all exposed tie rods prior to installing polyethylene.

3.05. BASIS OF PAYMENT

The items described in this Specification Section are considered incidental to the installation of the water main.

END OF SECTION 15000

SECTION 15020
DISINFECTING PIPELINES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing necessary labor, tools, transportation, and other equipment for flushing and disinfecting all pipelines installed under this Contract. Install, and if directed remove, all chlorination taps required for disinfection. The disinfection will be performed under the supervision of Owner.

1.02. RELATED WORK

- A. Specification Section 1000 – Summary of Work
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15025 – Cleaning Pipelines

1.03. REFERENCES

Refer to current standards:

- A. AWWA C651 – Disinfecting Water Mains
- B. AWWA B300 and B301
- C. AWWA Manual M12
- D. *Standard Methods for the Examination of Water and Wastewater*

1.04. SUBMITTALS

- A. Submit a plan of disposal of flushed water.
- B. Submit in accordance with Section 01300.

1.05. PROTECTION

- A. Chlorine disinfection and dechlorination shall be performed under the direct supervision of someone familiar with the physiological, chemical, and physical properties of the form of chlorine used. They shall be trained and equipped to handle any emergency that may arise. All personnel involved shall observe appropriate safety practices to protect working personnel and the public.
- B. The forwards of AWWA Standards B300 and B301 contain information and additional reference material regarding the safe handling of hypochlorites and liquid chlorine. The Contractor's supervision shall be familiar with this information prior to performing any disinfection work.
- C. See Specification Section 15025-1.05 for Protection During Flushing and Cleaning.

PART 2 – PRODUCTS

2.01. MATERIALS AND EQUIPMENT

- A. Furnish liquid chlorine and injection equipment and/or calcium hypochlorite (HTH) as needed to disinfect all pipelines and appurtenances.
- B. Liquid chlorine contains 100% available chlorine and is packaged in steel containers, usually of 100 pound, 150 pound, or 1 ton net chlorine weight. Liquid chlorine is to be furnished in accordance with AWWA B301.
- C. Calcium hypochlorite is available in granular form or in approximately 5-g tablets, and contains approximately 65% available chlorine by weight. The material should be stored in a cool, dry, and dark environment to minimize its deterioration. Do not use calcium hypochlorite intended for swimming pool disinfection, as this material (containing trichloroisocyanuric acid) has been sequestered and is extremely difficult to eliminate from the pipe after the desired contact time had been achieved.
- D. Calcium hypochlorite must conform to AWWA B300.
- E. Field testing for chlorine and other parameters, must be performed with equipment approved and calibrated for the range and resolution applicable. For example, pen chlorimeters typically do not accurately measure the concentration of chlorine in the high strength solution. High Strength Testing Strips are preferred. Any field testing equipment must be approved by Owner's local Water Quality personnel.

PART 3 – EXECUTION

3.01. PREPARATION

All pipelines shall be pressure and leak tested, flushed, and cleaned of debris and dirt prior to application of the disinfectant. Flushing shall continue until the volume in the newly installed main has turned over at least one time unless the Engineer determines that conditions do not permit the required volume to be safely discharged to waste.

3.02. APPLICATION OF DISINFECTANT

Methods to be used for disinfection are those detailed in ANSI/AWWA C651 Disinfecting Water Mains.

3.03. WATER MAINS

Two (2) methods of chlorination are described below. Information in the forward of AWWA Standard C651 will be helpful in determining the best method to be used. The tablet method cited in the AWWA standard is not approved for use.

A. Continuous Feed Method

1. Set up. The continuous feed method consists of completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and

then refilling the main with chlorinated potable water. The potable water shall be chlorinated, so that after a 24-hour holding period in the main, there will be a free chlorine residual of not less than 10 mg/L in collected samples.

Chlorine can be applied in advance of preliminary flushing by swabbing joints with bleach or placing hypochlorite granules in the pipe in areas where contamination is suspected. In any such case, the Contractor shall make sure and take appropriate action to make sure that the flushed water is dechlorinated.

2. Preliminary flushing. Prior to being chlorinated, fill the main to eliminate air pockets and flush to remove particulates. The flushing velocity in the main shall be not less than 3 fps unless the Engineer determines that conditions do not permit the required flow to be discharged to waste. **Table 1** shows the rates of flow required to produce a velocity of 3 fps in pipes of various sizes. In mains of 24-inches or larger diameter, an acceptable alternative to flushing is to broom-sweep the main, carefully removing all sweepings prior to chlorinating the main. **WARNING:** OSHA requirements for confined space need to be addressed before entering a pipeline.

NOTE: Flushing is no substitute for preventive measures during construction. Certain contaminants such as caked deposits resist flushing at any feasible velocity.

Table 1
Required Flow and Openings to Flush Pipelines at 3 fps
(40 psi Residual Pressure in Water Main)*

| Pipe Diameter (in.) | Flow Required to Produce 3 fps Velocity in Main (gpm) | Size of Tap Used (in.) | | | Number of 2-1/2 in. Hydrant Outlets to Use |
|------------------------|--|------------------------|-------|---|--|
| | | 1 | 1-1/2 | 2 | |
| 4 | 120 | 1 | | | 1 |
| 6 | 260 | | 1 | | 1 |
| 8 | 470 | | 2 | | 1 |
| 10 | 730 | | 3 | 2 | 1 |
| 12 | 1060 | | | 3 | 2 |
| 16 | 1880 | | | 5 | 2 |

*With a 40 psi pressure in the main with the hydrant flowing to atmosphere, a 2½-inch hydrant outlet will discharge approximately 1,000 gpm and a 4½-inch hydrant outlet will discharge approximately 2,500 gpm.

**Number of taps on pipe based on discharging through 5 feet of galvanized iron pipe with one 90 degree elbow.

3. Chlorinating the Main.

- a. Potable water may be supplied from a temporary backflow-protected connection to the existing distribution system or other approved source. The flow shall be at a constant, measured rate into the newly installed water main. In the absence of a meter, approximate the rate by placing a pitot gauge in the discharge or measuring the time to fill a container of known volume.
- b. At a point not more than 10 feet downstream from the beginning of the new main, dose the water entering the new main with chlorine fed at a constant rate such that the water will have not less than 25 mg/L free chlorine. Measure the chlorine concentration at regular intervals to ensure that this concentration is provided. Measure chlorine in accordance with the procedures described in the current edition of the AWWA Manual M12 or of *Standard Methods for the Examination of Water and Wastewater*.
- c. **Table 2** gives the amount of chlorine required for each 100 feet of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with calcium hypochlorite. The solution requires 1 pound of calcium hypochlorite in 8 gallons of water.

Table 2
Chlorine Required to Produce 25 mg/L
Concentration in 100 feet of Pipe by Diameter

| Pipe Diameter (in.) | 100% Chlorine (lb.) | 1% Chlorine (gal.) |
|---------------------|---------------------|--------------------|
| 4 | 0.013 | 0.16 |
| 6 | 0.030 | 0.36 |
| 8 | 0.054 | 0.65 |
| 10 | 0.085 | 1.02 |
| 12 | 0.120 | 1.44 |
| 16 | 0.217 | 2.6 |

- d. During the application of chlorine, position valves so that the strong chlorine solution in the main being treated will not flow into water mains in active service. Do not stop the chlorine application until the entire main is filled with heavily chlorinated water. Keep the chlorinated water in the main for at least 24 hours. During this time, operate all valves and hydrants in the section treated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water in all portions of the main shall have a residual of not less than 10 mg/L free chlorine.

- e. Hypochlorite solution may be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. Feed lines shall be of such material and strength as to safely withstand the corrosion caused by the concentrated chlorine solutions and the maximum pressures that may be created by the pumps. Check all connections for tightness before the solution is applied to the main. The main should undergo hydrostatic testing prior to disinfection.
- f. If gaseous chlorine in solution is permitted by the Engineer and proposed by the Contractor, the preferred equipment for the gas application employs a feed vacuum-operated chlorinator to mix the chlorine gas, in combination with a booster pump for injecting the chlorine gas solution water into the main to be disinfected. Direct feed chlorinators cannot be used. (A direct feed chlorinator is one which operates solely from the pressure in the chlorine cylinder.)

B. Slug Method

1. Set up. The slug method consists of placing calcium hypochlorite granules in the main during construction; completely filling the main to eliminate all air pockets, flushing the main to remove particulates, and slowly flowing a slug of water containing 100 mg/L of free chlorine through the main so that all parts of the main and its appurtenances will be exposed to the highly chlorinated water for a period of not less than 3 hours.
2. Preliminary flushing. Same as 3.03.A.2 in this Specification Section
3. Chlorinating the Main.
 - a. Potable water may be supplied from a temporary backflow-protected connection to the existing distribution system or other approved source. The flow shall be at a constant, measured rate into the newly installed water main. In the absence of a meter, approximate the rate by placing a pitot gauge in the discharge or measuring the time to fill a container of known volume. The main should undergo hydrostatic testing prior to disinfection.
 - b. At a point not more than 10 feet downstream from the beginning of the new main, dose the water entering the new main with chlorine fed at a constant rate such that the water will have not less than 100 mg/L free chlorine. Measure the chlorine concentration at regular intervals to ensure that this concentration is provided. Measure chlorine in accordance with the procedures described in the current edition of the AWWA Manual M12 or of *Standard Methods for the Examination of Water and Wastewater*. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated

water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L for at least 3 hours.

- c. The free chlorine residual shall be measured in the slug as it moves through the main. If at any time it drops below 50 mg/L, stop the flow, relocate the chlorination equipment to the head of the slug, and as flow is resumed, apply chlorine to restore the free chlorine in the slug to not less than 100 mg/L.
- d. As the chlorinated water flows past fittings and valves, operate related valves and hydrants so as to disinfect appurtenances and pipe branches.

C. Alternative Methods

1. Alternative methods for disinfection may be considered with the approval of the Engineer and Owner's Water Quality personnel.

3.04. FINAL FLUSHING AND DISPOSAL OF HEAVILY CHLORINATED WATER

- A. Do not keep heavily chlorinated water in contact with pipe for more than 48 hours after the applicable retention period. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, flush the heavily chlorinated water from the main fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use. Take all steps necessary to dechlorinate water where required per section 3.04B and 3.04C below. Contact the local sewer department to arrange for disposal of the heavily chlorinated water to the sanitary sewer if applicable.
- B. Neutralize the chlorine residual of the water being disposed of by treating with one of the chemicals listed in **Table 3**. Select an alternative disposal site if a sanitary sewer system is unavailable for disposal of the chlorinated water.
- C. The proposed alternative disposal site shall be inspected and approved of by the Engineer. Apply a reducing agent to the chlorinated water to be wasted to completely neutralize the chlorine residual remaining in the water. (See **Table 3** for neutralizing chemicals. Do not overdose neutralizing chemicals as this may result in adverse environmental impacts. Only dose the amount required to neutralize the amount of chlorine present). Contact Federal, State and Local regulatory agencies, where necessary, to determine special provisions for the disposal of heavily chlorinated water.

Table 3
Pounds of chemicals required to neutralize various residual chlorine concentrations in 100,000 gallons of water.

| Residual Chlorine Concentration (mg/L) | Sulfur Dioxide (SO ₂) | Sodium Bisulfite (NaHSO ₃) | Sodium Sulfite (Na ₂ SO ₃) | Sodium Thiosulfate (Na ₂ S ₂ O ₃ · 5H ₂ O) | Ascorbic Acid (C ₆ O ₈ H ₆) |
|--|-----------------------------------|--|---|--|---|
| 1 | 0.8 | 1.2 | 1.4 | 1.2 | 2.1 |
| 2 | 1.7 | 2.5 | 2.9 | 2.4 | 4.2 |
| 10 | 8.3 | 12.5 | 14.6 | 12.0 | 20.9 |
| 50 | 41.7 | 62.6 | 73.0 | 60.0 | 104.0 |

- D. Test for chlorine residual throughout the disposal process to be sure that the chlorine is neutralized.
- E. Submit a plan of disposal of flushed water to the Engineer for approval.

3.05. BACTERIOLOGICAL TESTING

- A. After final flushing and before the water main is placed in service, samples must be collected and tested.
- B. At least one set of samples shall be collected from every 1,200 feet of the new water main, plus one set from the end of the line and at least one set from each branch greater than one pipe length.
- C. Samples shall be collected by the Owner, or other qualified person approved by the Engineer. Coordinate with Owner and submit samples to the Owner for testing of bacteriological (chemical and physical) quality. Testing will be in accordance with *Standard Methods of the Examination of Water and Wastewater*. Samples shall show the absence of coliform organisms; and the presence of a chlorine residual. Samples shall also be tested for turbidity, pH, and standard heterotrophic plate count (HPC). HPC levels must be consistent with levels normally found in the distribution system to which the new main is connected.
- D. Bacteriological tests must show complete absence of coliforms and acceptable HPCs. If tests show the presence of coliform or unacceptable HPCs, perform additional flushing and disinfection of the pipeline until acceptable tests are obtained, all at no cost to the Owner. The Contractor will not be charged for the additional testing performed by the Owner.

3.06. RETESTING AND TESTING SOURCE WATER

- A. At the time of initial flushing the main to remove material and test for air pockets, Contractor may request the Owner to continue flushing until the desired chlorine residual is met at the discharge point. Notification must be provided in advance and

the Contractor shall be prepared to test for chlorine at intervals of no more than five minutes as the water clears. This will provide the Contractor with some assurance that the source water is chlorinated.

- B. If the subsequent tests for bacteriological contamination conducted by the Contractor fail, the Contractor may request the Owner to continue flush from the source water into the new pipe system until a chlorine residual is found at the discharge point. Notification must be provided in advance and the Contractor shall be prepared to test for chlorine at intervals of no more than five minutes as the water clears. The operation of all existing system valves shall be by the Owner at the Contractor expense and the discharge point must be opened prior to opening existing valves to avoid contamination. This will provide the Contractor with some assurance that the source water is chlorinated for subsequent tests.

3.07. BASIS OF PAYMENT

The items described in this Specification Section are considered incidental to the installation of the water main.

END OF SECTION 15020

SECTION 15025
CLEANING PIPELINES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing necessary labor, material, tools, transportation, and other equipment for cleaning the required pipeline when it is determined that normal flushing will not sufficiently remove dirt and debris introduced during construction. The cleaning shall use foam pigs, swabs or "go-devils" as described herein.

1.02. GENERAL

After the installation of water mains normal flushing often proves inadequate to remove all the entrapped air, loose debris and other objects that may have been left in the main during installation. Therefore, after the installation of water mains it may be necessary to use polyurethane foam pigs and/or polyurethane hard foam swabs to remove all foreign matter from the pipeline (i.e. "pig" the pipeline).

Cleaning per the requirements of this section shall be performed prior to testing and disinfection of the main.

1.03. RELATED WORK

- A. Specification Section 15000-3.02-Construction Methods to Avoid Contamination.
- B. Specification Section 15020-3.01-Preparation (prior to disinfecting pipelines).

1.04. SUBMITTALS

- A. Submit a cleaning plan.
- B. Submit in accordance with Section 01300.

1.05. PROTECTION DURING FLUSHING AND CLEANING

- A. Coordinate with Engineer and Owner before flushing to ensure that an adequate amount of flushing water is available, at sufficiently high pressure. Determine if the water can be disposed of safely. Notify the Owner, Engineer, and the following prior to flushing or cleaning:
 - 1. Fire Department
 - 2. Other utilities, such as gas, electric and telephone companies, who may have underground facilities in the area.
 - 3. Customers who may be inconvenienced by reduced pressure or dirty water.

- B. Operation of Water System – The operation of main valves and fire hydrants on the water system in service often results in disturbance of the natural sediments and mineral deposits in mains, causing problems for Illinois-American’s customers. Illinois-American has a responsibility to provide its customers the highest level of service possible. Therefore Illinois-American has adopted a strict policy that no one, other than an employee of Illinois-American, unless expressly authorized, is to operate any valve, fire hydrant, or other appurtenance of water system that is in service or which will affect the system that is in service. This operation is to be performed by an employee of Illinois-American or under Illinois-American direct supervision.
- C. Coordinate with the Owner to isolate the section to be flushed from the operating distribution system. Provide a minimum notice of two (2) working days to schedule Illinois American staff to report to site.
- D. Protect the work staff and the public during flushing and cleaning operation. Keep children away from the flow of flushing water. Where practical employ energy dissipators to help avoid damage to property and the flooding of streets. See General Conditions Article 6.

PART 2 - PRODUCTS

2.01. MATERIALS AND EQUIPMENT

As the cleaning described in this section pertains to new water mains, the use of pipe cleaning plugs which utilize bristles, wire brushes, carbide abrasives, steel studs or any other type of abrasive is not permitted unless specifically approved by the Engineer. Consult a manufacturer of pipe cleaning plugs, such as Knapp Polly Pig (Houston, Texas), to determine the type and size of cleaning plug best suited for the application. Two types of plugs shall be considered and are described as follows:

- A. Swabs used for cleaning mains shall be made of polyurethane foam. This foam has a density of 1 to 2 pounds per cubic foot. Swabs shall be purchased from commercial manufacturers of swabs for pipes. Both soft and hard grade foam swabs are available. New mains are typically cleaned with hard foam swabs.

Use swabs cut into cubes and cylinders slightly larger than the size of the pipe to be cleaned. Cubes one inch larger in dimension than the nominal diameter of the pipe being cleaned have worked well for cleaning pipes up to 12-inches in diameter.

For mains greater than 12-inches in diameter, the swab diameter must be considered individually for each operation. For new mains, swabs three inches larger than the pipe diameter have worked well. Swabs for the larger mains are usually 1-1/2 times the diameter in length.

- B. Pigs, if used, shall be commercially manufactured for the specific purpose of cleaning pipes. They shall be made of polyurethane foam weighing 2 to 15 pounds per cubic foot. Pigs are bullet shaped and come in various grades of flexibility and roughness. Pigs are typically 1/4 -inch to 1/2-inch larger in diameter than the pipe to be cleaned.

PART 3 – EXECUTION

3.01. PLUG INSTALLATION AND REMOVAL

- A. Satisfactorily expose cleaning wyes, or other entry or exit points. Remove cleaning wye covers, etc., as required by the Engineer to insert the plugs into the mains.
- B. If approved by the Engineer, stripped fire hydrants, air valves and blow-offs may serve as entry and exit points for smaller sized mains. The Engineer will examine these appurtenances and the connecting laterals to ensure that adequate openings exist through which a plug may be launched. If these appurtenances are used, a special launcher to ease the insertion and launching of the plug is required. If available a pressurized water source such as a fire hydrant can be used to launch the plug. If water from the system is not available nearby, use a water truck with pump.
- C. If hydrants are used as entry and exit points, remove the internal mechanisms and plug the drains. Insert the plug and replace the cap with a special flange with a 2-1/2-inch fitting. Connect the 2-1/2-inch fitting with a pressure gauge and valve to a pressurized water source. After the last valve isolating the section to be cleaned is closed, open the hydrant supply valve. Propel the swab or pig into the main by opening the exit valve.
- D. In mains greater than 8-inches, wyes shall be used at the entry and exit points. Fabricate the wye section one size larger than the main to ease the insertion and extraction of the plug. The use of wyes, as with the previously mentioned appurtenances, requires an outside source of pressurized water for launching. Cap the wye with a flange with a 2 to 6 inch fitting for connecting with the pressurized water source.
- E. Many pigs, since they are less flexible than swabs, are harder to insert into a pipe. Other methods acceptable to insert pigs include:
 - 1. winching with a double sling,
 - 2. winching with a rope attached to the pig,
 - 3. compression with a banding machine prior to insertion, and
 - 4. the use of a specially designed tapered steel pipe which is removed after use.
- F. During swab or pig installation, leave as much water as possible in the main to be cleaned. The water suspends the material being removed from the pipe and

minimizes the chance of the material forming a solid plug. Water in the pipe also keeps the swab or pig from traveling through the pipe at excessive rates. If swabs or pigs travel too fast they will remove less material. The swab or pig will also wear more rapidly in such a case.

- G. At the exit point or blow-off, install a wye long enough to house the swab or pig. Attach temporary piping to the end cap to allow the drainage of the water.
- H. Take precautions to prevent backflow of purged water into the main when the cleaning plug exits through a dead end main. This can be accomplished by installing mechanical joint bends and pipe joints to provide a riser out of the trench. Additional excavation of the trench may serve the same purpose.

3.02. PRE-CLEANING PROCEDURES

- A. Prepare a written cleaning plan for the Engineer's review.
- B. Suggested pre-cleaning procedures include the following:
 1. Identify mains to be cleaned on a map. Mark the location of the entry, water supply and exit points, any blow-offs to be used, valves to be closed, and the path of the swab or pig.
 2. Under the Engineer's supervision and with Owner staff as required, inspect and operate all valves and hydrants to be used in the cleaning operation. Ensure that all operate correctly and that a tight shutdown is possible.
 3. Check location and type of hydrants, launch and exit location, and blow-offs to be used. Make blow-off tap connections if necessary.
 4. The Owner will notify customers served by the main to be cleaned that their water will be off for a specified period on the day of the cleaning.
 5. The Owner will identify customers who may require temporary services during the main cleaning operation. The Contractor shall provide the temporary connections.
 6. Determine the number and size of plugs to be used.

3.03. CLEANING PROCEDURE

Clean the pipeline using the following procedures and the Contractor's cleaning plan, as approved by the Engineer.

A. Swab Cleaning Procedures

1. Open the water supply upstream of the swab. Throttle the flow in the main at the discharge (plug exit) point so that the swab passes through the main at a speed of 2 to 4 fps. At this velocity, swabs will effectively clean pipes for distances of up to 4000 feet before disintegrating to a size smaller than the

main. Use pitot gauges at the exist hydrant or blow-off to estimate the flowrate in the main.

2. Note the time of entry of the swab into the main and estimate its time or arrival at the exit point. If the swab does not reach the exit point in the estimated time plus ten minutes, then a blockage has probably occurred. Reverse the flow in the main and note the time required for the swab to reach the original entry point. From the return travel time, approximate the location of the blockage. The Engineer may require a swab to which a transmitter has been attached to be used to accurately locate a blockage.
3. Swab repeatedly as needed. Stop swabbing when the water behind the swabs emerging at the exit clears up within one minute. Account for all swabs inserted into the main.
4. After the last swab has been recovered, flush the main to remove swab particles. This may require up to an hour or flushing.

B. Pig Cleaning Procedures

1. Remove all air valves along the line. This will provide pressure relief should the pig suddenly stop and assure that no air is trapped in the main.
2. If the pig is inserted directly into the main, set it in motion by opening the upstream gate valve and a downstream fire hydrant or blow-off valve (usually the valve on the capped end at the exit point). If the pig is launched from a wye, fire hydrant, or other appurtenance, use an external pressurized water source to inject the pig into the main as described in Section 3.01.
3. Once the pig is in motion in the main, control its speed by throttling the discharge at a downstream fire hydrant or blow-off. Operate pigs typically at 1 fps. This slow speed will help prevent pressure surges when the pig passes through undersized valves, enters smaller pipes, or turns through tees or crosses. Speeds of up to 2 fps can be used on straight runs with no restrictions or sharp turns.
4. Make sufficient passes of the pig to obtain thorough cleaning. Two pigs may be used in tandem to save time and water. Sufficient cleaning is established when the water discharging after the pig becomes clear within one minute.

3.04. POST CLEANING PROCEDURE

After successful completion of cleaning the main shall be tested, flushed and disinfected in accordance with applicable sections of these Specifications.

3.05. BASIS OF PAYMENT

The items described in this Specification Section are considered incidental to the installation of the water main.

END OF SECTION 15025

SECTION 15030
PRESSURE AND LEAKAGE TESTS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing necessary labor, tools, material, and equipment for testing all pipelines installed under this Contract. Testing shall be performed concurrent with installation.

1.02. RELATED WORK

A. Specification Section 15000 – Piping – General Provisions

1.03. REFERENCES

Refer to current standards:

A. AWWA C600

B. Standard Specifications for Water and Sewer Construction in Illinois

1.04. SUBMITTALS

A. Submit schedules and procedures to the Engineer for testing of all parts of the water main installed.

B. Submit the schedule at least seven days prior to any testing.

C. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. EQUIPMENT

Furnish the pump, pipe connections, and all necessary apparatus for the pressure and leakage tests including gauges and metering devices. The Owner reserves the option to furnish the gauges and metering devices for the tests. Excavate, backfill, and furnish all necessary assistance for conducting the tests.

PART 3 – EXECUTION

3.01. GENERAL

- A. Perform hydrostatic pressure and leak tests in accordance with AWWA C600, Section 4 - Hydrostatic Testing after the pipe or section of pipe has been laid, thrust blocking cured (min. 5 days), and the trench is completely or partially backfilled. Where practical, testing shall be performed fully isolated from the active distribution system.
- B. The Contractor may completely backfill the trench or partially backfill the trench over the center portion of each pipe section to be tested. However, the Engineer may direct the Contractor to completely backfill the trench if local traffic or safety conditions require.
- C. For system operating pressures of 200 psi or less, perform the hydrostatic test at a pressure of no less than 100 psi above the normal operating pressure without exceeding the rating of the pipe and appurtenances, or a minimum of 150 psi. For system operating pressures in excess of 200 psi, perform the hydrostatic test at a pressure that is 1.5 times the normal operating pressure, but no more than the design rating of the pipe and appurtenances.
- D. Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. A test pressure greater than the rated valve working pressure can result in trapped test pressure between the gates of a double-disc gate valve. For tests exceeding the rated valve working pressure, the test setup should include a provision, independent of the valve, to reduce the line pressure to the rated valve working pressure on completion of the test. The valve can then be opened enough to equalize the trapped pressure with the line pressure, or the valve can be fully opened if desired.
- E. The test pressure shall not exceed the rated working pressure or differential pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.
- F. Attach a tapping sleeve and valve assembly to the main. Pressure test the assembly prior to making the tap. The required test pressure shall be determined in the same manner as for pipe. The test is acceptable if there is no pressure drop in 15 minutes at test pressure.

3.02. FILLING AND TESTING

- A. Slowly fill each segregated section of pipeline with water ensuring that all air is expelled. Extreme care must be taken to ensure that all air is expelled during the filling of pipe. The line shall stand full of water for at least twenty-four hours prior to testing to allow all air to escape. If necessary, tap the main at points of highest elevation to expel air as the pipe is filled. Remove the corporation stops and plug the taps after successfully filling the pipeline and expelling all air as approved by the Engineer.
- B. Apply the specified test pressure, measured at the point of lowest elevation, using a pump connected to the pipe in a manner satisfactory to the Engineer. If the elevation of the high point of the pipeline being tested is such that the pressure during testing will be below 85% of the required test pressure, the Engineer will require a separate test to be performed on this

section of pipeline. In lieu of a separate test, the test pressure measured at the lowest elevation may be increased, within the pressure rating of the pipeline material, such that the resulting pressure at the highest point exceeds 85% of the required test pressure. The test will be conducted for at least two hours at the required test pressure ± 5 psi.

- C. Conduct a leakage test concurrently with the pressure test. Leakage is defined as the volume of the water that must be supplied into the newly laid pipeline to maintain pressure within 5 psi of the test pressure after it is filled and purged of air. Measure the volume of water using a calibrated container or meter.
- D. No pipeline installation will be accepted by the Engineer if the leakage is greater than that shown in the following table:

Allowable Leakage per 1000 ft. of Pipeline*---gph

| Avg. Test Pressure psi | Nominal Pipe Diameter—in. | | | | | | | | | | | | | |
|---------------------------|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 | 42 | 48 |
| 450 | 0.57 | 0.86 | 1.15 | 1.43 | 1.72 | 2.01 | 2.29 | 2.58 | 2.87 | 3.44 | 4.30 | 5.16 | 6.02 | 6.88 |
| 400 | 0.54 | 0.81 | 1.08 | 1.35 | 1.62 | 1.89 | 2.16 | 2.43 | 2.70 | 3.24 | 4.05 | 4.86 | 5.68 | 6.49 |
| 350 | 0.51 | 0.76 | 1.01 | 1.26 | 1.52 | 1.77 | 2.02 | 2.28 | 2.53 | 3.03 | 3.79 | 4.55 | 5.31 | 6.07 |
| 300 | 0.47 | 0.70 | 0.94 | 1.17 | 1.40 | 1.64 | 1.87 | 2.11 | 2.34 | 2.81 | 3.51 | 4.21 | 4.92 | 5.62 |
| 275 | 0.45 | 0.67 | 0.90 | 1.12 | 1.34 | 1.57 | 1.79 | 2.02 | 2.24 | 2.69 | 3.36 | 4.03 | 4.71 | 5.38 |
| 250 | 0.43 | 0.64 | 0.85 | 1.07 | 1.28 | 1.50 | 1.71 | 1.92 | 2.14 | 2.56 | 3.21 | 3.85 | 4.49 | 5.13 |
| 225 | 0.41 | 0.61 | 0.81 | 1.01 | 1.22 | 1.42 | 1.62 | 1.82 | 2.03 | 2.43 | 3.04 | 3.65 | 4.26 | 4.86 |
| 200 | 0.38 | 0.57 | 0.76 | 0.96 | 1.15 | 1.34 | 1.53 | 1.72 | 1.91 | 2.29 | 2.87 | 3.44 | 4.01 | 4.59 |
| 175 | 0.36 | 0.54 | 0.72 | 0.89 | 1.07 | 1.25 | 1.43 | 1.61 | 1.79 | 2.15 | 2.68 | 3.22 | 3.75 | 4.29 |
| 150 | 0.33 | 0.50 | 0.66 | 0.83 | 0.99 | 1.16 | 1.32 | 1.49 | 1.66 | 1.99 | 2.48 | 2.98 | 3.48 | 3.97 |
| 125 | 0.30 | 0.45 | 0.60 | 0.76 | 0.91 | 1.06 | 1.21 | 1.36 | 1.51 | 1.81 | 2.27 | 2.72 | 3.17 | 3.63 |
| 100 | 0.27 | 0.41 | 0.54 | 0.68 | 0.81 | 0.95 | 1.08 | 1.22 | 1.35 | 1.62 | 2.03 | 2.43 | 2.84 | 3.24 |

*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size. The table has been generated from the formula:

$$L = \frac{S \cdot D \cdot P^{1/2}}{148,000}$$

where L is the allowable leakage in gallons per hour, S is the length of

pipe in feet, D is the nominal pipe diameter in inches, and P is the test pressure in psig.

- E. Should any test disclose damaged or defective materials or leakage greater than that permitted, the Contractor shall, at Contractor's expense, locate and repair and/or replace the damaged or defective materials. Materials used for repair must be approved by the Engineer and meet the Specifications. Repeat the tests until the leakage is within the permitted allowance and is satisfactory to the Engineer.

3.03. BASIS OF PAYMENT

The items described in this Specification Section are considered incidental to the installation of the water main.

END OF SECTION 15030

SECTION 15105
DUCTILE IRON PIPE AND FITTINGS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing ductile iron pipe and fittings as shown on the Drawings and Standard Details. The Owner reserves the right to provide ductile iron pipe. A list of additional materials to be provided by the Owner, if applicable, is shown in Specification Section 01000.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 02210 – Trenching, Backfilling, and Compacting
- D. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current Standards:

- A. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- B. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
- C. AWWA C110 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
- D. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- E. AWWA C115 - American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
- F. AWWA C116 - American National Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service

- G. AWWA C150 - American National Standard for the Thickness Design of Ductile-Iron Pipe
- H. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water
- I. AWWA C153 - American National Standard for Ductile-Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch, for Water Service
- J. AWWA C600 -- AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances
- K. ISO 8179-1 – Ductile Iron Pipes-External Zinc-based coating-Part1: Metallic Zinc with Finishing Layer

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's literature for all Contractor supplied materials.
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

Research has documented that certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this Specification Section assume that petroleum products or organic solvents will not be encountered. If during the course of pipeline installation the Contractor identifies, or suspects the presence of petroleum products or any unknown chemical substance, notify the Engineer immediately. Stop installing piping in the area of suspected contamination until direction is provided by the Engineer.

2.01. PIPE MATERIALS

A. General

Ductile iron pipe shall conform to the latest specifications as adopted by the American National Standards Institute, Inc., (ANSI) and the American Water Works Association (AWWA). Specifically, ductile iron pipe shall conform to AWWA Standard C151.

The exterior of ductile iron pipe shall be coated with a layer of arcsprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m² of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The coating system shall conform in every respect to ISO 8179-1 “Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Second edition 2004- 06-01.”

The pipe or fitting exterior shall be topcoated with a bituminous coating in accordance with AWWA Standard C151. The pipe or fitting interior shall be cement mortar lined and seal coated in compliance with the latest revision of AWWA Standard C104.

B. Quality

Pipe and fittings shall meet the minimum quality requirements by conforming to the following:

1. AWWA C105 / ANSI A21.5 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water Polyethylene Encasement for Ductile-Iron Pipe Systems
2. AWWA C110 / ANSI A21.10 Ductile Iron and Gray Iron Fittings, 3 NPS through 48 NPS for Water AWWA C111 / ANSI A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
3. AWWA C115 / ANSI A21.15 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
4. AWWA C116 / ANSI A21.16 Protective Fusion-Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service
5. AWWA C150 / ANSI A21.50 Thickness Design of Ductile-Iron Pipe
6. AWWA C151 / ANSI A21.51 Ductile-Iron Pipe, Centrifugally Cast, for Water
7. AWWA C153 / ANSI A21.53 Ductile-Iron Compact Fittings, 3 NPS through 24 NPS and 54 NPS through 64 NPS, for Water Service

Ductile iron water pipe and fittings will be accepted on the basis of the Manufacturer's certification that the material conforms to this specification. The certification for iron fittings shall list a fitting description, quantity, bare fitting weight and source, (AWWA Standard C110, C153 or Manufacturer, if fitting is not listed in either standard). The certification shall accompany the material delivered to the project site. The Owner reserves the right to sample and test this material subsequent to delivery at the project site. If foreign manufactured fittings are provided, then the Contractor is obligated to notify the Engineer with a submittal and provide the necessary documentation to satisfy the Engineer and the Owner that the materials provided meet the specified AWWA standards and, among other documentation that may be required, provide certificates of compliance on the component supplied.

C. Pipe Class

The pressure and thickness class of pipe to be furnished shall be in accordance with **Table 1** and the notes listed below.

Table 1
MINIMUM Rated Working Pressure
 For Ductile Iron Pipe Manufactured In Accordance
 With AWWA Standard C151

| Pipe Size (Inch) | Pressure Class | Thickness Class |
|------------------|----------------|-----------------|
| 6 | 350 | 52 |
| 8 | 350 | 52 |
| 12 | 350 | 54 |
| 16 | 300 | 54 |
| 20 | 300 | 54 |
| 24 | 250 | 54 |

NOTES:

1. Larger pipe sizes up to 54-inch can be installed as pressure Class 200 with cover up to nine (9) feet and an operating pressure of 200 psi, where approved by the Engineer. When trench depths exceed fifteen (15) feet for pipe sizes of 16-inch or larger, the Engineer shall direct the Contractor on the proper class pipe to use.
2. The noted pressure class is adequate to support 3/4 and 1-inch corporation stops. Use a full saddle for larger taps (e.g., air relief valves or larger corporations) due to limited wall thickness.
3. There are special conditions where a larger wall thickness is required. The Engineer shall direct the Contractor on the proper pressure class pipe to use in specific instances; e.g. at treatment plant or booster station sites where frequent excavation can be anticipated in the vicinity of pipe, where the pipeline is laid on a river channel bottom to prevent external damage to the pipe and minimize the potential for costly pipe replacement, etc.

D. Testing

Perform a hydrostatic test of all pipe and appurtenances as required by AWWA Standard C151 and Specification Section 15030.

E. Joints

1. Mechanical and Push-On joints including accessories shall conform to AWWA Standard C111.
2. Flanged joints shall conform to AWWA Standard C110 or ANSI B16.1 for fittings and AWWA Standard C115 for pipe. Do not use flanged joints in underground installations except within structures.

Furnish all flanged joints with 1/8-inch thick, red rubber or styrene butadiene rubber gaskets. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in American Standard for Wrench Head Bolts and Nuts and Wrench Openings (ANSI B18.2). For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended. The high-strength, low-alloy steel for bolts and nuts shall have

the characteristics listed in Table 6 of AWWA Standard C111. Exposed bolts and nuts in aggressive soils shall be Xylan or FluoroKote #1. Allowed Manufacturer for bolts is Cor-Blue.

3. Restrained Joint for pipes shall be of the boltless push-on type which provides joint restraint independent of the joint seal. Restrained push-on joints allowed for pipe only shall have accessories conforming to AWWA Standard C111. Restrained system shall be suitable for the following minimum working pressures:

| Pipe Size (Inch) | Pressure (psi) |
|------------------|----------------|
| Less than 20 | 350 |
| 20 | 300 |
| 24 | 250 |
| 30 - 64 | 200 |

- F. Acceptable Suppliers are listed in the most current version of the Supplemental Technical Specifications.

2.02. FITTINGS

A. Ductile Iron Fittings

Standard fittings shall be ductile iron conforming to AWWA Standard C110. Compact ductile iron fittings shall meet the requirements of AWWA Standard C153.

1. Working Pressures - Fittings shall be suitable for the following working pressures unless otherwise noted in AWWA Standard C110 or C153:

| Size (inch) | Compact Fittings Working Pressure (psi) | Standard Fitting Working Pressure (psi) |
|-------------|---|---|
| 3 - 24 | 350 | 250 (350 with special gaskets) |
| 30 - 48 | 250 | 250 |
| 54 - 64 | 150 | N/A |

The use of standard ductile iron fittings having a 250 psi pressure rating with ductile iron pipe (having a rating of 350 psi) is not permitted except by the expressed written approval by the Engineer.

2. Coating and Lining - The exterior of ductile iron pipe fittings shall be coated with a layer of arcsprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m² of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The coating system shall conform in every respect to ISO 8179-1 “Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Second edition 2004- 06-01.”The fittings shall be topcoated on the outside with a petroleum asphaltic coating in accordance with AWWA Standard C110 or fusion coated epoxy in accordance with AWWA Standard C116 and lined inside with cement-mortar and seal coated in accordance with AWWA Standard C104 or fusion coated epoxy in accordance with AWWA Standard C116.

B. Acceptable Suppliers are listed in the most current version of the Supplemental Technical Specifications.

C. Joints

1. Mechanical and Push-On joints including accessories shall conform to AWWA Standard C111. Anti-Rotational T-Bolts shall be used on mechanical joints and shall be of domestic origin, high strength, low alloy steel, meeting the current provisions of ANSI/AWWA C111/A21.1-90 for rubber gasket joints for cast iron or ductile iron pipe and fittings. Bolt manufacturer’s certification of compliance must accompany each shipment. T-bolts shall be Xylan or FluoroKote #1, (corrosion resistant) to handle corrosive conditions on any buried bolts. Standard T-Bolts may be allowed by the Owner, but must adhere to the above characteristics.
2. Flanged joints shall meet the requirements of AWWA Standard C115 or ANSI B16.1. Do not use flanged joints in underground installations except within structures. Furnish all flanged joints with a minimum 1/8-inch thick red rubber or styrene butadiene rubber gasket. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. Xylan or FluoroKote #1 Hex Bolts (corrosion resistant) to handle corrosive conditions shall be used on any buried flanged bolts. Flange gaskets shall be rubber in composition; paper gaskets are not permitted.

Bolts and nuts shall be threaded in accordance with ASME/ANSI B1.1, Unified Inch Screw Threads (UN and UNR Thread Form) class 2A external and class 2B internal. For bolts of 1-3/4-inches in diameter and larger, bolt

studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, 60,000 psi Tensile Strength, Grade B, unless otherwise specified. Bolt manufacturer's certification of compliance must accompany each shipment.

3. Restrained joints for valves and fittings shall be of the boltless push-on type which provides joint restraint independent of the joint seal. Field Lok gaskets are not permitted on valves or fittings. Restrained push-on joints allowed for pipe only shall have accessories conforming to AWWA Standard C111. Restrained system shall be suitable for the following minimum working pressures:

| Pipe Size (Inch) | Pressure (psi) |
|------------------|----------------|
| Less than 20 | 350 |
| 20 | 300 |
| 24 | 250 |
| 30 - 64 | 200 |

Where adjacent fittings are to be placed (as in a mechanical joint hydrant tee and a mechanical joint hydrant valve), the use of a suitably sized Foster adaptor is permitted to facilitate restraint between the fittings.

PART 3 – EXECUTION

3.01. INSTALLATION

Follow the provisions of Specification Section 15000 and 02210 in addition to the following requirements:

- A. Push-On Joints - Clean the surfaces that the gasket will contact thoroughly, just prior to assembly using a bacteria free solution (bleach, potable water or NSF approved material). Insert the gasket into the groove in the bell. Apply a liberal coating of special lubricant to the gasket and the spigot end of the pipe before assembling the joint. Center the spigot end in the bell and push home the spigot end.
- B. Mechanical Joints - Clean the surfaces that the gasket will contact thoroughly, just prior to assembly using a bacteria free solution (bleach, potable water or NSF approved material). Apply a liberal coating of special lubricant to all of the surfaces that the gasket will contact. Slip the follower gland and gasket over the pipe plain end making sure that the small side of the gasket and lip of the gland face the bell socket. Insert the plain end into socket. Push the gasket into position with fingers. Seat gasket evenly. Slide gland into position, insert bolts, and tighten nuts by hand. Tighten bolts alternately (across from one another) to the recommended manufacturing rating or if not provided, to the following normal torques:

| Bolt Size (inch) | Range of Torque (foot-pounds) |
|------------------|-------------------------------|
| 5/8 | 40 - 60 |
| 3/4 | 60 - 90 |
| 1 | 70 - 100 |
| 1-1/4 | 90 - 120 |

C. Restrained Joints

1. Ball and Socket. Assemble and install the ball and socket joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Check the retainer ring fastener.
2. Push-On. Assemble and install the push-on joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Check the retainer ring fastener.

Protect pipe from damage from the jacking device (backhoe bucket, pipe jack, etc.) when “pushing home” any pipe by using wood or other suitable (non metallic) material.

3. Mechanical Joint. Assemble and install the mechanical joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Use approved restrained joint device on fittings and valves where required and approved for use by Engineer.

D. Pipe Protection

Protect pipe from damage from the jacking device (backhoe bucket, pipe jack, etc.) when “pushing home” any pipe. Wood or other suitable material (non metallic) shall be used to push home the pipe.

E. Gaskets

Gaskets shall be as provided or recommended by the manufacturer and satisfy AWWA standard C111 in all respects. As noted in the products section of this specification, some gasket materials are prone to permeation of certain hydrocarbons which may exist in the soil (see part 2). Under these conditions and at the Engineer’s discretion provide FKM (Viton, Flourel) gasket material in areas of concern.

3.02. BASIS OF PAYMENT

The installation of water main, or restrained joint water main, will be paid at the Contract Unit Price per linear foot measured without deducting for length of fittings and valves for various sizes of water

main installation. The installation of fittings will be paid at the Contract Unit Price for each type and size of fitting installed. The unit price includes furnishing labor, material (except when provided by Owner), and equipment to install water main. Items specified in other Specification Sections that are considered incidental to water main installation shall be included in this Contract Unit Price including, but not limited to, excavation, backfill, shoring, polywrap, tracer wire, location tape, testing, disinfection, thrust restraint, and temporary blow-off outlets.

Note: Fire hydrant piping is not included in this item.

END OF SECTION 15105

SECTION 15120
POLYVINYL CHLORIDE (PVC) PIPE

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing PVC pressure pipe and fittings. Under special conditions 2-inch PVC may be specified in which case it shall meet NSF 61 and satisfy a 200 psi pressure rating. The Owner reserves the right to provide certain material. A list of materials to be provided by the Owner, if applicable, is shown in Specification Section 01000.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 02210 – Trenching, Backfilling, and Compacting
- D. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current Standards:

- A. ASTM A536 - Standard Specification for Ductile Iron Castings
- B. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
- C. ASTM D2855 - Standard Practice for Making Solvent Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings
- D. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
- E. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution
- F. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution

G. AWWA Manual M23 - PVC Pipe - Design and Installation

H. NSF Standard No. 61

1.04. SUBMITTALS

A. Submit shop drawings and manufacturer's literature for all Contractor supplied materials.

B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the Contractor identifies, or suspects, the presence of petroleum products or any unknown chemical substance the Engineer is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the Engineer.

2.01. PIPE MATERIALS

PVC pipe shall conform to the latest edition of American Water Works Association (AWWA) Standard C900/C905 with elastomeric gasket couplings in accordance with this Standard. The use of solvent cement connections shall not be allowed unless approved by the Engineer. Pipe shall be furnished with cast iron pipe equivalent outside diameter and the Dimension Ratio shall be 14, with a Pressure Class of 200 psi. The PVC compounds shall be treated or certified suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory (NSF Standard No. 61). Restrained Joint PVC pipe shall be supplied where called for on the Drawings.

Acceptable Suppliers are listed in the most current version of the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. INSTALLATION

Follow the provisions of Specification Section 15000 and 02210 in addition to the following requirements:

A. Pipe Joint Assembly

1. The assembly of joints should be performed as recommended by the pipe manufacturer, except that **neither deflection of PVC pipe joints nor bending of PVC pipe lengths are permitted**. The elastomeric gaskets may be supplied separately in cartons or positioned in the bell joint or coupling at the factory. When gaskets are color coded, be sure to consult the pipe manufacturer or literature for the significance. In all cases, clean the gasket, the bell or coupling interior, especially the groove area (except when gasket is permanently installed) and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before the assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.
2. Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.
3. After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion.
4. Solvent cemented joints will not be allowed.
5. To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

3.02. BASIS OF PAYMENT

The Work included in this Section will be paid at the Contract Unit Price per linear foot measured without deducting for length of fittings and valves for various sizes of water main installation. The unit price includes furnishing labor, material (except when provided by Owner), and equipment to install water main. Items specified in other Specification Sections that are considered incidental to water main installation shall be included in this Contract Unit Price including, but not limited to, excavation, backfill, shoring, tracer wire, location tape, testing, and disinfection, thrust restraint, and temporary blow-off outlets.

Note: Fire hydrant piping is not included in this item.

END OF SECTION 15120

SECTION 15122
FUSIBLE PVC PIPE

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing fusible polyvinyl chloride (PVC) pipe as shown on the Drawings. The Owner reserves the right to provide certain material. A list of materials to be provided by the Owner, if applicable, is shown in Specification Section 01000.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 02210 – Trenching, Backfilling, and Compacting
- D. Specification Section 15120 – Polyvinyl Chloride (PVC) Pipe
- E. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current Standards:

- A. AWWA C110 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
- B. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- C. AWWA C153 - American National Standard for Ductile-Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch, for Water Service
- D. ASTM D1784 - Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- E. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- F. ASTM D2152 - Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion

- G. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
- H. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- I. ASTM F1057 - Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
- J. UNI-PUB-08 - Tapping Guide for PVC Pressure Pipe
- K. NSF-14 - Plastics Piping System Components and Related Materials
- L. PPI TR-2 - PVC Range Composition Listing of Qualified Ingredients

1.04. SUBMITTALS

A. PRE-CONSTRUCTION SUBMITTALS

The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

1. Pipe Size
2. Dimensionality
3. Pressure Class per applicable standard
4. Color
5. Recommended Minimum Bending Radius
6. Recommended Maximum Safe Pull Force
7. Fusion technician qualification indicating conformance with this specification

B. POST-CONSTRUCTION SUBMITTALS

The following AS-RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:

1. Approved datalogger device reports
2. Fusion joint documentation containing the following information:
3. Pipe Size and Thickness
4. Machine Size
5. Fusion Technician Identification

6. Job Identification
7. Fusion Joint Number
8. Fusion, Heating, and Drag Pressure Settings
9. Heat Plate Temperature
10. Time Stamp
11. Heating and Cool Down Time of Fusion
12. Ambient Temperature

C. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

A. Pipe shall conform to the following dimensionality and general characteristics table:

| <u>Pipe Description</u> | <u>Nominal Diameter (in.)</u> | <u>DR</u> | <u>Color</u> | <u>Pressure Class (psi)</u> |
|-------------------------|-------------------------------|-----------|---------------|-----------------------------|
| Fusible PVC® Pipe | 4”-36” | 18 | Blue or Green | 235 |
| Fusible PVC® Pipe | 4”-36” | 25 | Blue or Green | 165 |
| Fusible PVC® Pipe | 14”-36” | 21 | Blue or Green | 200 |

- B. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.
- C. Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.
- D. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
- E. Fusible polyvinylchloride pipe shall be manufactured in a standard 40’ nominal length, or custom lengths as specified.
- F. Fusible polyvinylchloride pipe shall be blue in color for potable water use.
- G. Pipe shall be marked as follows:

1. Nominal pipe size
 2. PVC
 3. Dimension Ratio, Standard Dimension Ratio, or Schedule
 4. AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
 5. AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
 6. NSF-61 mark verifying suitability for potable water service
 7. Extrusion production-record code
 8. Trademark or trade name
 9. Cell Classification 12454 and/or PVC material code 1120 may also be included
- H. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.02. FUSION JOINTS

- A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

2.03. CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

- A. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

B. DUCTILE IRON MECHANICAL AND FLANGED FITTINGS

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53 and AWWA/ANSI C111/A21.11.

1. Connections to fusible polyvinylchloride pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.
2. Bends, tees and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated in the construction documents.
3. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.
4. If required, linings for Ductile Iron fittings shall meet the following requirements:

- a) Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
 - b) Polyurethane shall be DuraShield 210-61 or 310-61.
5. If required, coatings for Ductile Iron fittings shall meet the following requirements for buried and/or immersion service duty:
- c) Polyurethane shall be DuraShield 210 or 310.
 - d) Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
 - e) Coal tar epoxy shall be Sherwin Williams Targuard.

C. PVC GASKETED, PUSH-ON FITTINGS

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

- 1. Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.
- 2. Bends, tees and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.
- 3. PVC gasketed, push-on fittings and mechanical restraints, if used, must be installed per the manufacturer's guidelines.

D. FUSIBLE POLYVINYL CHLORIDE SWEEPS OR BENDS

- 1. Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.
- 2. Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.
- 3. Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

E. SLEEVE-TYPE COUPLINGS

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe, and may be restrained or unrestrained as indicated in the construction documents.
2. Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

F. EXPANSION AND FLEXIBLE COUPLINGS

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.
2. Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

G. CONNECTION HARDWARE

Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

H. APPROVED MANUFACTURERS

Acceptable Suppliers are listed in the most current version of the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. DELIVERY AND OFF-LOADING

- A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.
- B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.
- C. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier’s guidelines shall be followed.
- D. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.
- E. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.
- F. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.02. HANDLING AND STORAGE

- A. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.
- B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.
- C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.
- D. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.
- E. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.
- F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.03. FUSION PROCESS

A. GENERAL

- 1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.
- 2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.
- 3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.
- 4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:
 - a) HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of

maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

b) CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

c) GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

d) DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

a) Pipe rollers shall be used for support of pipe to either side of the machine

b) A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.

c) An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d) Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e) Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

B. JOINT RECORDING

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.04. FUSION TECHNICIAN REQUIREMENTS

A. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

3.05. GENERAL INSTALLATION

- B. Installation guidelines from the pipe supplier shall be followed for all installations.
- C. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius.
- D. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended Safe Pulling Force established by the pipe supplier shall not be exceeded.

3.06. PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

- A. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:
 - 1. Field verify location, size, piping material, and piping system of the existing pipe.
 - 2. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.
 - 3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.
- B. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.07. PIPE SYSTEM CONNECTIONS

- A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

3.08. TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS

- A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. **NO DIRECT TAPPING WILL BE PERMITTED.** Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.
- B. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.
- C. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted “shell” style cutters, specifically made for PVC pipe. ‘Hole saws’ made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.
 2. Manually operated or power operated drilling machines may be used.
- D. Taps may be performed while the pipeline is filled with water and under pressure (‘wet’ tap,) or when the pipeline is not filled with water and not under pressure (‘dry’ tap).

3.09. TESTING

- A. See Specification 15030

3.010. BASIS OF PAYMENT

The installation of water main will be paid at the Contract Unit Price per linear foot measured without deducting for length of fittings and valves for various sizes of water main installation. The unit price includes furnishing labor, material (except when provided by Owner), and equipment to install water main. Items specified in other Specification Sections that are considered incidental to water main installation shall be included in this Contract Unit Price including, but not limited to, excavation, backfill, shoring, tracer wire, location tape, testing, disinfection, thrust restraint, and temporary blow-off outlets.

Note: Fire hydrant piping is not included in this item.

END OF SECTION 15122

SECTION 15125
HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing 4-inch through 63-inch high density polyethylene (HDPE) pipe and fittings as shown on the Drawings. The Owner reserves the right to provide certain material. A list of materials to be provided by the Owner, if applicable, is shown in Specification Section 01000.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 02210 – Trenching, Backfilling, and Compacting
- D. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

- A. AWWA Standard C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) though 63 In. (1,575 mm), for Water Distribution and Transmission.
- B. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- C. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- D. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- E. ASTM F1055 - Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
- F. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's literature for all Contractor supplied materials.
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

Research has documented that certain pipe materials (such as polyethylene, polybutylene, polyvinyl chloride, and asbestos cement) and elastomers, such as used in jointing gaskets and packing glands, may be subject to permeation by lower molecular weight organic solvents or petroleum products. Products supplied under this Specification Section assume that petroleum products or organic solvents will not be encountered. If during the course of pipeline installation the Contractor identifies, or suspects the presence of petroleum products or any unknown chemical substance, notify the Engineer immediately. Stop installing piping in the area of suspected contamination until direction is provided by the Engineer.

2.01. MATERIALS

- A. Pipe and fittings shall be made from the same resin meeting the requirements of the Plastic Pipe Institute (PPI) material designation PE 4710 with an ATSM D3350 minimum cell classification of PE 345464C.
- B. The material shall have a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73 degrees F.
- C. All materials which come in contact with water, including lubricants, shall be evaluated, tested, and certified for conformance with ANSI/NSF Standard 61.

2.02. PIPE

- A. All pipe and fittings shall be manufactured in ductile iron pipe sizes (DIPS) only in accordance with AWWA Standard C906. Iron Pipe Sizes (IPS) may be allowed by approval of the Engineer and as shown on the Drawings.
- B. The pipe shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.
- C. Permanent identification of water piping service shall be provided by co-extruding longitudinal blue stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed or painted on the outside surface shall not be acceptable.
- D. The nominal pipe diameter is specified on the Drawings. The DR (dimension ratio) and the pressure rating of the pipe shall be as noted on the Drawings.
- E. The minimum pressure rating will be 200 psi, or as shown on the Drawings.
- F. HDPE may be deflected subject to approval by the Engineer. The following table shows maximum deflection based upon the allowable strain of the pipe wall. Potential flow restrictions, surge and other non- trench stability and pipe strain issues

may reduce the values shown here per the Engineer's recommendations. The bend radius multiplier determines the minimum radius of the pipe curvature and is calculated by multiplying the outside diameter of the pipe by the multiplier from the appropriate DR used. Bending radius allowed by the manufacturer can vary. Verify the multiplier with the manufacturer. In no case shall the radius be less than 125% of the manufacturer's permitted multiplier.

| PE pipe Dimension Ratio (DR) | Allowable deflection (percent) | Bend Radius Multiplier |
|------------------------------|--------------------------------|------------------------|
| 32.5 | 8.1 | 50 |
| 26.0 | 6.5 | 45 |
| 21.0 | 5.2 | 40 |
| 19.0 | 4.7 | 37.5 |
| 17.0 | 4.2 | 32.5 |
| 15.5 | 3.9 | 30 |
| 13.5 | 3.4 | 27.5 |
| 11.0 | 2.7 | 25 |

2.03. FITTINGS

- A. Plain end butt fused fittings and electrofusion couplings shall be used when joining polyethylene materials. Mechanical (compression) fittings shall be used only when joining polyethylene materials to different piping materials and approved by the Engineer.
- B. The fittings shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The fittings shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.
- C. Butt fusion fittings shall comply with ASTM D3261.
- D. Electrofusion fittings shall comply with ASTM F1055.
- E. Mechanical (compression) fittings used with polyethylene pipe shall be specifically designed for, or tested and found to be acceptable for, use with polyethylene pipe.

2.04. ACCEPTABLE MANUFACTURERS are listed in the most current version of the Supplemental Technical Specifications

PART 3 – EXECUTION

3.01. PACKAGING, HANDLING, AND STORAGE

- A. The manufacturer shall ensure that the interior of all pipe is clean and install plastic cleanliness plugs in all pipes to keep the pipe interiors clean. The manufacturer shall package the pipe in a manner designed to ensure that it arrives at the project neat,

clean, intact, and without physical damage. The transportation carrier shall use appropriate methods and intermittent checks to assure that the pipe is properly supported, stacked, and restrained during transport such that the pipe is not nicked, gouged, or physically damaged.

- B. Inspect pipe and appurtenances for defects prior to installation in the trench. Set aside defective, damaged or unsound material and hold material for inspection by the Engineer.
- C. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.
- D. Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined by butt fusing or the use of electrofusion fittings.

3.02. PIPE INSTALLATION

- A. Refer to Specifications 15000 and the Drawings that are part of these Contract Documents. Trenching shall be performed in accordance with ASTM D2774 and embedment materials shall be in accordance with ASTM D2321.
- B. Remove all dirt and foreign matter from pipe before lowering into the trench. Do not place debris, hand tools, clothing or other materials in the pipe. Keep pipe clean during and after laying.
- C. Maximum pipe bending radius shall be in conformance with the manufacturer's recommendation for the specific diameter and dimension ratio (DR) of the pipe. Whenever possible, changes in direction shall be accomplished by bending the pipe in lieu of installing a fitting, except as approved by the Engineer.
- D. Place location wire immediately above the initial backfill material, directly over the pipe. The wire shall be as required in Specification 15130-2.08.
- E. Prevent flotation of sealed pipe during work stoppages.
- F. HDPE pipe will not be employed with directional drilling through rock and other abrasive conditions unless it is encased.

3.03. PIPE AND FITTING JOINING

- A. Butt fusion and electrofusion procedures shall be in accordance with the manufacturer's recommendations. Surfaces must be clean and dry before joining. The fusion equipment operator shall be fully trained in the use of the respective equipment. The wall thicknesses of the adjoining pipes shall have the same DR at the point of fusion.

- B. Butt fusion equipment shall be equipped with a Datalogger. Records of each weld (including, as a minimum, heater temperature, fusion pressure, and a graph of the fusion cycle) shall be appropriately identified and provided to the Engineer.
- C. Electrofusion reports of each weld shall be appropriately identified and provided to the Engineer. The reports shall include, as a minimum, the fusion date, time, ambient temperature, fitting type and size, user ID, and the manufacturer of the part.
- D. Mechanical (compression) joining of pipe and fittings is only permissible when joining polyethylene pipe to unlike materials. HDPE stiffeners shall be utilized with all mechanical (compression) fittings. Blocking must be provided at changes in direction for any mechanical fittings. Use of positive restrained joints fittings (non-friction type) is permissible when approved by the Engineer.

3.04. SERVICE CONNECTIONS

- A. Sidewall fused polyethylene hot-tapping tees shall be used for 3/4 inch and 1 inch service lines off mains 3 inches to 12 inches in diameter. For larger sized mains, polyethylene service saddles may be used, sidewall fused, and then tapped with a tapping tool or machine.
- B. For large mains (>12 inch), mechanical clamps or tapping saddles may be used provided they are designed for HDPE pipe and acceptable to the manufacturer of the pipe.

3.05. TESTING AND DISINFECTION

- A. Pressure testing shall be conducted in accordance with the Manufacturer's recommended procedure or as recommended by the Engineer. Pressure testing shall use water as the test media. Pneumatic (air) testing is prohibited. Air must be completely removed before pressure testing. Under no circumstances shall HDPE pipe be pressure tested when the temperature of the pipe is above 80 degrees F.

3.06. BASIS OF PAYMENT

The Work included in this Section will be paid at the Contract Unit Price per linear foot measured without deducting for length of fittings and valves for various sizes of water main installation. The unit price includes furnishing labor, material (except when provided by Owner), and equipment to install water main. Items specified in other Specification Sections that are considered incidental to water main installation shall be included in this Contract Unit Price including, but not limited to, excavation, backfill, shoring, tracer wire, location tape, testing, and disinfection, thrust restraint, and temporary blow-off outlets.

Note: Fire hydrant piping is not included in this item.

END OF SECTION 15125

SECTION 15130
PIPING SPECIALTIES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing miscellaneous piping specialties as shown on the Drawings. Piping specialties include polyethylene encasement (polywrap); valve boxes; rods, bolts, lugs, and brackets; retaining glands; test/tracer wire boxes; and marking posts.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling, and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15105 – Ductile Iron Pipe and Fittings

1.03. REFERENCES

Refer to current Standards:

- A. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
- B. AWWA C217 – Petrolatum and Petroleum Wax Tape Coatings
- C. AWWA C600 – Installation of Ductile Iron Water Mains and Their Appurtenances
- D. DIPRA Field Polyethylene Installation Guide

PART 2 – PRODUCTS

2.01. POLYETHYLENE ENCASEMENT

A. Polyethylene encasement shall conform to AWWA Standard C105 and shall be enhanced with V-Bio. The polyethylene encasement shall be 8 mils thick (12 mils thick in corrosive soil). The polyethylene film shall be translucent and blue in color and distinctly marked (at minimum 2 foot intervals) with the following information:

- 1. manufacturer's name (or trademark),
- 2. year manufactured,

3. minimum film thickness and material type (LLDPE or HDCLPE),
 4. range of nominal pipe diameter size
 5. ANSI/AWWA C105/A21.5 (compliance)
 6. A warning “WARNING–CORROSION PROTECTION-REPAIR ANY DAMAGE
 7. labeled “WATER”
- B. Tape shall be polyethylene compatible adhesive and a minimum of 1.5 inches wide. Acceptable suppliers are listed in the most current version of the Supplemental Technical Specifications.
- C. Store all polyethylene encasement out of the sunlight. Exposure of wrapped pipe should be kept to a minimum.
- D. Acceptable Suppliers of polyethylene encasement are listed in the most current version of the Supplemental Technical Specifications.

2.02. VALVE BOXES

- A. All valves shall be provided with valve boxes. Valve boxes shall be of the standard, adjustable, cast iron extension type, multiple piece, 5-1/4-inch shaft, screw type, and of such length as necessary to extend from the valve to finished grade. Cast iron valve boxes shall be hot coated inside and out with an asphaltic compound.
- B. Valve boxes shall be positioned with a Box Alignment Tool or Box Aligner (“top hats”).
- C. Valve box bases shall conform to the following:

| Valve Size (inch) | Base |
|--------------------------|--|
| 4 and smaller | Round, 8-inch high, 10-7/8-inch diameter at bottom. |
| 6 and 8 | Round, 11-inch high, 14-3/8-inch diameter at bottom |
| 10 and larger | Oval, 11-inch high, 15-inch by 11-1/8-inch at bottom |

- D. Acceptable Manufacturers are listed in the Supplemental Technical Specifications.

2.03. RODS, BOLTS, LUGS AND BRACKETS

- A. All steel rods, bolts, lugs and brackets, shall be ASTM A36 or A307 carbon steel with xylan coating as a minimum requirement. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. Xylan or FluoroKote #1 T-Bolts, corrosion resistant to handle corrosive conditions shall be used on any buried flanged bolts.
- B. After field installation, all steel surfaces shall receive a petrolatum wax tape coating in accordance with Specification Section 15000 and AWWA Standard C217. Subject to approval by the Engineer, an alternative corrosion protection for exposed buried metal is an aerosol applied rubberized coating per Specification Section 15000.
- C. Acceptable manufacturers are listed in the most current version of the supplemental Technical Specifications.

2.04. RETAINING GLANDS

- A. All retaining glands shall be ductile iron with ductile iron set screws. Pressure ratings for use with ductile iron pipe shall be a minimum of 250 psi. Retainer Glands shall be coated with electrostatically applied baked-on polyurethane coating or approved equal. Locking wedges, bolts, and set screws shall be coated with Xylan or FluoroKote #1.
- B. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.05. TEST /TRACER BOXES

- A. All test/tracer boxes shall be 18-inch plastic box flared and squared at base and have a 4-inch I.D. with a 1 ½-inch cast iron flange. Lid shall be a one piece locking lid with “Test Station” marked on lid and shall contain 5 screw-type brass terminals on a non conductive terminal board.
- B. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.06. MARKING POSTS

- A. All marking posts shall be Rhino FiberCurve™ with PolyTechCoating or equivalent fiber-composite marking posts. The color shall be standard blue for water and the length shall be a minimum 66-inches. The decals shall be UV stable, all-weather type with a no dig symbol in white and contrasting white and blue vertical lettering:

Butterfly and Gate Valves decals (Rhino GD-5226K) Blow-Offs decals (Rhino GD-5411K) Pipeline decals (Rhino GD-1333K).

- B. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.07. IDENTIFICATION TAPE

- A. Identification tape shall be manufactured of polyethylene with a minimum thickness of 4-mils. The tape shall be highly resistant to alkalis, acid and other destructive agents found in soil. Tape width shall be a minimum of 3 inches and a maximum of 6 inches and shall have a blue background color, imprinted with black letters. Imprint shall be “CAUTION CAUTION – WATER LINE BURIED BELOW” and shall repeat itself a minimum of once every 2 feet for entire length of the tape.

- B. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.08. LOCATION WIRE

- A. Location wire shall be used at all pipe installations. Location wire shall be a direct burial #12 AWG (0.0808-inch diameter) fully annealed; high strength solid copper clad steel conductor (HS-CCS); insulated with a 30 mil high molecular weight, high density blue polyethylene jacket complying with ASTM D1248; and rated for direct burial use at 30 volts. HS-CCS conductor must be at 21% conductivity with 452-pound average tensile break load for open cut and 1150 pound average tensile break load for boring. Location wire may only be spliced with approved connectors.

- B. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.09. RESTRAINED JOINT MARKING TAPE

- A. Restrained Joint Marking Tape shall be used when restrained joint pipe or fittings are installed. Joint restraint tape is specifically to warn Water Company workers/contractors that the water main joint is restrained. It is not to be used in place of regular marking tape.

- B. Restrained Joint Marking Tape shall be polyethylene 4-mil thick and 2 ½-inches wide with blue lettering on white background color and imprinted with the words “RESTRAINED JOINT” at 2-foot intervals. The tape shall have an adhesive backer. The tape shall be highly resistant to alkalis, acid and other destructive agents found in soil.

- C. Acceptable manufacturers are listed in the most current version of the Supplemental Technical Specifications.

PART 3: EXECUTION

3.01. INSTALLATION

Install “piping specialties” in accordance with the general provisions provided in Specification Section 15000 and the following:

A. Polyethylene Encasement

1. Encase piping in polyethylene as required to prevent contact with surrounding backfill and bedding material in all areas shown on the Drawings or designated by the Engineer.
2. Install the polyethylene wrap in accordance with DIPRA V-Bio Enhanced Polyethylene Encasement brochure found at:

<https://www.dipra.org/component/phocadownload/category/15-ductile-iron-pipe-research-association-brochures?download=56:v-bio-enhanced-polyethylene-encasement-brochure>

B. Valve Boxes

Valve boxes shall be supported so that no load can be transmitted from the valve box to the valve. See Standard Details. Using the Box Alignment Tool/Box Aligner according to the manufacturer’s instructions, make sure that the bottom of the box is centered over the operating nut and runs perpendicular to the horizontal prior to backfilling.

C. Test/Tracer Wire Boxes

Boxes shall be placed at areas designated in the Drawings and shall be flush with existing grade unless otherwise noted.

D. Marker Posts

Install Marker Posts per manufacturer guidelines and place at locations noted in the Drawings or as approved by Engineer.

E. IDENTIFICATION TAPE, LOCATION WIRE, AND RESTRAINED JOINT MARKING TAPE

1. Install in accordance with manufacturer’s installation instructions and as specified in the Contract Documents.
2. Install identification tape one foot above the top of the pipe.

3. Install location wire directly on top of the buried pipe.
4. Loop the location wire up the outside of valve box to one foot from the surface. Insert the wires into the valve box at that depth for connection to a locating device. The wire shall be one continuous piece from valve box to valve box up to 1250 feet maximum. When distance between valve boxes exceeds 1250 feet, or when shown on the Drawings, install tracer boxes near the mid-point of such lengths that no continuous piece of location wire exceeds 1250 feet.
5. Install the joint marking tape by adhering directly to the pipe as it is installed. The marking tape shall be installed along the entire length of pipe, including around the circumference of the bells of all fittings and valves. The pipe must be free of any foreign matter along the surface of the pipe for the marking tape installation. If clear polywrap is used, the restrained joint tape can be applied on the top of the pipe so long as it is visible. Otherwise the joint marking tape shall be applied on top of the polywrap and secured so the tape is not shifted by backfilling.
6. The tape does not adhere in wet or cold conditions. The tape should be stored in temperatures above 50 degrees F until the time of application. The pipe must be free of frost and moisture along the surface of the pipe receiving the tape.
7. Contractor and/or Owner shall test the performance of the location wire prior to conducting pavement or landscape restoration.

3.02. BASIS OF PAYMENT

The Work included in this Section is considered incidental to the installation of pipe, valves, and fittings.

END OF SECTION 15130

SECTION 15150
GATE VALVES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing gate valves as shown on the Drawings. Insertion valves may be approved for use on certain projects. If insertion valves are shown on the Drawings, see Supplemental Technical Specifications.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C509 OR C515, C111, C550, C500

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's data
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. SMALL GATE VALVES

- A. All gate valves, 3 inches through 12 inches NPS, shall be iron body, resilient-seated, nut-operated, non-rising stem gate valves suitable for buried service. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum). The valves shall be designed for a minimum differential pressure of 250 psi and a minimum internal test pressure of 500 psi unless otherwise noted on the Drawings. Valves shall be designed to operate in the vertical position.
- B. Valves shall comply fully with AWWA Standard C509 OR C515. Valve ends shall be push on joint or MJ (when restrained), or as shown on the Drawings or approved in writing in accordance with AWWA Standard C111. Stems shall be made of a low zinc alloy in accordance with AWWA C509 OR C515. Stem seals shall be double O-ring stem seals. Square operating nuts conforming to AWWA Standard C509 OR C515 shall be used. Valves shall open (left or right) in accordance with **Table 1 of the**

Supplemental Technical Specifications. All valve materials shall meet the requirements of NSF 61.

- C. Test valves (Operation Test and Hydrostatic Tests) at the manufacturer's plant in accordance with AWWA Standard C509 OR C515. If requested, provide the Engineer with certified copies of all tests prior to shipment. The Engineer reserves the right to observe all tests.
- D. Acceptable Manufacturers are listed in the Supplemental Technical Specifications.

2.02. LARGE GATE VALVES

- A. Gate valves larger than 12-inches NPS shall be iron body, double disc (metal to metal seat), parallel seats, bronze mounted, rubber O-ring packing seals, epoxy coated interior and exterior meeting the requirements of AWWA Standard C550, and conforming to AWWA Standard C500. Stems shall be made of a low zinc alloy in accordance with AWWA C500 4.2.2.4.3. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. All valves furnished shall open (left or right) in accordance with **Table 1 of the Supplemental Technical Specifications**. All valve materials shall meet the requirements of NSF 61.
- B. Test valves (Operation Test and Hydrostatic Tests) at the manufacturer's plant in accordance with AWWA Standard C515. If requested, provide the Engineer with certified copies of all tests prior to shipment. The Engineer reserves the right to observe all tests.
- C. Valves shall have mechanical joint ends unless otherwise designated on the Drawings or approved by the Engineer.
- D. The valves shall be designed for a minimum differential pressure of 150 psi and a minimum internal test pressure of 300 psi, unless otherwise noted on the Drawings. Make all valves tight under their working pressures after they have been placed and before the main is placed in operation. Any defective parts shall be replaced at the Contractor's expense.
- E. Acceptable Manufacturers are listed in the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. INSTALLATION

- A. Install the valves in strict accordance with the requirements contained in Specification Section 15000, Drawings, and Standard Details.
- B. Install valve box in accordance with Specification Section 15130.

3.02. PROTECTION

After installation of the valve all external bolts shall be protected as described in Technical Specification 15130-2.03 before backfilled in accordance with Specification Section 15000. If polyethylene is applied to the pipe, the entire valve shall be encased in the polyethylene encasement prior to backfill. The polyethylene encasement shall be installed up to the operating nut leaving the operating nut exposed and free to be operated.

3.03. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new valve, by type and size, complete in place. The Contract Unit Price shall include all labor, material, and equipment for the valve installation including excavation and backfilling, valve box installation, protection, location tape, tracer wire, rough grading, removal of excess excavated material, and any other ancillary Work related to valve installation.

Note: This item does not include hydrant valves.

END OF SECTION 15150

SECTION 15155
BUTTERFLY VALVES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing butterfly valves as shown on the Drawings.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C504, C111, C550

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's data
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. BUTTERFLY VALVES

- A. Valves shall be rubber-seated butterfly valves and shall conform to AWWA Standard C504. Valves shall conform to Class 150B of AWWA C504 when the working pressure is less than 150 psi. Valves shall conform to Class 250B of AWWA C504 when the working pressure is greater than 150 psi.
- B. Valve bodies shall be ductile iron with mechanical joint ends. Mechanical joint ends shall conform to AWWA Standard C111. All valve materials shall meet the requirements of NSF 61. Valves shall open (left or right) in accordance with **Table 1 of the Supplemental Technical Specifications**.
- C. Valve shafts shall consist of one-piece units extending through the discs of 18-8 stainless steel Type 303 or 304. Shaft diameter shall be in accordance with Table 3 of AWWA Standard C504.
 - 1. Valve discs shall be Ni-Resist, Type 1, or cast iron with stainless steel edges.
 - 2. Valve seats shall be hycar or natural rubber mounted in the valve body.
 - 3. Valve bearings shall be nylon or Teflon.

- D. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum).
- E. All elastomers used in the butterfly valves must be suitable for service in the following water conditions:
 - 1. Chlorine concentration up to 12 mg/L.
 - 2. Chloramine concentrations up to 6 mg/L.
 - 3. Ozone concentrations up to 2.0 mg/L (AWWA Standard says 0.5 ppm)
 - 4. pH range of 4-11.
- F. Manual buried operators, if provided, shall be either worm gear or traveling nut type and shall be furnished with 2-inch AWWA nuts and extension shafts. Input required at nuts to produce specified output torque shall be less than 150 foot-pounds. Operators shall be designed to withstand an input at the nut of 300 foot-pounds without damage to any operator components.
- G. Test valves (Operation Test and Hydrostatic Tests) at the manufacturer's plant in accordance with AWWA Standard C504. If requested, provide the Engineer with certified copies of all tests prior to shipment. The Engineer reserves the right to observe all tests.
- H. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. INSTALLATION

- A. Install the valves in strict accordance with the requirements contained in Specification Section 15000, Drawings, and Standard Details.
- B. Install valve box in accordance with Specification Section 15130.

3.02. PROTECTION

After installation of the valve all external bolts shall be protected as described in Technical Specification 15130-2.03 before backfilled in accordance with Specification Section 15000. If polyethylene is applied to the pipe, the entire valve shall be encased in the polyethylene encasement prior to backfill. The polyethylene encasement shall be installed up to the operating nut leaving the operating nut exposed and free to be operated.

3.03. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new valve, by size, complete in place. The Contract Unit Price shall include all labor, material, and equipment for the valve installation including excavation and backfilling, valve box installation, protection,

location tape, tracer wire, rough grading, removal of excess excavated material, and any other ancillary Work related to valve installation.

END OF SECTION 15155

SECTION 15170
TAPPING SLEEVES, SADDLES AND VALVES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing tapping sleeves, tapping valves, and tapping saddles as shown on the Drawings.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C509 – Resilient-Seated Gate Valves for Water Supply Service
- B. AWWA C550 – Protective Interior Coatings for Valves and Hydrants
- C. AWWA C207 – Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
- D. AWWA C223 – Fabricated Steel and Stainless Steel Tapping Sleeves
- E. Manufacturer’s Standardization Society (MSS) Standard Practice 60 – Connecting Flange Joints Between Tapping Sleeves and Tapping Valves
- F. Manufacturer’s Standardization Society (MSS) Standard Practice 124 – Fabricated Tapping Sleeves

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer’s data.
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. GENERAL

- A. All tapping sleeves, saddles and valves shall be designed for a working pressure of at least 250 psi for 12-inch and smaller. The valves shall be designed for a minimum differential pressure of 250 psi and a minimum internal test pressure of 500 psi unless otherwise noted on the Drawings.

- B. Verify the type of existing pipe and the outside diameter of the pipe on which the tapping sleeve is to be installed.

2.02. TAPPING VALVES

- A. The horizontal tapping valves, 3-inch through 12-inch, shall conform to the applicable requirements of AWWA Standard C509. The tapping valves, 3-inch through 12-inch, shall be ductile iron body, resilient-seated, nut-operated, non-rising stem gate valves suitable for buried service. The valve interior and exterior shall be epoxy coated at the factory by the valve manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum). The tapping valves shall have mechanical joint inlets with mechanical joint outlets, enclosed bevel gears, bypass valve, rollers, tracks and scrapers. All valves furnished shall open (left or right) in accordance with the **Table 1 of the Supplemental Technical Specifications**.
- B. Test valves (Operation Test and Hydrostatic Tests) at the manufacturer's plant in accordance with AWWA Standard C509. If requested, provide the Engineer with certified copies of all tests prior to shipment. The Engineer reserves the right to observe all tests.
- C. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specification.

2.03. STAINLESS STEEL TAPPING SLEEVES

Stainless steel tapping sleeves shall meet the requirements of MSS SP-124 and AWWA C223 and be suitable for use with the tapping valves listed in this Specification. Tapping sleeves shall provide full circumferential seal, include a 3/4" NPT test plug, have a mechanical joint outlet, and be compatible with multiple pipe materials including, but not limited to, ductile iron, steel, cast iron, asbestos cement, and PVC.

- A. Acceptable Manufacturers are listed in the Supplemental Technical Specifications.

2.04. CONCRETE PIPE TAPPING SLEEVES

Concrete pipe tapping sleeves shall meet the requirements of MSS SP-124, AWWA C223 and AWWA M-9 Manual and be suitable for use with the tapping valves listed in this Specification. Tapping sleeves shall provide full circumferential seal.

- A. Acceptable Manufacturers are listed in the Supplemental Technical Specifications.

2.05. TAPPING SADDLES

Unless otherwise specified by the Drawings, tapping saddles shall conform to the requirements of AWWA Standard C800 for the High Pressure class tapping saddles. Tapping saddles shall have a brass or bronze body and consist of ductile iron outlet castings, attached to the pipeline with high strength stainless steel straps. Castings shall be

sealed to pipeline with O-ring seals. Saddles shall have ANSI A21.10 flanged outlets counterbored for use with tapping valves and tapping equipment.

A. Acceptable Manufacturers are listed in Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. INSTALLATION

A. Install the tapping sleeves, saddles, and valves in strict accordance with the requirements contained in Specification Section 15000 and Drawings.

B. Install the tapping sleeves, tapping saddles, and tapping valves in accordance with the manufacturer's instructions. The tapping procedure is to be in accordance with the tapping machine manufacturer's instructions.

C. Install valve box in accordance with Specification Section 15130.

3.02. PROTECTION

After installation of the tapping sleeve, tapping saddle, and tapping valve all external bolts except the operating nut shall be protected as described in Technical Specification 15130-2.03 before backfilled in accordance with Specification Section 15000. If polyethylene is applied to the pipe, the entire valve shall be encased in the polyethylene encasement prior to backfill. The polyethylene encasement shall be installed up to the operating nut leaving the operating nut exposed and free to be operated.

3.03. PRELIMINARY TESTING

Perform a hydrostatic test of the tapping sleeve and valve assembly in accordance with Specification Section 15030 after installation of the tapping sleeve and valve, but prior to making the tap. The test shall be made with the valve open using a tapped mechanical joint cap. No leakage is acceptable. The test pressure shall be maintained for a minimum of 15 minutes. Close the valve, remove the cap and observe for leakage at the valve seal. No leakage is acceptable.

Perform hydrostatic test of tapping saddles in accordance with AWWA Standard C800.

3.04. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new tapping sleeve and valve, by size, complete in place. The Contract Unit Price shall include all labor, material, and equipment for the tapping sleeve and valve installation including excavation and backfilling, thrust restraint, valve box installation, protection, location tape, tracer wire, rough grading, removal of excess excavated material, and any other ancillary Work related to tapping sleeve and valve installation.

Note: This item does not include service line taps.

END OF SECTION 15170

SECTION 15175
LINE STOPS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing Line Stops as shown on the Drawings.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15170 – Tapping Sleeves, Saddles, and Valves

1.03. SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:

- a. Submit manufacturer's technical product data, installation instructions, and dimensioned drawings for each type of proposed pipe and pipe fitting. For all existing pipes to be tapped or line-stopped, submit piping schedule showing field- verified pipe location, depth, material, size, exact outside diameter, condition, and all other information pertinent to performing line stopping services.

PART 2 – PRODUCTS

2.01 LINE STOP FITTINGS AND TEMPORARY VALVES

- A. The permanent carbon steel or cast iron line stop fittings such as the mechanical tapping sleeves, blind flanges and completion plugs shall be shop primed and finish coated in the field with an Illinois EPA approved for potable water liquid epoxy coating. The interior and exterior surfaces shall be coated. The coatings shall be applied in accordance with the coating manufacturer's recommendations and AWWA Standard C-210-92. All bolts, nuts, washers or connection devices used on the permanent line stop fittings shall be corrosion resistant 316 stainless steel.

1. Line stop fitting:

- a. Two-part saddle weldment fabricated from ASTM A285, Grade C steel.

- b. Outlet shall be sealed with blind flanges.
 - c. Minimum saddle wall thickness shall be 3/8 inch.
 - d. All mild steel parts shall be stressed relieved after welding and coated with a fusion-bonded epoxy.
 - 1) Nozzle flanges shall be machined from 150 lb forged steel flanges, ASTM A181 or A105.
 - 2) The design of the nozzle flange shall be such that it will receive, securely retain, and pressure seal a completion plug installed under pressure through the Line Stop Valve.
 - 3) After welding and stress relief, the nozzle and flange shall be bored to provide a pressure-tight seal with the O-Ring contained in a groove in the completion plug.
 - 4) A single 3/4" NPT pipe coupling shall be welded to each nozzle for pressure test purposes.
2. The upper saddle plate shall be sealed to the outside of the force main by means of a resilient gasket cemented inside a groove in the nozzle half of the fitting. The gasket shall be located adjacent to and concentric with the bore of the nozzle. It will be molded with one or more concentric lips that will seal more tightly against the main with an increase in fluid pressure.
 3. The fitting halves shall be drawn together by twelve 3/4" diameter Type 304 stainless steel bolts, nuts, and washers.
 4. The design of the completion plug shall be such that it will carry an O-Ring to pressure seal against the interior of the nozzle and be mechanically held in place in the nozzle flange. The plug shall be capable of later removal, under pressure, in the event that a Line Stop may have to be reinstalled. The plug shall be made from ductile iron.
 5. A suitable blind flange shall be fabricated from ASTM A-36 mild steel plate and coated with fusion-bonded epoxy. Type 304 stainless bolts and nuts shall be provided to secure the blind flange to the nozzle flange after the completion plug has been installed.

B. Blow Down/Equalization Fittings by the Owner:

1. The Owner will provide pressure taps downstream from line stop on the water main. This pressure connection will allow quick determination of shutdown adequacy and allow draining.
 2. In order to remove a line stop-plugging head, water pressure must be equalized across that head. The equalization tap provides access to the depressurized main for purposes of refilling and final pressure equalization.
 3. Outlets shall be sealed with screwed pipe caps or blind flanges at option of Owner.
- C. Sleeve, Concrete Thrust Blocking, and Appurtenances:
1. Line Stop Contractor is responsible for furnishing and installing sleeve, concrete thrust blocking, and all necessary appurtenances for completion of each line stop.
 2. After construction is completed on the water main, Line Stop Contractor is responsible for removal of all equipment and any appurtenances not left in place permanently.
- D. Installed line stopping fittings shall be leak tested before any pipe cutting is initiated. The leak test pressure shall be determined by the line stopping equipment installation subcontractor. Any leaks shall be repaired before tapping the pressurized pipe.

PART 3 – EXECUTION

3.01. INSTALLATION

- A. The Line Stop Contractor shall power wire brush and grind the exterior of the main to remove any debris, corrosion deposits, or other surface irregularities that might interfere with proper seating and sealing of each line stop fitting against each main.
- B. Any structural defects in main, service connections, appurtenances or adjacent utilities that could interfere with the line stop installation shall be immediately reported by the Line Stop Contractor to the Owner.
- C. Line Stopping Contractor shall fit saddle assemblies to main, thoroughly checking for proper fit to main.
- D. Under no circumstances shall Line Stopping Contractor attempt to force, reshape, or bend saddle plates by excessive tightening of saddle studs while line stop fitting is assembled around the main.
 - a. Any retrofitting shall be accomplished with the fitting removed from the main.

- b. Any damage to fitting, accessories or main shall be repaired at Line Stopping Contractor's expense to the approval of the Engineer.
- E. The Contractor will excavate, dewater (if necessary), and expose the water main.
- F. The Line Stop Contractor shall clean the exterior of the main at location of each line stop. If main is heavily corroded; or if utilities will interfere with fittings, support/reaction blocking, or equipment; move location up or downstream to structurally sound pipe.
- a. The Line Stop Contractor shall verify pipe size and condition.
 - b. The Line Stop Contractor shall place approved concrete thrust restraints and supports.
 - c. Backfill and restoration by the Owner.
- G. The Line Stop Contractor shall:
- a. Assemble line stop fitting around the main.
 - b. Pressure test all fittings and saddles per Engineer's specifications. Pressure tap blow down and equalization fitting.
 - c. Pour concrete support and reaction blocking at the line stop. Allow to cure per Engineer's instructions.
 - d. Install temporary line stop tapping valve and tapping machine. Pressure tap line stop. Remove tapping machine.
 - e. Mount line stop machine.
 - f. Test for flow at equalization fitting. Use pitot-type instrument, if necessary.
 - g. When flow ceases, insert Line Stop into pipe. Test for good shut down at equalization and blow down fittings. If a complete shutdown is not achieved, the stop head shall be withdrawn and the sealing element changed in order to achieve a better stop. This procedure shall be repeated as many times as necessary in order to achieve the best possible shut-down
- H. The Owner shall:
- a. Install the blow down and equalization fittings.
 - b. Drain the depressurized pipe.
 - c. Cut pipe; perform required work on depressurized pipe.
 - d. Refill downstream piping through blow down tap. If necessary, bleed air at equalization tap.
- I. The Line Stop Contractor shall:
- a. Equalize pressure across line stop plugging head. Retract plugging head. Close temporary valve. Remove line stop machine.
 - b. Install completion machine; open Line Stop valve. Insert completion plug into flange of line stop fitting.
 - c. Remove completion machine and temporary valve. Install blind flange.

- d. Repeat completion operations at blow down and equalization fittings.

3.02 CLEANING, FLUSHING, INSPECTING

- A. Tapping and line stopping assemblies: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.
 - 1. Inspect pressure piping in accordance with procedures of ASME B31.

3.03 BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new line stop, complete in place. The Contract Unit Price shall include all labor, material, and equipment and incidentals for the line stop installation This work includes but is not limited to:

- a. Furnishing and installation and removal of all temporary piping, valves, couplings, bolts, gaskets, supports, thrust blocks, and concrete encasement required to complete the line stopping activities associated with this project.
- b. Hydrostatic pressure testing and disinfection of all lines and fittings associated with the temporary bypass piping and line stopping.

END OF SECTION 15175

SECTION 15180
FIRE HYDRANTS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing fire hydrant assemblies at locations shown on the Drawings and in accordance with Standard Details and local regulations. The fire hydrant assembly includes the connection to the water main, hydrant valve and valve box, anchor couplings, hydrant lateral, hydrant extensions, and the fire hydrant (including base and hydrant barrel). The Owner reserves the right to provide the fire hydrant (including base and hydrant barrel). A list of additional materials to be provided by the Owner, if applicable, is shown in Specification Section 01000.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 02210 – Trenching, Backfilling and Compacting
- C. Specification Section 15105 – Ductile Iron Pipe and Fittings
- D. Specification Section 15000 – Piping – General Provisions
- E. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C502 – Dry Barrel Fire Hydrants
- B. AWWA C550 – Protective Interior Coatings for Valves and Hydrants

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's data
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. MATERIAL

- A. All fire hydrants shall be ductile iron and conform to the requirements of AWWA C502, traffic-model break-away type fire hydrants.
- B. Contact the local water district and obtain written fire hydrant mechanical details for the water district prior to ordering any fire hydrants for the Work. All fire hydrants shall open left or right as required and be clearly marked on the top of the hydrant with

- a 1-1/2-inch pentagon top nut and have not less than two (2) O- ring stem seals. The number and sizes of hose nozzle outlets is dependent on the local regulation. (Most Districts use two (2) bronze male threaded 2-1/2-inch hose outlet nozzles and one (1) bronze male threaded 4-1/2-inch pumper outlet nozzle with American National Fire Hose Connection Screw Threads (NH).) The hydrant shall be break-away traffic flange, 5-1/4-inch valve opening, 6-inch mechanical joint pipe connection. The hydrant interior and exterior shall be epoxy coated at the factory by the hydrant manufacturer in accordance with AWWA Standard C550 (6-8 mil average, 4 mil minimum).
- C. All hydrant materials shall meet the requirements of NSF 61.
 - D. Acceptable manufacturers and model numbers are listed in the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. INSPECTION PRIOR TO INSTALLATION

- A. Contractor shall inspect all fire hydrants upon receipt. Cycle each hydrant to full open and full closed positions to ensure that no internal damage or breakage has occurred during shipment and handling. Check all external bolts for proper tightness.
- B. After inspection, close the hydrant valves and replace the outlet nozzle caps to prevent the entry of foreign matter. Protect stored hydrants from the weather/elements with the inlets facing downward.

3.02. INSTALLATION

- A. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. When placed behind the curb, the hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than eighteen to twenty-four inches, depending on local requirements, from the gutter face of the curb. All hydrants shall stand plumb with the pumper nozzle facing the curb. Set hydrants with nozzles at least eighteen inches above the finished grade as shown on the Standard Details. Set the break flange at least two but no more than six inches above finished grade, or as directed by the Engineer. Connect each hydrant to the main with a six inch branch connection controlled by an independent six inch gate valve, unless otherwise shown on the Drawings. All hydrants assemblies must be restrained from the hydrant to the main.
- B. The Engineer may authorize hydrant protection using steel pipe bollards when hydrant installations have a greater than normal exposure to vehicular damage (e.g. parking lot installations, unusual driving situation, etc.). Install all such protection designated by the Engineer. Locate bollards as necessary adjacent to the hydrant and in such a manner as to not interfere with the ability to connect hoses or operate the hydrant as shown in the Drawings. Additionally, locate the bottom of the bollard and encasement above the hydrant supply piping and valve to prevent the possibility of damage to the piping

should the bollard be displaced when hit.

- C. Unless otherwise directed by the Engineer, excavate a drainage pit two feet in diameter and two feet deep below but not beyond each hydrant. Fill the pit with compacted Coarse Aggregate, as described in Specification Section 02210, under and around the base of the hydrant to a level 12 inches above the hydrant drain opening. No hydrant drainage pit shall be connected to a sewer.
- D. Cover the drainage area with geotextile fabric. The fabric shall completely isolate the gravel or stone so that no fill material or adjacent earth comes in contact with pit material.
- E. Notify the Engineer of situations where the ground water table is above the drain opening of dry barrel hydrants. If directed by Engineer, plug the drain opening using a method acceptable to the hydrant manufacturer. No drainage pit is required when the hydrant drain is plugged. Mark the hydrant, in a manner acceptable to the Owner, to indicate that the drain opening has been plugged. Operation of a hydrant with plugged drain leaves the hydrant barrel full of water. Pump the hydrant barrel dry after each use.
- F. Install connection to water main and hydrant lateral in accordance with Specification Sections 15000, 15130, 15150, and Standard Details.
- G. Install hydrant valve and valve box in accordance with Specification Sections 15000, 15130, and 15150.
- H. If thrust blocks are called for by the Drawings or the Engineer, reaction or thrust blocking at the base of each hydrant must not obstruct the drainage outlet of the hydrant. The size and shape of concrete thrust blocking and the number and size of tie rods, when required, shall be approved by the Engineer. Use the thrust blocking material specified in Specification Section 03300. See Specification Section 15000 for tie rod requirements.
- I. Paint all hydrants above the bury line in accordance with the local operations standards listed in the Supplemental Technical Specifications. Touch up paint shall be applied upon completion of installation as needed. Take extreme care to avoid getting any paint on the "O" ring under the top operating nut or on the hydrant nozzles. Should paint be found on the "O" ring, the Contractor shall remove the paint and replace the "O" ring at no additional cost to the Owner. Any paint on the hydrant nozzles shall be removed at the Contractor's expense.

3.03. TESTING

After installation and before backfilling (and after pressure testing the water main) test the hydrant as follows:

A. Pressure Test

1. Open the hydrant fully and fill with water; close all outlets.

2. To prevent caps from being blow off dry-barrel hydrants and to prevent other possible damage, vent air from the hydrant by leaving one of the caps slightly loose as the hydrant is being filled. After all air has escaped, tighten the cap before proceeding.
3. Apply line pressure.
4. Check for leakage at flanges, nozzles and operating stem.
5. If leakage is noted, repair or replace components or complete hydrant until no leaks are evident.

B. Drainage Test for Dry Barrel Hydrants

1. Following the pressure test, close hydrant.
2. Remove one nozzle cap and place pylon or hand over nozzle opening.
3. Drainage rate should be sufficiently rapid to create a noticeable suction.
4. After backfilling, operate the hydrant to flush out any foreign material.
5. Tighten nozzle caps, then back them off slightly so that they will not be excessively tight; leave tight enough to prevent removal by hand.

3.04. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new fire hydrant assembly complete in place. The Contract Unit Price shall include all labor, material (unless provided by the Owner), and equipment for the hydrant assembly installation including excavation and backfilling, valve box installation, protection, thrust restraint, location tape, tracer wire, rough grading, removal of excess excavated material, painting, and any other ancillary Work related to fire hydrant assembly installation.

END OF SECTION 15180

SECTION 15190
AIR RELEASE, BLOW-OFF OUTLETS AND RELATED COMPONENTS

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing air release and blow-off outlets at the locations shown on the Drawings and in accordance with Standard Details.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling and Compacting
- B. Specification Section 15000 – Piping – General Provisions
- C. Specification Section 15200 – Service Lines
- D. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C512

1.04. SUBMITTALS

- A. Submit shop drawings and manufacturer's data
- B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

2.01. COMBINATION AIR/VACUUM RELEASE VALVES

- A. Combination valves shall be double acting to prevent accumulation of air in the pressurized main and to permit air to enter the pipe when pressure seriously drops. Bodies shall be cast iron with stainless steel floats. Not for use in flood prone areas.
- B. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.02. BLOW-OFF FLUSHING HYDRANT ASSEMBLY

- A. Blow off assembly for underground applications shall be designed to fit within a standard valve box. In areas prone to cold weather they shall be self-draining and non-freezing. All working parts shall be serviceable from above with no digging required. They shall be operated such that the device goes from full open to full close in a ¼ clockwise turn.
- B. Acceptable Manufacturers are listed in the most current version of the Supplemental Technical Specifications.

2.03. RELATED COMPONENTS

See Specification Section 15200 for copper pipe, corporation stops, curb stops, curb boxes and miscellaneous service line fittings.

PART 3 – EXECUTION

3.01. INSTALLATION

- A. See Specification Section 15000 for piping general provisions. See Specification Section 15200 for information about selected components (copper pipe, corporation stops, curb stops, curb boxes) common to service lines. See Standard Details showing installation of manual air release, air/vacuum release valve assemblies and blow-off flushing hydrant assemblies.
- B. Excavate, backfill, and restore the surface in accordance with Division 2 of these Specifications.
- C. Install copper pipe between the corporation stop and the curb stop or air release valve location making only gradual changes in grade or alignment, as required. Do not make bends greater than 15 degrees in any direction. Install curb stops with the operating nut in the vertical position
- D. Open the corporation stop slowly to fill the service line. When the line is full and all air has been removed, completely open the corporation. Perform a visual leak inspection of all piping, fittings, and taps prior to backfilling. Zero leakage is allowed in 10 minutes.
- E. Provide polyethylene encasement, or other protective wrap approved by the Engineer, on all service lines (valves, stops, etc.) unless they are not subject to aggressive soils. Polyethylene encasement shall extend along the service line for its entire length.
- F. Install the curb box centered over the nut. Install and adjust the curb boxes to be flush with finished grade. Install and lock the lids on the curb boxes.

3.02. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each new air/vacuum release valve and each permanent blow-off/flushing hydrant assembly complete in place. The Contract Unit Price shall include all labor, material, and equipment for the installation including excavation and backfilling, valve box/curb box/ meter box installation, connection to the water main, thrust restraint, rough grading, removal of excess excavated material, and any other ancillary Work related to the installation. **Temporary blow-off outlets are considered incidental to the installation of the water main.**

END OF SECTION 15190

SECTION 15195
WATER MAIN ABANDONMENT

PART 1 – GENERAL

1.01. SUMMARY

This section includes abandoning existing water mains, cutting & capping existing water mains, and removing associated items as shown on the Drawings and Standard Details. When shown on the Drawings or required by local agencies place flowable fill in water mains to be abandoned.

1.02. RELATED WORK

- A. Specification Section 02210 – Trenching, Backfilling, and Compacting
- B. Specification Section 03300 – Cast-In-Place Concrete
- C. Specification Section 15000 – Piping-General Provisions
- D. Specification Section 15150 – Ductile Iron Pipe & Fittings

1.03. SUBMITTALS

- A. Contractor's plan for filling abandoned pipe completely with flowable fill, if required
- B. Submit in accordance with Section 01300

PART 2 – PRODUCTS

2.01. FLOWABLE FILL

- A. Flowable fill for abandoned water mains shall meet the requirements of flowable fill for trench backfill in accordance with Specification Section 02210, or as approved by Engineer.

PART 3 – EXECUTION

All work shall be coordinated with Owner and Engineer. Provide a minimum of 72 hours' notice prior to beginning abandonment Work. The Work described in this section shall not proceed until the Engineer has determined that all hydrants and customer service lines are transferred to the new main and placed in service.

3.01. ABANDONING WATER MAIN

- A. Contractor shall have all labor, equipment, and material on site for all reasonable water main abandonment possibilities. Excavate at water main and locate the connection to the water main to be abandoned or point of abandonment. Engineer shall determine type of abandonment to be performed and its exact location for each water main abandonment. Owner will be responsible for operating valves necessary for isolating the abandonment.
- B. Water main to be abandoned shall be physically separated from the rest of the system at the points determined by the Engineer. Cut and remove a sufficient length of the pipe to provide access for installing cap and thrust restraint on the portion of the main to remain in service and, if required, placing flowable fill in the portion of water main to be abandoned. The abandoned water main shall be drained and the water safely discharged. Install the type of abandonment determined by the Engineer and install thrust restraint.
- C. Remove valve boxes on all valves located on abandoned water main.
- D. When shown on the Drawings or required by local agencies, the abandoned main shall be filled with flowable fill. The main shall be completely filled, leaving no voids.
- E. Backfill excavations in accordance with Specification Section 02210.

3.02. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each abandonment by size. The Contract Unit Price shall include all labor, material, and equipment for the abandonment of water main including excavation, backfill, rough grading, removal of pipe and valve boxes, and any other ancillary Work related to abandoning water main. Any required line stops will be considered a separate pay item.

END OF SECTION 15195

SECTION 15200
SERVICE LINES

PART 1 – GENERAL

1.01. SUMMARY

This section includes furnishing and installing the water service line and ancillary items originating at the water main and terminating at the property line (typically at a curb stop/meter box) at locations shown on the Drawings or described in the Supplemental Technical Specifications. This section also includes furnishing and installing required items for Service Renewals as determined by the Owner/Engineer. This Specification Section does not include service lines or meter installation beyond the property line. Refer to Standard Details for typical service line installation(s).

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 02210 – Trenching, Backfilling and Compacting
- C. Specification Section 15130 – Piping Specialties

1.03. REFERENCES

Refer to current standards:

- A. AWWA C800 - Underground Service Line Valves and Fittings
- B. Illinois State Plumbing Code

1.04. SUBMITTALS

A. Product Data – Submit manufacturer’s data on the following:

- 1. Service line material
- 2. Corporation stops
- 3. Curb stops
- 4. Curb boxes
- 5. Meter boxes
- 6. Meter box frame and lid
- 7. Meter setter

B. Submit in accordance with Section 01300.

PART 2 – PRODUCTS

All Products described below shall meet the requirements of NSF 61.

Research has documented that certain pipe materials (such as polyethylene) and certain elastomers (such as those used in gasket material and packing glands) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this Specification Section assume that petroleum products or organic solvents will not be encountered. If during the course of pipeline installation the Contractor identifies, or suspects the presence of petroleum products or any unknown chemical substance, notify the Engineer immediately. Stop installing piping in the area of suspected contamination until direction is provided by the Engineer.

2.01. COPPER SERVICE LINE MATERIAL

Copper pipe shall be Type L or Type K, as specified on the Drawings or Supplemental Technical Specifications, meeting the requirements of ASTM Standard B88. The pipe size (3/4", 1", 1-1/2", or 2") and type are to be determined by the Engineer. Type K is normally required in corrosive environments where polyethylene is not allowed.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.02. POLYETHYLENE SERVICE LINE MATERIAL

Polyethylene service line material shall be Class 160 (minimum), ultra high molecular weight, as specified on the drawings or Supplemental Technical Specifications, conforming to AWWA Standard C901. Pipe sizes (3/4", 1", 1-1/2" and 2", copper tube size (CTS) or iron pipe size (IPS)) to be determined by the Engineer. PE service lines will typically not be allowed in systems with surface water sources due to temperature fluctuations. PE service lines will typically not be allowed in high pressure systems.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.03. CORPORATION STOPS

Corporation stops shall be of the brass, ball valve type manufactured in accordance with AWWA Standard C800. The inlet connection shall have standard AWWA tapered threads unless otherwise required by the Engineer. The outlet connection shall be copper or brass compression connection end or pack joint for polyethylene pipe, as required. Dielectric unions shall be used to prevent transfer of any electrical stray currents from metallic service lines to metallic water main. The sizes shall range from 1/2" to 2" and shall match the size of specified service line material.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.04. CURB STOPS

Curb stops shall be bronze body construction, ball valves, with Double O-ring stem seals. Curb stops shall conform to AWWA Standard C800. End connections shall be suitable for copper or brass compression connection or pack joint for polyethylene pipe, as required. Sizes shall be from 3/4" to 2" and shall match the service line size.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.05. CURB BOXES

Curb boxes shall be standard cast iron, sliding or screw type, 1" or 2-1/2" as required, complete with lid and head bolt. Boxes shall be adjustable from 18-inches to 66-inches. The box size will be determined by the Engineer.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.06. METER BOX/METER PIT

Meter boxes shall be a high quality, heavy duty, crush resistant plastic pipe. They must have a dual-wall construction with a smooth, white interior, a ribbed/corrugated exterior, and shall be notched on the bottom sides of the pit.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.07. METER BOX FRAME AND LID

Meter box frames and lids shall be cast iron and have a non-recessed lid opening. The meter box frames must be compatible with the meter box.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.08. METER SETTER/METER YOKE

Meter Setters shall be manufactured and tested in accordance with applicable section of AWWA C800 and maintain electrical ground continuity (Bonded).

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

2.09. MISCELLANEOUS SERVICE LINE FITTINGS

Miscellaneous service line fittings such as couplings, adapters, saddles, bends, plugs, service line electrical insulators, etc. shall conform to AWWA Standard C800.

Acceptable manufacturers are listed in the Supplemental Technical Specifications.

PART 3 – EXECUTION

3.01. POTHOLE INVESTIGATION

A. Contractor shall pothole all existing services 2 feet on the owner side of the water meter and a minimum of 4 feet on the customer side of the meter to determine material.

B. Work includes hydro-vac excavation, rough grading, and removal of excess excavation materials per Owner specifications, replacement of driveway, roadway, or gravel to existing condition, and any other ancillary work related to potholing to replace the work area to existing conditions.

C. Water will be supplied by the Owner.

D. Service line size and material shall be documented by both Contractor and Engineer

and delivered to Owner upon request.

- E. If, at any time, lead services are encountered, Contractor shall immediately coordinate with the Owner and refer to Specification 15205. Contractor shall take care to not disturb or agitate lead service line.

3.02. INSTALLATION OF CORPORATION STOPS

- A. Use experienced craftsmen familiar with installation of water service lines when tapping water mains. Make all taps with a suitable tapping machine (Mueller, Ford, Hays or Dresser type) using the proper combined drill and tap. Hand held drilling equipment is not acceptable.
- B. Before making the tap, inspect corporation stops for cleanliness, damaged threads, and proper operation of the ball valve prior to installation. Do not install corporation stops that fail this inspection.
- C. The main may be tapped along the top half of the pipe as directed by the Engineer or as shown on Standard Details. Use a tapping saddle when the water main wall thickness or material (plastic, concrete or asbestos cement pipeline material) make it unsuitable for direct tapping. Taps should be a minimum of 18" away from pipe bells.
- D. In the case of multiple services of small diameter (less than 2" diameter), corporation stops shall be at least 12 inches apart and at least 22-1/2 degrees above or below the location of any adjacent tap(s). Curb stops and boxes and/or meter boxes shall be at least one foot apart. In the case of large diameter multiple services, tap at least 24 inches apart and at least 22-1/2 degrees above or below the location of any adjacent tap(s).
- E. Install all corporation stops so that between 2 and 3 threads extend beyond the inside wall of the main. If necessary, make a test tap with the boring bar marked to the proper depth. The corporation stop, when properly installed, will not be shouldered with the main. Do not use lubricants of any type when installing the corporation stop.
- F. Use the procedures outlined in AWWA Standard C600 or the DIPRA Field Polyethylene Installation Guide for installing taps on grey iron or ductile iron mains encased in polyethylene.

3.03. INSTALLATION OF SERVICE LINES AND FITTINGS

- A. Excavate the service line trench in accordance with Division 2 of these Specifications. Where augering, directional drilling, or moling is permitted follow guidelines provided by the equipment manufacturer including making a proper size hole to launch and receive the unit. If moling, directional drilling, or augering is employed, take appropriate precautions to avoid damaging other utilities and disturbing the unexcavated surface. Contractor is responsible for locating, identifying, and utilizing appropriate precautionary measures to protect existing utilities in accordance with State and Local requirements.
- B. Install all services straight and at right angles to the main. If this cannot be accomplished, consult Engineer.
- C. All trench services shall be installed with identification tape in accordance with Specification Section 02210.
- D. All PE services shall be installed with tracer wire in accordance with Specification Section 02210.
- E. All plastic service line connections shall use insert stiffeners of the appropriate length and size.
- F. Coupling new service line to existing service lines are not permitted under paved surfaces or within 10 feet of the meter or curb stop, unless authorized by the Engineer.
- G. All service line size and material, on both sides of the meter, shall be verified and recorded.

3.04. INSTALLATION OF CURB STOPS

- A. Install curb stops with the operating nut in the vertical position and the curb box centered over the nut. Install curb boxes plum and adjusted to be flush with finished grade. Install and lock curb boxes immediately after installation.
- B. After completion of service line installation, but prior to backfilling, open the corporation stop slowly to fill the line. When the line is full and all air has been removed, completely open the corporation and close the curb stop. Visually inspect all piping, fittings, and taps for leaks. Backfill and restore the surface the service line trench in accordance with Division 2 of these Specifications.

3.05. INSTALLATION OF METER SETTER

- A. Always verify an electrically safe environment before continuing work. Please contact owner for recommended procedures.
- B. Install meter setter with the shut-off valve in the vertical position and the meter box centered over the valve. Install meter boxes plum and adjusted to be flush with finished grade.
- C. After completion of service line installation, but prior to backfilling, open the corporation stop slowly to fill the line. When the line is full and all air has been removed, completely open the corporation and close the curb stop or inlet valve in meter box. Visually inspect all piping, fittings, and taps for leaks. Backfill and restore the surface of the service line trench in accordance with Division 2 of these Specifications.

3.06. BASIS OF PAYMENT

Payment for “Potholes” will be on a Contract Unit Price basis and contract will be adjusted to actual number of potholes completed. Potholes performed in pavement will be considered a separate unit price.

Payment will be made at the Contract Unit Price for each “Long Service Transfer” and each “Short Service Transfer”. A Long Service Transfer is defined as a tap and new service line when the new water main is located on the opposite side of the street of the unit being re-connected. A Short Service Transfer is defined as a tap and new service line when the new water main is located on the same side of the street of the unit being re-connected. Payment will be made at the Contract Unit Price for each “Service Renewal – Meter Setter”, “Service Renewal – Meter Box”, and “Service Renewal – Meter Box Frame and Lid” as determined by the Owner/Engineer. The Contract Unit Price shall include all labor, material (unless provided by the Owner), and equipment for the water service line installation including excavation and backfilling, connection to the water main, installation of water service line and fittings, installation of curb stop, installation of meter setter and meter box, protection, location tape, tracer wire, rough grading, removal of excess excavated material, and any other ancillary Work related to water service line installation.

Where an installation is made that a single tap and service line is then split to serve multiple units, the tap and service line will be considered its respective “Service Transfer.” Any improvements to the Meters will be paid by the respective Contract Unit Price. A “Multiple Service Transfer” will be paid for each instance for the pipe and fittings from the service line split to the respective meters or curb stops.

END OF SECTION 15200

SECTION 15205
LEAD SERVICE LINE REPLACEMENT

PART 1 – GENERAL

1.01. SUMMARY

This section includes additional requirements for replacing lead services lines. Any work described in this section is supplemental to Specification 15200.

1.02. RELATED WORK

- A. Specification Section 01000 – Summary of Work
- B. Specification Section 02210 – Trenching, Backfilling and Compacting
- C. Specification Section 15130 – Piping Specialties
- D. Specification Section 15200 – Service Lines

1.03. REFERENCES

Refer to current standards:

- A. AWWA C800 - Underground Service Line Valves and Fittings
- B. Illinois State Plumbing Code

1.04. SUBMITTALS

- A. Submit data as required in Specification 15200

PART 2 – PRODUCTS

All Products described below shall meet the requirements of Specification 15200.

PART 3 – EXECUTION

3.01. PRE-REPLACEMENT COORDINATION

- A. Prior to commencing replacement of the lead service line, delivery of communication materials must have been completed. Additionally, if replacing the customer side service line, an executed Lead Service Line Agreement must be obtained.

3.02. OWNER-SIDE SERVICE TRANSFER

- A. All work shall be in accordance with Specification 15200.
- B. The replacement of a lead corporation stop shall be installed a minimum of 18” laterally away from the previous location.

3.03. CUSTOMER-SIDE SERVICE TRANSFER

- A. Install new service line from meter pit into, or reasonable distance per Engineer's approval, of the customer's building per Specification 15200. Service line shall be replace through the foundation and extend not more than 5 feet into the building. Route of new service line shall be coordinated with Owner, Customer, and Engineer.
- B. Connect or reconnect customer's service line to meter pit.
- C. Connect or reconnect customer's service line into existing plumbing.

3.04. FLUSHING PROCEDURES (FOR CONTRACTOR INFORMATION ONLY)

- A. Following all Lead Service Line Replacements Flushing and Sampling procedures must be followed:
 - i. A 30 minute flush of the hose bibb followed by a 30 minute flush of all the cold water taps inside the home. A sample is collected, and delivered by the Inspector to the Illinois American Water Engineering Office.
 - ii. If the property owner does not agree to a Full In-Home flush, contractor is to flush at the hose bibb for 60 minutes and collect a sample, both of which are required to be delivered by the inspector to the Illinois American Water Engineering Office.
 - iii. A second property owner elected sample, which must collected within 72 hours of the first by the customer and after 6 hours of no water use in the house, is to be picked up and delivered by the Inspector to the Belleville Engineering office.
 - iv. Coordination and scheduling with the customer.
- B. Upon notification of passing samples, the service transfer will be considered complete.

3.05. BASIS OF PAYMENT

Payment will be made at the Contract Unit Price for each "Long Service Transfer , each "Short Service Transfer, and each "Lead Service Line Replacement – Customer". "Long Service Transfer" and "Short Service Transfer" is paid as described in Specification 15200. A "Lead Service Line Replacement – Customer" is defined as a complete service line replacement from the water meter to the existing shut-off valve inside the building. The Contract Unit Price for "Lead Service Line Replacement – Customer" shall include all labor, material, and equipment for the water service line installation including excavation and backfilling, connection to the water meter, installation of water service line and fittings, foundation penetration, waterproofing, connection to the shut-off valve, protection, rough grading, removal of excess excavated material, final grading, seeding, pavement

restoration, landscaping, and any other ancillary Work related to water service line installation.

Coordination with Owner and/or Customer is incidental to these Unit Prices.

END OF SECTION 15205

SUPPLEMENTAL TECHNICAL SPECIFICATIONS

The Technical Specification used for Water Main Installation shall be “The Illinois American Water Company Standard Pipeline Specifications” dated January 2019. The Supplemental Technical Specifications amend or supplement the technical specifications. All provisions, which are not so amended or supplemented by the Supplemental Technical Specifications, shall remain in full force and effect:

DIVISION 2 – SITE WORK

Section 02210 – Trenching, Backfilling, and Compacting

2.04 FILTER FABRIC

Acceptable manufacturers:

- a. Mirafi 140N by Mirafi, Inc.
- b. Typar 3401 by DuPont
- c. Propex 4547 by Amoco Fabrics Co
- d. US 120NW by US Fabrics
- e. Advanced Drainage Systems

Section 02220 – Casing Installation (Steel)

2.02 CASING END SEAL

B. Acceptable Manufacturers:

- a. Cascade Waterworks Mfg. – Model CCES
- b. APS Standard Model AC Casing End Seal
- c. BWM Manufacturing

2.03 CASING INSULATORS

C. Acceptable Manufacturers:

- a. Cascade Water Work Manufacturing Company (Stainless Steel only – Model CCS)
- b. Pipeline Seal and Insulator, Inc. (Carbon Steel with polyvinyl chloride or the Ranger II model)

- c. Advanced Products and Systems, Inc. (Model SI)
- d. Power Seal Pipeline Products Corp. (Model 4810)
- e. RACI (polyethylene model F-60 for 12-inch carrier pipe and smaller).
RACI shall not be used for carrier pipe larger than 12-inch.
- f. BWM Manufacturing

Section 02225 – Casing Installation (PVC)

2.02 CASING END SEAL

B. Acceptable Manufacturers:

- a. Cascade Waterworks Mfg. – Model CCES
- b. APS Standard Model AC Casing End Seal
- c. BWM Manufacturing

DIVISION 15 – MECHANICAL

Section 15000 – Piping – General Provisions

2.02 PETROLATUM TAPE COATING

C. Acceptable Manufacturers

- a. Tapecoat TC Envirotape
- b. Denso Densyl Tape

2.03 RUBBERIZED-BITUMEN BASED SPRAY-ON COATING

Acceptable Manufacturers:

- a. 3M Rubberized Underseal Undercoating 08883
- b. Permatex

Section 15105 – Ductile Iron Pipe and Fittings

2.01 PIPE MATERIALS

F. Acceptable Suppliers

- a. United State Pipe & Foundry Co.
1101 East Pearl Street
Burlington, NJ 08016
- b. American Cast Iron Pipe Company
2916 16th Street North

Birmingham, AL 35207

- c. McWane

2.02 FITTINGS

B. Acceptable Suppliers

- a. Sigma (through United States Pipe & Foundry Co.
1101 East Pearl Street
Burlington, NJ 08016
- b. Tyler Union (domestic only)
McWane Cast Iron Pipe Co.
P.O. Box 607
Birmingham, AL 35201
- c. American Cast Iron Pipe Company
2916 16th Street North
Birmingham, AL 35207
- d. Star Pipe Products

C. Joints

- 1. Bolt manufacturer shall be Cor-Blue
- 3. Romac Alpha Restrained Joints are allowable in all districts but Alton.

Section 15120 – Polyvinyl Chloride (PVC) Pipe

2.01 PIPE MATERIALS

Approved manufacturers:

- a. J-M Eagle Company, Inc
9 Peach Tree Hill Road
Livingston, NJ 07039
(973)535-1633
www.jmeagle.com
- b. Pipe Life Jet Stream
- c. Diamond Plastics
- d. NAPCO Pipe

Section 15122 – Fusible PVC Pipe

2.03 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

H. Approved Manufacturers:

Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051.

Section 15125 – HDPE Pipe

2.04 Acceptable Manufacturers

- A. CPChem Performance Pipe
- B. KWH Pipe Ltd
- C. Poly Systems Inc.

Section 15130 – Piping Specialties

2.01 POLYETHYLENE ENCASEMENT

- B. Acceptable Suppliers of Polyethylene Tape: Gorilla Tape
- D. Acceptable Suppliers:
 - a. Approved DI Pipe Manufacturers

2.02 VALVE BOXES

- C. Acceptable Manufacturers:
 - a. Bingham & Taylor
 - b. Mueller (Streator, Sterling, Chicago Metro)
 - c. A.Y. McDonald (Chicago Metro)
 - d. Water Quality Products (Sterling)
 - e. Sigma Corp
 - f. Star Pipe Products
 - g. Tyler Union

2.03 RODS, BOLTS, LUGS, AND BRACKETS

- C. Approved Manufacturer is Cor-Blue
 - a. Sigma Corp

2.04 RETAINING GLANDS

B. Acceptable Manufacturers:

- a. EBBA Iron, Inc.
P.O. Box 857
Eastland, TX 76448
- b. Ford Retaining Glands – 1400 Series for DI, 1500 Series for PVC
- c. Sigma Corp

2.05 TEST/TRACER BOXES

B. Acceptable Manufacturers:

- a. Copperhead Snake Pit Access Box
- b. Handley Industries, Inc

2.06 MARKING POSTS

B. Acceptable Manufacturers:

- a. Rhino
280 University Drive Southwest
Waseca, MN 56093
1-800-522-4343
- b. Carsonite International
605 Bob Gifford Boulevard
Early Branch, SC 29916
800-648-7916

- c. Proline Safety Products

2.07 IDENTIFICATION TAPE

B. Acceptable Manufacturers:

- a. Reef Industries, Inc – Terra Tape
- b. Proline Safety Products

2.08 LOCATION WIRE

B. Acceptable Manufacturers:

- a. Copperhead Industries, LLC – Part Number 1230B-HS (OPEN CUT ONLY)
- b. Copperhead Industries, LLC – Part Number 1245B-EHS (Horizontal Directional Drilling)
- c. Copperhead Industries, LLC – Part Number LSL1230B Connector
- d. DryConn Waterproof Connectors – Direct Bury Lug Aqua #90220

- e. Neptco, Inc Part #1802W w/ TS-19-LC/IL (Option for Interurban)

2.09 RESTRAINED JOINT MARKING TAPE

C. Acceptable Manufacturers:

- a. St. Louis Paper & Box Company – Part Number MIAM-010
- b. AA Thread

Section 15150 – Gate Valves

2.01. Small Gate Valve

B.

Table 1 – Valve Opening Direction

| DISTRICT | OPENING DIRECTION |
|-----------------|--------------------------|
| Alton | Right |
| Grafton | Left |
| Cairo | Left |
| Interurban | Right |
| Hardin | Left |
| Lincoln | Left |
| Pekin | Left |
| Peoria | Left |
| Champaign | Left |
| Pontiac | Left |
| Streator | Left |
| Sterling | Left |
| Chicago Metro | Left |
| South Beloit | Left |

D. Acceptable Manufacturers:

- a. Mueller Company
- b. Clow (Not Permitted in Alton/Grafton, Interurban)
- c. U.S. Pipe (Champaign, Streator, Sterling)
- d. American Cast Iron Pipe Company
- e. Val-Matic

2.02. Large Gate Valves

- A. Valves larger than 12” for use in the Alton and Champaign Districts shall be Butterfly valves, not Gate Valves. See Specification 15155.

Table 1 – Valve Opening Direction

| DISTRICT | OPENING DIRECTION |
|-----------------|--------------------------|
| Alton | Right |
| Grafton | Left |
| Cairo | Left |
| Interurban | Right |
| Hardin | Left |
| Lincoln | Left |
| Pekin | Left |
| Peoria | Left |
| Champaign | Left |
| Pontiac | Left |
| Streator | Left |
| Sterling | Left |
| Chicago Metro | Left |
| South Beloit | Left |

- E. Acceptable Manufacturers:
- a. Mueller Company
 - b. Clow (Cairo, Interurban)
 - c. U.S. Pipe
 - d. Val-Matic

Section 15155 – Butterfly Valves

2.01

B.

Table 1 – Valve Opening Direction

| DISTRICT | OPENING DIRECTION |
|-----------------|--------------------------|
| Alton | Right |
| Grafton | Left |
| Cairo | Left |
| Interurban | Right |
| Hardin | Left |
| Lincoln | Left |
| Pekin | Left |
| Peoria | Left |
| Champaign | Left |
| Pontiac | Left |
| Streator | Left |
| Sterling | Left |
| Chicago Metro | Left |
| South Beloit | Left |

H. Acceptable Manufacturers:

- a. Henry Platt (Not Chicago Metro)
- b. DeZurik (Not Chicago Metro)
- c. Mueller (Chicago Metro)
- d. Clow (Chicago Metro)
- e. Val-Matic Corp

Section 15170 – Tapping Sleeves, Saddles, and Valves

2.02 Tapping Valves

A.

Table 1 – Valve Opening Direction

| DISTRICT | OPENING DIRECTION |
|-----------------|--------------------------|
| Alton | Right |
| Grafton | Left |
| Cairo | Left |
| Interurban | Right |
| Hardin | Left |
| Lincoln | Left |
| Pekin | Left |
| Peoria | Left |
| Champaign | Left |
| Pontiac | Left |
| Streator | Left |
| Sterling | Left |
| Chicago Metro | Left |
| South Beloit | Left |

C. Acceptable manufacturers:

- a. ~~McWane (Clow and M&H)~~
- b. ~~AFC (Waterous)~~
- c. U.S. Pipe (Mueller)

2.03 STAINLESS STEEL TAPPING SLEEVES

A. Acceptable Manufacturers:

- a. JCM
- b. Romac Industries

A. 2.04 CONCRETE TAPPING SLEEVES Acceptable Manufacturers:

- a. JCM
- b. Romac Industries

2.05 TAPPING SADDLES

A. Acceptable Manufacturers:

- a. Bronze Service Saddles
 - i. Mueller - BR1B Series
 - ii. Mueller - BR2B Series
 - iii. Mueller – BR1S Series (for use with PVC)
 - iv. A.Y. McDonald C-900 #3895
 - v. A.Y. McDonald DIP #3825
- b. Stainless Service Saddles

- i. Mueller

Section 15180 – Fire Hydrants

2.01 MATERIAL

- B. Hydrants for use in the Alton District shall have a 4 ½ inch valve opening.
- D. Acceptable Manufacturers:
 - a. Mueller Super Centurion ~~Catalog #A421-534-896; 5 1/4 inch valve opening, 4 ½' bury~~
 - b. Waterous Pacer (Chicago Metro)
 - c. Clow Valve Company

3.02 INSTALLATION

- I. Paint Color
 - a. Interurban
 - a. Barrel and Caps – Yellow
 - b. Hydrant
 - i. 6" Main – Red
 - ii. 8" Main – Orange
 - iii. 10" & Above - Green
 - b. Alton – Orange
 - c. Champaign – Orange
 - d. Streator – Red
 - e. Pontiac – Orange
 - f. Cairo – Yellow
 - g. Sterling – Orange
 - h. Chicago Metro - Yellow

Section 15190 – Air Release, Blow-Off Outlets and Related Components

2.01 COMBINATION AIR/VACUUM RELEASE VALVES

- B. Acceptable Manufacturers:
 - a. Henry Pratt
 - b. Val-Matic

2.02 BLOW-OFF FLUSHING HYDRANT ASSEMBLY

- B. Acceptable Manufacturers:

- a. Kupferle Foundry – Tru-Flo Model TF 500
- b. Mueller (Chicago Metro)

Section 15200 - Service Lines

2.01 COPPER SERVICE LINE MATERIAL

Acceptable manufacturers:

- a. Core and Main Provided
 - 1. ¾” and 1” Copper – Type L 60’ Coils
 - 2. 2” Copper – Type K 40’ Coils or 20’ Rigid
- b. Kobe Weiland

2.02 POLYTHYLENE SERVICE LINE MATERIAL

Acceptable manufacturers:

- a. Endot Industries (EndoPure PE-3408 only)
- b. JM Eagle
- c. KWH Pipe
- d. Advanced Drainage Systems

2.03 CORPORATION STOPS

Acceptable manufacturers:

- a. A.Y. McDonald – ¾” and 1” – 74701-22
- b. A.Y. McDonald – 2” – 74701B-22
- c. Mueller - ¾” and 2” – B-25008N
- d. Mueller – ¾” and 1” – P-15008N
- e. Mueller – ¾” and 2” – P-25008N

2.04 CURB STOPS

Acceptable manufacturers:

- a. Mueller
- b. A.Y. McDonald

2.05 CURB BOXES

Acceptable manufacturers:

- a. Mueller
- b. Bingham and Taylor (Champaign and Streator)
- c. Sigma Corp.
- d. A.Y. McDonald

2.06 METER BOX/PIT

Acceptable manufacturers:

- a. Sigma
- b. Mueller (Champaign, Chicago Metro)
- c. A.Y. McDonald (Champaign, Chicago Metro)
- d. Advanced Drainage Systems

2.07 METER BOX FRAME AND LID

Acceptable manufacturers:

- a. Vestal (Not Champaign, Chicago Metro)
- b. Mueller (Champaign, Chicago Metro)
- c. A.Y. McDonald (Champaign, Chicago Metro, Interurban)
- d. Sigma Corp.

2.08 METER SETTER/METER YOKE

Acceptable manufacturers:

- a. A.Y. McDonald
- b. Mueller

2.09 MISCELLANEOUS SERVICE LINE FITTINGS

Acceptable manufacturers:

- a. A.Y. McDonald (Champaign and Interurban)
- b. Ford (Interurban and Alton)
- c. Mueller

END OF SUPPLEMENTAL TECHNICAL SPECIFICATIONS

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

Description.

This work shall consist of the removal and disposal of regulated substances according to Section 669 of the Standard Specifications as revised below.

Contract Specific Sites. The excavated soil and groundwater within the areas listed below shall be managed as either “uncontaminated soil”, hazardous waste, special waste or non-special waste. For stationing, the lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit, whichever is less.

PESA REC Site #29– 2020 Court Street, Pekin, Tazewell County

Station 901+52.71 to Station 903+53.48, 17.4 TO 23.7 FT LT (2020 Court Street, adjoining Sunset Drive southwest of Court Street) (PESA REC Site #29, boring B3) - The engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). COC sampling parameters include: arsenic.

PESA REC Site #34– 2206 Court Street, Pekin, Tazewell County

Station 182+70.44 to Station 183+32.87, 45.1 TO 72.8 FT RT (2206 Court Street, adjoining Court Street and Forest Drive) (PESA REC Site #34, borings B7 & B10) - The engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). COC sampling parameters include: arsenic.

Work Zones. Three distinct OSHA HAZWOPER work zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within sites with documented leaking underground storage tank (LUST) incidents, or sites under management in accordance with the requirements of the Site Remediation Program (SRP), Resource Conservation and Recovery Act (RCRA), or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or as deemed necessary. For this project, the work zones apply for the following ISGS PESA Sites: **Two (PESA REC Sites #29 and #34).**

Additional information on the above sites collected during the Phase I Engineering process is available through the District’s Environmental Studies Unit (DESU).

State of Illinois
Department of Transportation
Bureau of Local Roads and Streets

SPECIAL PROVISION
FOR
INSURANCE

Effective: February 1, 2007
Revised: August 1, 2007

All references to Sections or Articles in this specification shall be construed to mean specific Section or Article of the Standard Specifications for Road and Bridge Construction, adopted by the Department of Transportation.

The Contractor shall name the following entities as additional insured under the Contractor's general liability insurance policy in accordance with Article 107.27:

The entities listed above and their officers, employees, and agents shall be indemnified and held harmless in accordance with Article 107.26.

State of Illinois
Department of Transportation
Bureau of Local Roads and Streets
SPECIAL PROVISION
FOR
CONSTRUCTION AND MAINTENANCE SIGNS

Effective: January 1, 2004
Revised: June 1, 2007

All references to Sections or Articles in this specification shall be construed to mean a specific Section or Article of the Standard Specifications for Road and Bridge Construction, adopted by the Department of Transportation.

701.14. Signs. Add the following paragraph to Article 701.14:

All warning signs shall have minimum dimensions of 1200 mm x 1200 mm (48" x 48") and have a black legend on a fluorescent orange reflectorized background, meeting, as a minimum, Type AP reflectivity requirements of Table 1091-2 in Article 1091.02.

State of Illinois
DEPARTMENT OF TRANSPORTATION
Bureau of Local Roads & Streets
SPECIAL PROVISION
FOR
LOCAL QUALITY ASSURANCE/ QUALITY MANAGEMENT QC/QA
Effective: January 1, 2022

Replace the first five paragraphs of Article 1030.06 of the Standard Specifications with the following:

“1030.06 Quality Management Program. The Quality Management Program (QMP) will be Quality Control / Quality Assurance (QC/QA) according to the following.”

Delete Article 1030.06(d)(1) of the Standard Specifications.

Revise Article 1030.09(g)(3) of the Standard Specifications to read:

“(3) If core testing is the density verification method, the Contractor shall provide personnel and equipment to collect density verification cores for the Engineer. Core locations will be determined by the Engineer following the document “Hot-Mix Asphalt QC/QA Procedure for Determining Random Density Locations” at density verification intervals defined in Article 1030.09(b). After the Engineer identifies a density verification location and prior to opening to traffic, the Contractor shall cut a 4 in. (100 mm) diameter core. With the approval of the Engineer, the cores may be cut at a later time.”

Revise Article 1030.09(h)(2) of the Standard Specifications to read:

“(2) After final rolling and prior to paving subsequent lifts, the Engineer will identify the random density verification test locations. Cores or nuclear density gauge testing will be used for density verification. The method used for density verification will be as selected below.

| Density Verification Method | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | Cores |
| <input type="checkbox"/> | Nuclear Density Gauge (Correlated when paving \geq 3,000 tons per mixture) |

Density verification test locations will be determined according to the document “Hot-Mix Asphalt QC/QA Procedure for Determining Random Density Locations”. The density testing interval for paving wider than or equal to 3 ft (1 m) will be 0.5 miles (800 m) for lift thicknesses of 3 in. (75 mm) or less and 0.2 miles (320 m) for lift thicknesses greater than 3 in. (75 mm). The density testing interval for paving less than 3 ft (1 m) wide will be 1 mile (1,600 m). If a day’s paving will be less than the prescribed density testing interval, the length of the day’s paving will be the interval for that day. The density testing interval for mixtures used for patching will be 50 patches with a minimum of one test per mixture per project.

If core testing is the density verification method, the Engineer will witness the Contractor coring, and secure and take possession of all density samples at the

density verification locations. The Engineer will test the cores collected by the Contractor for density according to Illinois Modified AASHTO T 166 or AASHTO T 275.

If nuclear density gauge testing is the density verification method, the Engineer will conduct nuclear density gauge tests. The Engineer will follow the density testing procedure detailed in the document "Illinois Modified ASTM D 2950, Standard Test Method for Density of Bituminous Concrete In-Place by Nuclear Method".

A density verification test will be the result of a single core or the average of the nuclear density tests at one location. The results of each density test must be within acceptable limits. The Engineer will promptly notify the Contractor of observed deficiencies."

Revise the seventh paragraph and all subsequent paragraphs in Section D. of the document "Hot-Mix Asphalt QC/QA Initial Daily Plant and Random Samples" to read:

"Mixtures shall be sampled from the truck at the plant by the Contractor following the same procedure used to collect QC mixture samples (Section A). This process will be witnessed by the Engineer who will take custody of the verification sample. Each sample bag with a verification mixture sample will be secured by the Engineer using a locking ID tag. Sample boxes containing the verification mixture sample will be sealed/taped by the Engineer using a security ID label."

IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION

Effective: August 1, 2012 Revised: February 2, 2017

In addition to the Contractor's equal employment opportunity (EEO) affirmative action efforts undertaken as required by this Contract, the Contractor is encouraged to participate in the incentive program described below to provide additional on-the-job training to certified graduates of the IDOT pre-apprenticeship training program, as outlined in this Special Provision.

IDOT funds, and various Illinois community colleges operate, pre-apprenticeship training programs throughout the State to provide training and skill-improvement opportunities to promote the increased employment of minority groups, disadvantaged persons and women in all aspects of the highway construction industry. The intent of this IDOT Pre-Apprenticeship Training Program Graduate (TPG) special provision (Special Provision) is to place these certified program graduates on the project site for this Contract in order to provide the graduates with meaningful on-the-job training. Pursuant to this Special Provision, the Contractor must make every reasonable effort to recruit and employ certified TPG trainees to the extent such individuals are available within a practicable distance of the project site.

Specifically, participation of the Contractor or its subcontractor in the Program entitles the participant to reimbursement for graduates' hourly wages at \$15.00 per hour per utilized TPG trainee, subject to the terms of this Special Provision. Reimbursement payment will be made even though the Contractor or subcontractor may also receive additional training program funds from other non-IDOT sources for other non-TPG trainees on the Contract, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving reimbursement from another entity through another program, such as IDOT through the TPG program. With regard to any IDOT funded construction training program other than TPG, however, additional reimbursement for other IDOT programs will not be made beyond the TPG Program described in this Special Provision when the TPG Program is utilized.

No payment will be made to the Contractor if the Contractor or subcontractor fails to provide the required on-site training to TPG trainees, as solely determined by IDOT. A TPG trainee must begin training on the project as soon as the start of work that utilizes the relevant trade skill and the TPG trainee must remain on the project site through completion of the Contract, so long as training opportunities continue to exist in the relevant work classification. Should a TPG trainee's employment end in advance of the completion of the Contract, the Contractor must promptly notify the IDOT District EEO Officer for the Contract that the TPG's involvement in the Contract has ended. The Contractor must supply a written report for the reason the TPG trainee involvement terminated, the hours completed by the TPG trainee on the Contract, and the number of hours for which the incentive payment provided under this Special Provision will be, or has been claimed for the separated TPG trainee.

Finally, the Contractor must maintain all records it creates as a result of participation in the Program on the Contract, and furnish periodic written reports to the IDOT District EEO Officer that document its contractual performance under and compliance with this Special Provision. Finally, through participation in the Program and reimbursement of wages, the Contractor is not relieved of, and IDOT has not waived, the requirements of any federal or state labor or employment law applicable to TPG workers, including compliance with the Illinois Prevailing Wage Act.

METHOD OF MEASUREMENT: The unit of measurement is in hours.

BASIS OF PAYMENT: This work will be paid for at the contract unit price of \$15.00 per hour for each utilized certified TPG Program trainee (TRAINEES TRAINING PROGRAM GRADUATE). The estimated total number of hours, unit price, and total price must be included in the schedule of prices for the Contract submitted by Contractor prior to beginning work. The initial number of TPG trainees for which the incentive is available for this contract is 2.

The Department has contracted with several educational institutions to provide screening, tutoring and pre-training to individuals interested in working as a TPG trainee in various areas of common construction trade work. Only individuals who have successfully completed a Pre-Apprenticeship Training Program at these IDOT approved institutions are eligible to be TPG trainees. To obtain a list of institutions that can connect the Contractor with eligible TPG trainees, the Contractor may contact: HCCTP TPG Program Coordinator, Office of Business and Workforce Diversity (IDOT OBWD), Room 319, Illinois Department of Transportation, 2300 S. Dirksen Parkway, Springfield, Illinois 62764. Prior to commencing construction with the utilization of a TPG trainee, the Contractor must submit documentation to the IDOT District EEO Officer for the Contract that provides the names and contact information of the TPG trainee(s) to be trained in each selected work classification, proof that that the TPG trainee(s) has successfully completed a Pre-Apprenticeship Training Program, proof that the TPG is in an Apprenticeship Training Program approved by the U.S. Department of Labor Bureau of Apprenticeship Training, and the start date for training in each of the applicable work classifications.

To receive payment, the Contractor must provide training opportunities aimed at developing a full journeyworker in the type of trade or job classification involved. During the course of performance of the Contract, the Contractor may seek approval from the IDOT District EEO Officer to employ additional eligible TPG trainees. In the event the Contractor subcontracts a portion of the contracted work, it must determine how many, if any, of the TPGs will be trained by the subcontractor. Though a subcontractor may conduct training, the Contractor retains the responsibility for meeting all requirements imposed by this Special Provision. The Contractor must also include this Special Provision in any subcontract where payment for contracted work performed by a TPG trainee will be passed on to a subcontractor.

Training through the Program is intended to move TPGs toward journeyman status, which is the primary objective of this Special Provision. Accordingly, the Contractor must make every effort to enroll TPG trainees by recruitment through the Program participant educational institutions to the extent eligible TPGs are available within a reasonable geographic area of the project. The Contractor is responsible for demonstrating, through documentation, the recruitment efforts it has undertaken prior to the determination by IDOT whether the Contractor is in compliance with this Special Provision, and therefore, entitled to the Training Program Graduate reimbursement of \$15.00 per hour.

Notwithstanding the on-the-job training requirement of this TPG Special Provision, some minimal off-site training is permissible as long as the offsite training is an integral part of the work of the contract, and does not compromise or conflict with the required on-site training that is central to the purpose of the Program. No individual may be employed as a TPG trainee in any work classification in which he/she has previously successfully completed a training program leading to journeyman status in any trade, or in which he/she has worked at a journeyman level or higher.

ACCESSIBLE PEDESTRIAN SIGNALS (APS) (BDE)

Effective: April 1, 2003

Revised: January 1, 2022

Description. This work shall consist of furnishing and installing accessible pedestrian signals (APS). Each APS shall consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a light emitting diode (LED) indicator light, a solid-state electronic control board, a power supply, wiring, and mounting hardware. The APS shall meet the requirements of the MUTCD and Sections 801 and 888 of the Standard Specifications, except as modified herein.

Electrical Requirements. The APS shall operate with systems providing 95 to 130 VAC, 60 Hz and throughout an ambient air temperature range of -29 to +160 °F (-34 to +70 °C).

The APS shall contain a power protection circuit consisting of both fuse and transient protection.

Audible Indications. A pushbutton locator tone shall sound at each pushbutton and shall be deactivated during the associated walk indication and when associated traffic signals are in flashing mode. Pushbutton locator tones shall have a duration of 0.15 seconds or less and shall repeat at 1-second intervals. Each actuation of the pushbutton shall be accompanied by the speech message "Wait".

If two accessible pedestrian pushbuttons are placed less than 10 ft (3 m) apart or placed on the same pole, the audible walk indication shall be a speech walk message. This message shall sound throughout the WALK interval only. The verbal message shall be modeled after: "Street Name. Walk Sign is on to cross Street Name." For signalized intersections utilizing exclusive pedestrian phasing, the verbal message shall be "Walk sign is on for all crossings". In addition, a speech pushbutton information message shall be provided by actuating the APS pushbutton when the WALK interval is not timing. This verbal message shall be modeled after: "Wait. Wait to cross 'Street Name' at 'Street Name'".

Where two accessible pedestrian pushbuttons are separated by at least 10 ft (3 m), the walk indication shall be an audible percussive tone. It shall repeat at 8 to 10 ticks per second with a dominant frequency of 880 Hz.

Automatic volume adjustments in response to ambient traffic sound level shall be provided up to a maximum volume of 100 dBA. Locator tone and verbal messages shall be no more than 5 dB louder than ambient sound.

At locations with railroad interconnection, an additional speech message stating "Walk time shortened when train approaches" shall be used after the speech walk message. At locations with emergency vehicle preemption, an additional speech message "Walk time shortened when emergency vehicle approaches" shall be used after the speech walk message.

Pedestrian Pushbutton. Pedestrian pushbuttons shall be at least 2 in. (50 mm) in diameter or width. The force required to activate the pushbutton shall be no greater than 3.5 lb (15.5 N).

A red LED shall be located on or near the pushbutton which, when activated, acknowledges the pedestrians request to cross the street.

Signage. A sign shall be located immediately above the pedestrian pushbutton and parallel to the crosswalk controlled by the pushbutton. The sign shall conform to one of the following standard MUTCD designs: R10-3, R10-3a, R10-3e, R10-3i, R10-4, and R10-4a.

Tactile Arrow. A tactile arrow, pointing in the direction of travel controlled by a pushbutton, shall be provided on the pushbutton.

Vibrotactile Feature. The pushbutton shall pulse when depressed and shall vibrate continuously throughout the WALK interval.

Method of Measurement. This work will be measured for payment as each, per pushbutton.

Basis of Payment. This work will be paid for at the contract unit price per each for ACCESSIBLE PEDESTRIAN SIGNALS.

80099

BLENDED FINELY DIVIDED MINERALS (BDE)

Effective: April 1, 2021

Revise the second paragraph of Article 1010.01 of the Standard Specifications to read:

“Different sources or types of finely divided minerals shall not be mixed or used alternately in the same item of construction, except as a blended finely divided mineral product according to Article 1010.06.”

Add the following article to Section 1010 of the Standard Specifications:

“1010.06 Blended Finely Divided Minerals. Blended finely divided minerals shall be the product resulting from the blending or intergrinding of two or three finely divided minerals. Blended finely divided minerals shall be according to ASTM C 1697, except as follows.

- (a) Blending shall be accomplished by mechanically or pneumatically intermixing the constituent finely divided minerals into a uniform mixture that is then discharged into a silo for storage or tanker for transportation.
- (b) The blended finely divided mineral product will be classified according to its predominant constituent or the manufacturer’s designation and shall meet the chemical requirements of its classification. The other finely divided mineral constituent(s) will not be required to conform to their individual standards.”

80436

CEMENT, TYPE IL (BDE)

Effective: August 1, 2023

Add the following to Article 302.02 of the Standard Specifications:

“(k) Type IL Portland-Limestone Cement1001”

Revise Note 2 of Article 352.02 of the Standard Specifications to read:

“Note 2. Either Type I or Type IA portland cement or Type IL portland-limestone cement shall be used.”

Revise Note 1 of Article 404.02 of the Standard Specifications to read:

“Note 1. The cement shall be Type I portland cement or Type IL portland-limestone cement.”

Revise Article 1019.02(a) of the Standard Specifications to read:

“(a) Cement, Type I or IL1001”

80449

COMPENSABLE DELAY COSTS (BDE)

Effective: June 2, 2017

Revised: April 1, 2019

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days.”

Revise Article 107.40(c) of the Standard Specifications to read:

“(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the

Contractor's yard or another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13.”

Revise Article 108.04(b) of the Standard Specifications to read:

“(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item.”

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) Basis of Payment. After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead

other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

“109.13 Payment for Contract Delay. Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

| Contract Type | Cause of Delay | Length of Delay |
|-----------------|--|---|
| Working Days | Article 108.04(b)(3) or Article 108.04(b)(4) | No working days have been charged for two consecutive weeks. |
| Completion Date | Article 108.08(b)(1) or Article 108.08(b)(7) | The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08. |

Payment for each of the various costs will be according to the following.

- (a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.
- (b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.
 - (1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

| Original Contract Amount | Supervisory and Administrative Personnel |
|--|--|
| Up to \$5,000,000 | One Project Superintendent |
| Over \$ 5,000,000 - up to \$25,000,000 | One Project Manager, One Project Superintendent or Engineer, and One Clerk |
| Over \$25,000,000 - up to \$50,000,000 | One Project Manager, One Project Superintendent, One Engineer, and |

| | |
|-------------------|--|
| | One Clerk |
| Over \$50,000,000 | One Project Manager, Two Project Superintendents, One Engineer, and One Clerk |

(2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.

(c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid for according to Article 109.04.

When an extended traffic control adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department's efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision."

80384

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: March 2, 2019

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a

good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform _____% of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents enough DBE participation has been obtained to meet the goal or,
- (b) The bidder documents a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:

<http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement and failure of the bidder to comply will render the bid not responsive.

The bidder shall submit a DBE Utilization Plan (form SBE 2026), and a DBE Participation Statement (form SBE 2025) for each DBE company proposed for the performance of work to achieve the contract goal, with the bid. If the Utilization Plan indicates the contract goal will not be met, documentation of good faith efforts shall also be submitted. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract. The required forms and documentation must be submitted as a single .pdf file using the "Integrated Contractor Exchange (iCX)" application within the Department's "EBids System".

The Department will not accept a Utilization Plan if it does not meet the bidding procedures set forth herein and the bid will be declared not responsive. In the event the bid is declared not responsive, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty and may deny authorization to bid the project if re-advertised for bids.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan is approved. All information submitted by the bidder must be complete, accurate and adequately document enough DBE participation has been obtained or document the good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. This means the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts the bidder has made. Mere *pro forma* efforts, in other words efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases and will be considered by the Department.
 - (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.
 - (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

- (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.
 - b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.
- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
 - (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
 - (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
 - (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- (b) If the Department determines the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided it is otherwise eligible for award. If the Department determines the

bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification will also include a statement of reasons for the adverse determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period to cure the deficiency.

- (c) The bidder may request administrative reconsideration of an adverse determination by emailing the Department at "DOT.DBE.UP@illinois.gov" within the five calendar days after the receipt of the notification of the determination. The determination shall become final if a request is not made on or before the fifth calendar day. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be reviewed by the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

- (a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.
- (b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

- (c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

- (d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:
 - (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 - (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement.

- (e) DBE as a material supplier:
 - (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
 - (2) 100 percent goal credit for the cost of materials or supplies obtained from a DBE manufacturer.
 - (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be emailed to the Department at DOT.DBE.UP@illinois.gov.
- (b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, a new Request for Approval of Subcontractor will not be required. However, the Contractor must document efforts to assure the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.
- (c) SUBCONTRACT. The Contractor must provide copies of DBE subcontracts to the Department upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.
- (d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:
- (1) The replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
 - (2) The DBE is aware its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
 - (3) The DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

- (e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;
- (3) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.

- (6) The Contractor has determined the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides written notice to the Contractor of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

- (f) FINAL PAYMENT. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than 30 calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be

made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

- (h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of “Good Faith Effort Procedures” of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

80029

PERFORMANCE GRADED ASPHALT BINDER (BDE)

Effective: January 1, 2023

Revise Article 1032.05 of the Standard Specifications to read:

“1032.05 Performance Graded Asphalt Binder. These materials will be accepted according to the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure.” The Department will maintain a qualified producer list. These materials shall be free from water and shall not foam when heated to any temperature below the actual flash point. Air blown asphalt, recycle engine oil bottoms (ReOB), and polyphosphoric acid (PPA) modification shall not be used.

When requested, producers shall provide the Engineer with viscosity/temperature relationships for the performance graded asphalt binders delivered and incorporated in the work.

- (a) Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 “Standard Specification for Performance Graded Asphalt Binder” for the grade shown on the plans and the following.

| Test | Parameter |
|---|------------|
| Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs) | -5 °C min. |

- (b) Modified Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 “Standard Specification for Performance Graded Asphalt Binder” for the grade shown on the plans.

Asphalt binder modification shall be performed at the source, as defined in the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure.”

Modified asphalt binder shall be safe to handle at asphalt binder production and storage temperatures or HMA construction temperatures. Safety Data Sheets (SDS) shall be provided for all asphalt modifiers.

- (1) Polymer Modification (SB/SBS or SBR). Elastomers shall be added to the base asphalt binder to achieve the specified performance grade and shall be either a styrene-butadiene diblock, triblock copolymer without oil extension, or a styrene-butadiene rubber. The polymer modified asphalt binder shall be smooth, homogeneous, and be according to the requirements shown in Table 1 or 2 for the grade shown on the plans.

| Table 1 - Requirements for Styrene-Butadiene Copolymer (SB/SBS) Modified Asphalt Binders | | |
|---|---|---|
| Test | Asphalt Grade SB/SBS PG 64-28 SB/SBS PG 70-22 | Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SB/SBS PG 76-22 SB/SBS PG 76-28 |
| Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions | 4 (2) max. | 4 (2) max. |
| TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240) | | |
| Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, % | 60 min. | 70 min. |

| Table 2 - Requirements for Styrene-Butadiene Rubber (SBR) Modified Asphalt Binders | | |
|---|---|---|
| Test | Asphalt Grade SBR PG 64-28 SBR PG 70-22 | Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SBR PG 76-22 SBR PG 76-28 |
| Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions | 4 (2) max. | 4 (2) max. |
| Toughness ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m) | 110 (12.5) min. | 110 (12.5) min. |
| Tenacity ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m) | 75 (8.5) min. | 75 (8.5) min. |
| TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240) | | |
| Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, % | 40 min. | 50 min. |

- (2) Ground Tire Rubber (GTR) Modification. GTR modification is the addition of recycled ground tire rubber to liquid asphalt binder to achieve the specified performance grade. GTR shall be produced from processing automobile and/or truck tires by the ambient

grinding method or micronizing through a cryogenic process. GTR shall not exceed 1/16 in. (2 mm) in any dimension and shall not contain free metal particles, moisture that would cause foaming of the asphalt, or other foreign materials. A mineral powder (such as talc) meeting the requirements of AASHTO M 17 may be added, up to a maximum of four percent by weight of GTR to reduce sticking and caking of the GTR particles. When tested in accordance with Illinois Modified AASHTO T 27 “Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates” or AASHTO PP 74 “Standard Practice for Determination of Size and Shape of Glass Beads Used in Traffic Markings by Means of Computerized Optical Method”, a 50 g sample of the GTR shall conform to the following gradation requirements.

| Sieve Size | Percent Passing |
|------------------|-----------------|
| No. 16 (1.18 mm) | 100 |
| No. 30 (600 µm) | 95 ± 5 |
| No. 50 (300 µm) | > 20 |

GTR modified asphalt binder shall be tested for rotational viscosity according to AASHTO T 316 using spindle S27. GTR modified asphalt binder shall be tested for original dynamic shear and RTFO dynamic shear according to AASHTO T 315 using a gap of 2 mm.

The GTR modified asphalt binder shall meet the requirements of Table 3.

| Table 3 - Requirements for Ground Tire Rubber (GTR) Modified Asphalt Binders | | |
|--|---|---|
| Test | Asphalt Grade GTR PG 64-28 GTR PG 70-22 | Asphalt Grade GTR PG 76-22 GTR PG 76-28 GTR PG 70-28 |
| TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240) | | |
| Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, % | 60 min. | 70 min. |

- (3) Softener Modification (SM). Softener modification is the addition of organic compounds, such as engineered flux, bio-oil blends, modified vegetable oils, glycol amines, and fatty acid derivatives, to the base asphalt binder to achieve the specified performance grade. Softeners shall be dissolved, dispersed, or reacted in the asphalt binder to enhance its performance and shall remain compatible with the asphalt binder with no separation. Softeners shall not be added to modified PG asphalt binder as defined in Articles 1032.05(b)(1) or 1032.05(b)(2).

An Attenuated Total Reflectance-Fourier Transform Infrared spectrum (ATR-FTIR) shall be collected for both the softening compound as well as the softener modified

asphalt binder at the dose intended for qualification. The ATR-FTIR spectra shall be collected on unaged softener modified binder, 20-hour Pressurized Aging Vessel (PAV) aged softener modified binder, and 40-hour PAV aged softener modified binder. The ATR-FTIR shall be collected in accordance with Illinois Test Procedure 601. The electronic files spectral files (in one of the following extensions or equivalent: *.SPA, *.SPG, *.IRD, *.IFG, *.CSV, *.SP, *.IRS, *.GAML, *. [0-9], *.IGM, *.ABS, *.DRT, *.SBM, *.RAS) shall be submitted to the Central Bureau of Materials.

Softener modified asphalt binders shall meet the requirements in Table 4.

| Test | Asphalt Grade | |
|--|---------------|-------------|
| | SM PG 46-28 | SM PG 46-34 |
| | SM PG 52-28 | SM PG 52-34 |
| | SM PG 58-22 | SM PG 58-28 |
| | SM PG 64-22 | |
| Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs) | -5°C min. | |
| Large Strain Parameter (Illinois Modified AASHTO T 391) DSR/LAS Fatigue Property, $\Delta G^* _{peak}$, 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs) | ≥ 54 % | |

The following grades may be specified as tack coats.

| Asphalt Grade | Use |
|------------------------------|-----------|
| PG 58-22, PG 58-28, PG 64-22 | Tack Coat |

Revise Article 1031.06(c)(1) and 1031.06(c)(2) of the Standard Specifications to read:

“(1) RAP/RAS. When RAP is used alone or RAP is used in conjunction with RAS, the percentage of virgin ABR shall not exceed the amounts listed in the following table.

| Ndesign | Binder | Surface | Polymer Modified Binder or Surface ^{3/} |
|---------|--------|---------|--|
| 30 | 30 | 30 | 10 |
| 50 | 25 | 15 | 10 |
| 70 | 15 | 10 | 10 |
| 90 | 10 | 10 | 10 |

1/ For Low ESAL HMA shoulder and stabilized subbase, the RAP/RAS ABR shall not exceed 50 percent of the mixture.

- 2/ When RAP/RAS ABR exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
 - 3/ The maximum ABR percentages for ground tire rubber (GTR) modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.
- (2) FRAP/RAS. When FRAP is used alone or FRAP is used in conjunction with RAS, the percentage of virgin asphalt binder replacement shall not exceed the amounts listed in the following table.

| HMA Mixtures - FRAP/RAS Maximum ABR % ^{1/2/} | | | |
|---|--------|---------|--|
| Ndesign | Binder | Surface | Polymer Modified Binder or Surface ^{3/} |
| 30 | 55 | 45 | 15 |
| 50 | 45 | 40 | 15 |
| 70 | 45 | 35 | 15 |
| 90 | 45 | 35 | 15 |
| SMA | -- | -- | 25 |
| IL-4.75 | -- | -- | 35 |

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the FRAP/RAS ABR shall not exceed 50 percent of the mixture.
- 2/ When FRAP/RAS ABR exceeds 20 percent for all mixes, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ The maximum ABR percentages for GTR modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.”

Add the following to the end of Note 2 of Article 1030.03 of the Standard Specifications.

“A dedicated storage tank for the ground tire rubber (GTR) modified asphalt binder shall be provided. This tank shall be capable of providing continuous mechanical mixing throughout and/or recirculation of the asphalt binder to provide a uniform mixture. The tank shall be heated and capable of maintaining the temperature of the asphalt binder at 300 °F to 350 °F (149 °C to 177 °C). The asphalt binder metering systems of dryer drum plants shall be calibrated with the actual GTR modified asphalt binder material with an accuracy of ±0.40 percent.”

PORTLAND CEMENT CONCRETE (BDE)

Effective: August 1, 2023

Revise the second paragraph of Article 1103.03(a)(4) the Standard Specifications to read:

“The dispenser system shall provide a visual indication that the liquid admixture is actually entering the batch, such as via a transparent or translucent section of tubing or by independent check with an integrated secondary metering device. If approved by the Engineer, an alternate indicator may be used for admixtures dosed at rates of 25 oz/cwt (1630 mL/100 kg) or greater, such as accelerating admixtures, corrosion inhibitors, and viscosity modifying admixtures.”

80451

SEEDING (BDE)

Effective: November 1, 2022

Revise Article 250.07 of the Standard Specifications to read:

“250.07 Seeding Mixtures. The classes of seeding mixtures and combinations of mixtures will be designated in the plans.

When an area is to be seeded with two or more seeding classes, those mixtures shall be applied separately on the designated area within a seven day period. Seeding shall occur prior to placement of mulch cover. A Class 7 mixture can be applied at any time prior to applying any seeding class or added to them and applied at the same time.

| TABLE 1 - SEEDING MIXTURES | | |
|---|---|----------------------|
| Class - Type | Seeds | lb/acre (kg/hectare) |
| 1 Lawn Mixture 1/ | Kentucky Bluegrass | 100 (110) |
| | Perennial Ryegrass | 60 (70) |
| | <i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue) | 40 (50) |
| 1A Salt Tolerant Lawn Mixture 1/ | Kentucky Bluegrass | 60 (70) |
| | Perennial Ryegrass | 20 (20) |
| | <i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue) | 20 (20) |
| | <i>Festuca brevipila</i> (Hard Fescue) | 20 (20) |
| | <i>Puccinellia distans</i> (Fulfs Saltgrass or Salty Alkaligrass) | 60 (70) |
| 1B Low Maintenance Lawn Mixture 1/ | Turf-Type Fine Fescue 3/ | 150 (170) |
| | Perennial Ryegrass | 20 (20) |
| | Red Top | 10 (10) |
| | <i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue) | 20 (20) |
| 2 Roadside Mixture 1/ | <i>Lolium arundinaceum</i> (Tall Fescue) | 100 (110) |
| | Perennial Ryegrass | 50 (55) |
| | <i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue) | 40 (50) |
| | Red Top | 10 (10) |
| 2A Salt Tolerant Roadside Mixture 1/ | <i>Lolium arundinaceum</i> (Tall Fescue) | 60 (70) |
| | Perennial Ryegrass | 20 (20) |
| | <i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue) | 30 (20) |
| | <i>Festuca brevipila</i> (Hard Fescue) | 30 (20) |
| | <i>Puccinellia distans</i> (Fulfs Saltgrass or Salty Alkaligrass) | 60 (70) |
| 3 Northern Illinois Slope Mixture 1/ | <i>Elymus canadensis</i> (Canada Wild Rye) 5/ | 5 (5) |
| | Perennial Ryegrass | 20 (20) |
| | Alsike Clover 4/ | 5 (5) |
| | <i>Desmanthus illinoensis</i> (Illinois Bundleflower) 4/ 5/ | 2 (2) |
| | <i>Schizachyrium scoparium</i> (Little Bluestem) 5/ | 12 (12) |
| | <i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/ | 10 (10) |
| | <i>Puccinellia distans</i> (Fulfs Saltgrass or Salty Alkaligrass) | 30 (35) |
| | Oats, Spring | 50 (55) |
| | Slender Wheat Grass 5/ | 15 (15) |
| | Buffalo Grass 5/ 7/ | 5 (5) |
| | 3A Southern Illinois Slope Mixture 1/ | Perennial Ryegrass |
| <i>Elymus canadensis</i> (Canada Wild Rye) 5/ | | 20 (20) |
| <i>Panicum virgatum</i> (Switchgrass) 5/ | | 10 (10) |
| <i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ | | 12 (12) |
| <i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/ | | 10 (10) |
| <i>Dalea candida</i> (White Prairie Clover) 4/ 5/ | | 5 (5) |
| <i>Rudbeckia hirta</i> (Black-Eyed Susan) 5/ | | 5 (5) |
| Oats, Spring | | 50 (55) |

| Class – Type | Seeds | lb/acre (kg/hectare) |
|--|---|---|
| 4 Native Grass 2/ 6/ | <i>Andropogon gerardi</i> (Big Blue Stem) 5/ | 4 (4) |
| | <i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ | 5 (5) |
| | <i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/ | 5 (5) |
| | <i>Elymus canadensis</i> (Canada Wild Rye) 5/ | 1 (1) |
| | <i>Panicum virgatum</i> (Switch Grass) 5/ | 1 (1) |
| | <i>Sorghastrum nutans</i> (Indian Grass) 5/ | 2 (2) |
| | Annual Ryegrass | 25 (25) |
| | Oats, Spring | 25 (25) |
| | Perennial Ryegrass | 15 (15) |
| | 4A Low Profile Native Grass 2/ 6/ | <i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ |
| <i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/ | | 5 (5) |
| <i>Elymus canadensis</i> (Canada Wild Rye) 5/ | | 1 (1) |
| <i>Sporobolus heterolepis</i> (Prairie Dropseed) 5/ | | 0.5 (0.5) |
| Annual Ryegrass | | 25 (25) |
| Oats, Spring | | 25 (25) |
| Perennial Ryegrass | | 15 (15) |
| 4B Wetland Grass and Sedge Mixture 2/ 6/ | Annual Ryegrass | 25 (25) |
| | Oats, Spring | 25 (25) |
| | Wetland Grasses (species below) 5/ | 6 (6) |
| <u>Species:</u> | | <u>% By Weight</u> |
| <i>Calamagrostis canadensis</i> (Blue Joint Grass) | | 12 |
| <i>Carex lacustris</i> (Lake-Bank Sedge) | | 6 |
| <i>Carex slipata</i> (Awl-Fruited Sedge) | | 6 |
| <i>Carex stricta</i> (Tussock Sedge) | | 6 |
| <i>Carex vulpinoidea</i> (Fox Sedge) | | 6 |
| <i>Eleocharis acicularis</i> (Needle Spike Rush) | | 3 |
| <i>Eleocharis obtusa</i> (Blunt Spike Rush) | | 3 |
| <i>Glyceria striata</i> (Fowl Manna Grass) | | 14 |
| <i>Juncus effusus</i> (Common Rush) | | 6 |
| <i>Juncus tenuis</i> (Slender Rush) | | 6 |
| <i>Juncus torreyi</i> (Torrey's Rush) | | 6 |
| <i>Leersia oryzoides</i> (Rice Cut Grass) | | 10 |
| <i>Scirpus acutus</i> (Hard-Stemmed Bulrush) | | 3 |
| <i>Scirpus atrovirens</i> (Dark Green Rush) | | 3 |
| <i>Bolboschoenus fluviatilis</i> (River Bulrush) | | 3 |
| <i>Schoenoplectus tabernaemontani</i> (Softstem Bulrush) | | 3 |
| <i>Spartina pectinata</i> (Cord Grass) | | 4 |

| Class – Type | Seeds | lb/acre (kg/hectare) |
|--------------|---|---|
| 5 | Forb with Annuals Mixture 2/ 5/ 6/ | Annuals Mixture (Below) Forb Mixture (Below) |
| | | 1 (1) 10 (10) |
| | Annuals Mixture - Mixture not exceeding 25 % by weight of any one species, of the following: | |
| | <i>Coreopsis lanceolata</i> (Sand Coreopsis) <i>Leucanthemum maximum</i> (Shasta Daisy) <i>Gaillardia pulchella</i> (Blanket Flower) <i>Ratibida columnifera</i> (Prairie Coneflower) <i>Rudbeckia hirta</i> (Black-Eyed Susan) | |
| | Forb Mixture - Mixture not exceeding 5 % by weight PLS of any one species, of the following: | |
| | <i>Amorpha canescens</i> (Lead Plant) 4/ <i>Anemone cylindrica</i> (Thimble Weed) <i>Asclepias tuberosa</i> (Butterfly Weed) <i>Aster azureus</i> (Sky Blue Aster) <i>Symphotrichum leave</i> (Smooth Aster) <i>Aster novae-angliae</i> (New England Aster) <i>Baptisia leucantha</i> (White Wild Indigo) 4/ <i>Coreopsis palmata</i> (Prairie Coreopsis) <i>Echinacea pallida</i> (Pale Purple Coneflower) <i>Eryngium yuccifolium</i> (Rattlesnake Master) <i>Helianthus mollis</i> (Downy Sunflower) <i>Heliopsis helianthoides</i> (Ox-Eye) <i>Liatris aspera</i> (Rough Blazing Star) <i>Liatris pycnostachya</i> (Prairie Blazing Star) <i>Monarda fistulosa</i> (Prairie Bergamot) <i>Parthenium integrifolium</i> (Wild Quinine) <i>Dalea candida</i> (White Prairie Clover) 4/ <i>Dalea purpurea</i> (Purple Prairie Clover) 4/ <i>Physostegia virginiana</i> (False Dragonhead) <i>Potentilla arguta</i> (Prairie Cinquefoil) <i>Ratibida pinnata</i> (Yellow Coneflower) <i>Rudbeckia subtomentosa</i> (Fragrant Coneflower) <i>Silphium laciniatum</i> (Compass Plant) <i>Silphium terebinthinaceum</i> (Prairie Dock) <i>Oligoneuron rigidum</i> (Rigid Goldenrod) <i>Tradescantia ohiensis</i> (Spiderwort) <i>Veronicastrum virginicum</i> (Culver's Root) | |

| Class – Type | Seeds | lb/acre (kg/hectare) |
|---|--|--|
| 5A Large Flower Native Forb Mixture 2/ 5/ 6/ | Forb Mixture (see below) | 5 (5) |
| | <u>Species:</u> | <u>% By Weight</u> |
| | <i>Aster novae-angliae</i> (New England Aster) | 5 |
| | <i>Echinacea pallida</i> (Pale Purple Coneflower) | 10 |
| | <i>Helianthus mollis</i> (Downy Sunflower) | 10 |
| | <i>Heliopsis helianthoides</i> (Ox-Eye) | 10 |
| | <i>Liatris pycnostachya</i> (Prairie Blazing Star) | 10 |
| | <i>Ratibida pinnata</i> (Yellow Coneflower) | 5 |
| | <i>Rudbeckia hirta</i> (Black-Eyed Susan) | 10 |
| | <i>Silphium laciniatum</i> (Compass Plant) | 10 |
| | <i>Silphium terebinthinaceum</i> (Prairie Dock) | 20 |
| | <i>Oligoneuron rigidum</i> (Rigid Goldenrod) | 10 |
| 5B Wetland Forb 2/ 5/ 6/ | Forb Mixture (see below) | 2 (2) |
| | <u>Species:</u> | <u>% By Weight</u> |
| | <i>Acorus calamus</i> (Sweet Flag) | 3 |
| | <i>Angelica atropurpurea</i> (Angelica) | 6 |
| | <i>Asclepias incarnata</i> (Swamp Milkweed) | 2 |
| | <i>Aster puniceus</i> (Purple Stemmed Aster) | 10 |
| | <i>Bidens cernua</i> (Beggarticks) | 7 |
| | <i>Eutrochium maculatum</i> (Spotted Joe Pye Weed) | 7 |
| | <i>Eupatorium perfoliatum</i> (Boneset) | 7 |
| | <i>Helenium autumnale</i> (Autumn Sneezeweed) | 2 |
| | <i>Iris virginica shrevei</i> (Blue Flag Iris) | 2 |
| | <i>Lobelia cardinalis</i> (Cardinal Flower) | 5 |
| | <i>Lobelia siphilitica</i> (Great Blue Lobelia) | 5 |
| | <i>Lythrum alatum</i> (Winged Loosestrife) | 2 |
| | <i>Physostegia virginiana</i> (False Dragonhead) | 5 |
| | <i>Persicaria pensylvanica</i> (Pennsylvania Smartweed) | 10 |
| | <i>Persicaria lapathifolia</i> (Curlytop Knotweed) | 10 |
| | <i>Pycnanthemum virginianum</i> (Mountain Mint) | 5 |
| | <i>Rudbeckia laciniata</i> (Cut-leaf Coneflower) | 5 |
| | <i>Oligoneuron riddellii</i> (Riddell Goldenrod) | 2 |
| | <i>Sparganium eurycarpum</i> (Giant Burreed) | 5 |
| 6 Conservation Mixture 2/ 6/ | <i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ <i>Elymus canadensis</i> (Canada Wild Rye) 5/ Buffalo Grass 5/ 7/ Vernal Alfalfa 4/ Oats, Spring | 5 (5) 2 (2) 5 (5) 15 (15) 48 (55) |
| 6A Salt Tolerant Conservation Mixture 2/ 6/ | <i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ <i>Elymus canadensis</i> (Canada Wild Rye) 5/ Buffalo Grass 5/ 7/ Vernal Alfalfa 4/ Oats, Spring <i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass) | 5 (5) 2 (2) 5 (5) 15 (15) 48 (55) 20 (20) |
| 7 Temporary Turf Cover Mixture | Perennial Ryegrass Oats, Spring | 50 (55) 64 (70) |

Notes:

- 1/ Seeding shall be performed when the ambient temperature has been between 45 °F (7 °C) and 80 °F (27 °C) for a minimum of seven (7) consecutive days and is forecasted to be the same for the next five (5) days according to the National Weather Service.
- 2/ Seeding shall be performed in late fall through spring beginning when the ambient temperature has been below 45 °F (7 °C) for a minimum of seven (7) consecutive days and ending when the ambient temperature exceeds 80 °F (27 °C) according to the National Weather Service.
- 3/ Specific variety as shown in the plans or approved by the Engineer.
- 4/ Inoculation required.
- 5/ Pure Live Seed (PLS) shall be used.
- 6/ Fertilizer shall not be used.
- 7/ Seed shall be primed with KNO_3 to break dormancy and dyed to indicate such.

Seeding will be inspected after a period of establishment. The period of establishment shall be six (6) months minimum, but not to exceed nine (9) months. After the period of establishment, areas not exhibiting 75 percent uniform growth shall be interseeded or reseeded, as determined by the Engineer, at no additional cost to the Department.”

80445

SOURCE OF SUPPLY AND QUALITY REQUIREMENTS (BDE)

Effective: January 2, 2023

Add the following to Article 106.01 of the Standard Specifications:

“The final manufacturing process for construction materials and the immediately preceding manufacturing stage for construction materials shall occur within the United States. Construction materials shall include an article, material, or supply that is or consists primarily of the following.

- (a) Non-ferrous metals;
- (b) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- (c) Glass (including optic glass);
- (d) Lumber;
- (e) Drywall.

Items consisting of two or more of the listed construction materials that have been combined through a manufacturing process, and items including at least one of the listed materials combined with a material that is not listed through a manufacturing process shall be exempt.”

80448

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.
The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

80397

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017

Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

| Value of Subcontract Reported on Form BC 260A | Mobilization Percentage |
|---|-------------------------|
| Less than \$10,000 | 25% |
| \$10,000 to less than \$20,000 | 20% |
| \$20,000 to less than \$40,000 | 18% |
| \$40,000 to less than \$60,000 | 16% |
| \$60,000 to less than \$80,000 | 14% |
| \$80,000 to less than \$100,000 | 12% |
| \$100,000 to less than \$250,000 | 10% |
| \$250,000 to less than \$500,000 | 9% |
| \$500,000 to \$750,000 | 8% |
| Over \$750,000 | 7%” |

80391

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021

Revised: November 1, 2022

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

“STATEMENTS AND PAYROLLS

The payroll records shall include the worker’s name, the worker’s address, the worker’s telephone number when available, the worker’s social security number, the worker’s classification or classifications, the worker’s gross and net wages paid in each pay period, the worker’s number of hours worked each day, and the worker’s starting and ending times of work each day. However, any Contractor or subcontractor who remits contributions to a fringe benefit fund that is not jointly maintained and jointly governed by one or more employers and one or more labor organization must additionally submit the worker’s hourly wage rate, the worker’s hourly overtime wage rate, the worker’s hourly fringe benefit rates, the name and address of each fringe benefit fund, the plan sponsor of each fringe benefit, if applicable, and the plan administrator of each fringe benefit, if applicable.

The Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee’s social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option (“No Work”, “Suspended”, or “Complete”) selected.”

STATE CONTRACTS. Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

- “3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx>. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an

identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

80437

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

Revised: September 2, 2021

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be _____. In the event the Contractor subcontracts a portion of the contract work, it shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also ensure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee it employs on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he or she has successfully completed a training course leading to journeyman status or in which he or she has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor Employment Training Administration shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting its performance under this Training Special Provision.

For contracts with an awarded contract value of \$500,000 or more, the Contractor is required to comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules to the extent permitted by Section 20-20(g). For federally funded projects, the number of trainees to be trained under this contract, as stated in the Training Special Provisions, will be the established goal for the Illinois Works Apprenticeship Initiative 30 ILCS 559/20-20(g). The Contractor shall make a good faith effort to meet this goal. For federally funded projects, the Illinois Works Apprenticeship Initiative will be implemented using the FHWA approved OJT procedures. The Contractor must comply with the recordkeeping and reporting obligations of the Illinois Works Apprenticeship Initiative for the life of the project, including the certification as to whether the trainee/apprentice labor hour goals were met.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

20338

VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)

Effective: November 1, 2021

Revised: November 1, 2022

Add the following paragraph after the first paragraph of Article 701.08 of the Standard Specifications:

“The Contractor shall equip all vehicles and equipment with high-intensity oscillating, rotating, or flashing, amber or amber-and-white, warning lights which are visible from all directions. In accordance with 625 ILCS 5/12-215, the lights may only be in operation while the vehicle or equipment is engaged in construction operations.”

80439

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: November 1, 2021

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Sunday through Saturday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

80302

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Add the following to Article 701.03 of the Standard Specifications:

“(q) Temporary Sign Supports 1106.02”

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

“For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer’s specifications.”

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

“**701.15 Traffic Control Devices.** For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer’s self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device.”

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

“**1106.02 Devices.** Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 1 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 2 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact

attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH-16 compliant is available, an NCHRP 350 or MASH-2009 compliant device may be used, even if manufactured after December 31, 2019.”

Revise Articles 1106.02(g), 1106.02(k), and 1106.02(l) to read:

“(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

(k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

(l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis.”

80427

WORKING DAYS (BDE)

Effective: January 1, 2002

The Contractor shall complete the work within 150 working days.

80071

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:

The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA- 1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally- assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics,

including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor

set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* \$27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages.

The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or

equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders

or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

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

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

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

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

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

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.
2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

