



**Milwaukee**  
**Water Works**

*Safe, Abundant Drinking Water.*

**City of Milwaukee**  
**Department of Public Works**  
**Milwaukee Water Works**

**Specifications for O.N. 102-2016**

**Linnwood Water Treatment Plant**

**WP-320: Linnwood Wash Water Piping Rehabilitation**



Anthony Aquila, P.E.  
Management Engineer

Carrie M. Lewis  
Superintendent

Anthony Fahres, P.E.  
Civil Engineer III

**SECTION 00 0102**  
**PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 PROJECT IDENTIFICATION**

- A. Project Name: Linnwood Wash Water Piping Rehabilitation, located at:  
Linnwood Water Treatment Plant.  
3000 N. Lincoln Memorial Dr..  
Milwaukee, WI 53212.
- B. The Owner, hereinafter referred to as City: City of Milwaukee - Water Works

**1.02 NOTICE TO PROSPECTIVE BIDDERS**

- A. These documents constitute an Invitation to Bid to General Contractors for the construction of the project described below.

**1.03 PROJECT DESCRIPTION**

- A. Summary Project Description: This contract includes the furnishing of all equipment, labor, supervision, materials, appurtenances and rentals for and in connection with improvements to existing facilities and construction of new facilities at the Linnwood Water Treatment Plant as shown on the contract documents and described below.
- B. Wash Water Suction Piping Lining: This project consists of all work to clean the exterior of the 36" diameter wash water suction piping, supply and install (3) 24" diameter manway access points, prepare the pipe's interior surface to standards appropriate for structural lining, inspect the prepared surface area, line the interior surface of the pipe with a high-build polymer lining material and secure all fittings to prepare the pipe for return to service.
- C. Wash Water Discharge Piping Lining: This project consists of all work to prepare the pipe's interior surface to standards appropriate for structural lining, inspect the prepared surface area, line the interior surface of the pipe with a high-build polymer lining material and secure all fittings to prepare the pipe for return to service.
- D. Contract Terms: Bids shall be submitted as a lump sum .

**1.04 LIST OF CONTRACT DRAWINGS. THE CONTRACT DRAWINGS UPON WHICH THE PROPOSAL IS TO BE BASED ARE LISTED HEREUNDER:**

- A. WP-320-G1 Title Sheet and Drawing Index
- B. WP-320-C1 North Wash Water Discharge Plan
- C. WP-320-C2 Wash Water Suction Piping Modifications
- D. WP-320-C3 Wash Water Suction Piping Lining Limits
- E. WP-320-C4 South Wash Water Discharge Plan
- F. WP-320-C5 36" Wash Water Piping Plan
- G. WP-320-C6 Details

**1.05 PROCUREMENT TIMETABLE**

- A. Pre-Bid Briefing: Tuesday, September 27, 2016 at Linnwood Water Treatment Plant.
- B. Pre-Bid Site Tour: Following the Pre-Bid Meeting.
- C. Bid Opening: Tuesday, October 11, 2016, 10:30 AM local time.
- D. Construction Start: Not earlier than Notice to Proceed.
- E. Substantial Completion Date: Not later than December 31, 2016.
- F. Final Completion Date: Not later than January 15, 2017.
- G. The City reserves the right to change the schedule or terminate the entire procurement process at any time.

### 1.06 PRE-BID MEETING

- A. A MANDATORY Pre-Bid Meeting is scheduled for Tuesday, September 27, 2016 at 10:00AM in the Linnwood Water Treatment Plant Conference Room; 3000 North Lincoln Memorial Drive, Milwaukee, WI 53211.
- B. The City of Milwaukee will ONLY receive bids from prospective bidders who are in attendance at the MANDATORY Pre-Bid Meeting. The official envelope for submitting a bid and bid bond form will be available at the MANDATORY Pre-Bid Meeting. Bids may also be submitted electronically via Bid Express.
- C. All attendees are required to e-mail [anthony.aquila@milwaukee.gov](mailto:anthony.aquila@milwaukee.gov) AND [anthony.fahres@milwaukee.gov](mailto:anthony.fahres@milwaukee.gov) at least 24 hours in advance of the MANDATORY Pre-Bid Meeting to be placed on the visitor list for access to the Linnwood Water Treatment Plant.
- D. A site visit will be available at the conclusion of the Pre-Bid Meeting.

### 1.07 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
  - 1. The Invitation to Bid, all bid documents, and the Specifications for this project area ll available electronically on the DPW web site as well as on the Bid Express Website.
    - a. Electronic documents can be obtained via <http://www.mpw.net/bids/docs/102-2016/>
    - b. The Bid Express website is located at [www.bidexpress.com](http://www.bidexpress.com)
  - 2. Contract Drawings
    - a. Contract drawings for this project will only be available to prospective bidders for viewing at the Milwaukee Water Works Linnwood Treatment Plant located at 3000 N. Lincoln Memorial Drive, Milwaukee, WI 53211, by appointment.
    - b. Appointments may be made ONLY by e-mail to [anthony.aquila@milwaukee.gov](mailto:anthony.aquila@milwaukee.gov) and [anthony.fahres@milwaukee.gov](mailto:anthony.fahres@milwaukee.gov).
  - 3. Addenda
    - a. Any required addenda or responses related to this project will be posted on the city website.

### 1.08 PROGRESS PAYMENTS

- A. Within ten (10) business days after the Notice to Proceed is issued, the contractor shall submit to the City for approval a schedule showing the breakdown of the contract with quantities and prices as a basis for checking and computing progress estimates. The values shown in the approved breakdown shall be used for pay purposes only and shall not be used as a basis for additions to or deductions from contract work.
- B. The contractor shall take note of the two (2) wage scales included with this bid – the Prevailing Wage Rate issued by the State of Wisconsin, and the Davis-Bacon Wage documents as issued by the U.S. Department of Labor Wage and Hour Division. The contractor is required to pay the HIGHER of the two wage scales.
- C. When the contractor proceeds properly and with diligence to perform and complete the work on this contract, the Commissioner of Public Works may, from time to time as the work progresses, grant to the contractor an estimate of the amount already earned. In making such progress estimates, there shall be retained 5.0% of each progress estimate until final completion and acceptance of the work; except that after 50% of the work has been completed and the Commissioner finds that satisfactory progress is being made and all conditions complied with, he may authorize any of the remaining progress payments to be paid in full to the contractor with no amount retained.
- D. In accordance with Charter Ordinance 7.26 as amended 6-1-72, payment for materials delivered to the work or storage site may be authorized by the Commissioner of Public Works providing the following terms and conditions are met:
  - 1. The work is progressing properly and such materials as specified are properly stored and suitable for permanent incorporation in the work. Field Engineer shall verify that material is as specified and properly stored.

2. Materials designated for pay in the next progress estimate after delivery shall be limited to fabricated or manufactured components which are assembled in final form ready for placement in the work.
3. The following forms shall be submitted with requests for payment:
  - a. Progress Estimate and Request for Payment for Fabricated Materials or Components Properly Stored. Field Engineer shall verify that material is as specified and properly stored.
  - b. Certification of the Contractor or his duly authorized representative
4. The contractor shall be responsible for the safeguarding of any such materials against loss or damage whatsoever, and in the case of any loss or damage, the contractor shall replace such lost or damaged materials at no cost to the City. The Commissioner shall reserve the right to deduct from ensuing progress estimates the value of any lost or damaged materials until the contractor restores such loss or damage.
5. The Commissioner may limit processing progress estimates to those cases where the amount earned in any pay period for work and materials is \$5,000 or more.
6. Any materials for which payment has been made shall not be removed from the work or storage site without the specific written approval of the Commissioner of Public Works.

#### **1.09 FORMAL CORRESPONDENCE**

- A. Formal correspondence shall be addressed to: Ms. Carrie M. Lewis, Superintendent of Milwaukee Water Works, Zeidler Municipal Building, 841 North Broadway, Room 409, Milwaukee, WI 53202.
- B. Formal correspondence shall include
  1. Request for Change Order
  2. Request for extension of Completion Date
  3. Disputes concerning payment or field issues
  4. Payment Requests
  5. Submittals
  6. Closeout Documents

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**END OF SECTION**

## SECTION 01 1000

### SUMMARY

#### PART 1 GENERAL

##### 1.01 PROJECT

- A. Project Name: Linnwood Wash Water Piping Rehabilitation
- B. City's Name: City of Milwaukee - Water Works.
- C. The Project consists of the interior structural lining of Wash Water Suction Piping and areas of the Wash Water Discharge Piping. The contractor shall install a

##### 1.02 OWNER OCCUPANCY

- A. City intends to occupy the Project upon Substantial Completion.
- B. City intends to occupy a certain portion of the Project prior to the completion date for the conduct of normal operations.
- C. Cooperate with City to minimize conflict and to facilitate City's operations.
- D. Schedule the Work to accommodate City occupancy.

##### 1.03 CONTRACTOR USE OF SITE AND PREMISES

- A. Provide access to and from site as required by law and by City:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- B. Utility Outages and Shutdown:
  - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to City and authorities having jurisdiction.
  - 2. Prevent accidental disruption of utility services to other facilities.

##### 1.04 WORK SEQUENCE

- A. Construct Work in stages during the construction period:
  - 1. Stage 1: Wash Water Suction Line Lining.
- B. Coordinate construction schedule and operations with Milwaukee Water Works.

##### 1.05 WARRANTY AND GUARANTEE

- A. The contractor shall furnish a written two (2) years warranty from the date of official acceptance against defective materials or workmanship before the final payment is made.
- B. During the period of two (2) years from and after the date of the final acceptance by the CITY of the work embraced by this contract, the Contractor shall make all needed repairs arising out of defective workmanship or materials, or both, which in the judgment of the Commissioner of Public Works, shall become necessary during such period.
- C. Whenever defective equipment or materials are replaced, the equipment or materials shall be guaranteed for one (1) year from the date that the replacement is performing satisfactorily.
- D. If within ten (10) business days after mailing of a notice in writing to the Contractor, or his agent, the said Contractor shall neglect to make, or undertake with due diligence to make, the aforesaid repairs, the CITY is hereby authorized to make such repair at the Contractor's expense; providing, however, that in case of an emergency where, in the judgment of the Commissioner, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the Contractor shall pay the cost thereof.
- E. The Contractor shall also furnish written guarantees as required by each Section. Length of time and requirements of guarantees, if applicable, are specified in each Section. Each guarantee shall commence on the date of official acceptance. Final payment will not be paid until the City receives all guarantees.

F. See individual specification sections for additional warranty information.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 2000**  
**PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.

**1.02 SCHEDULE OF VALUES**

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Milwaukee Water Works for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 10 days after date established in Notice to Proceed.

**1.03 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Milwaukee Water Works for approval.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Total Completed and Stored to Date of Application.
  - 7. Percentage of Completion.
  - 8. Balance to Finish.
- E. Execute certification by signature of authorized officer.
- F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- G. When Milwaukee Water Works requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

**1.04 MODIFICATION PROCEDURES**

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Milwaukee Water Works will issue instructions directly to Contractor.
- B. For other required changes, Milwaukee Water Works will issue a document signed by City instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Milwaukee Water Works will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 2 days.
- D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

1. For change requested by Milwaukee Water Works for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Milwaukee Water Works.

**1.05 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01 7000.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 3000**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Pre-installation meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

**1.03 REFERENCE STANDARDS**

- A. AIA G810 - Transmittal Letter; 2001.

**1.04 PROJECT COORDINATION**

- A. Project Coordinator: Project Engineer.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for construction access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Milwaukee Water Works through the Project Coordinator:
  - 1. Requests for interpretation.
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Milwaukee Water Works will schedule a meeting after Notice to Proceed.
- B. Attendance Required:
  - 1. City.
  - 2. Milwaukee Water Works.
  - 3. Contractor.

- C. Agenda:
  - 1. Execution of City-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract, Subcontractors and Milwaukee Water Works.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
- D. Minutes of the meeting shall be recorded and distributed to all participants and those affected by decisions made.

### **3.02 PRE-INSTALLATION MEETING**

- A. When determined by the City, Milwaukee Water Works will schedule a meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Milwaukee Water Works.
  - 3. Contractor's Superintendent.
  - 4. Major Subcontractors.
- C. Agenda:
  - 1. Agenda shall be prepared and distributed to all parties prior to the meeting.
- D. Minutes of the meeting shall be recorded and distributed to all participants and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Milwaukee Water Works will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Milwaukee Water Works.
  - 3. Contractor's Superintendent.
  - 4. Major Subcontractors.
- C. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of off-site fabrication and delivery schedules.
  - 7. Maintenance of progress schedule.
  - 8. Corrective measures to regain projected schedules.
  - 9. Planned progress during succeeding work period.
  - 10. Coordination of projected progress.
  - 11. Maintenance of quality and work standards.
  - 12. Effect of proposed changes on progress schedule and coordination.
  - 13. Other business relating to Work.
- D. Minutes of the meeting shall be recorded and distributed to all participants and those affected by decisions made.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Submit updated schedule with each Application for Payment, as applicable.

### **3.05 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
  - 2. Shop drawings.
  - 3. Samples for selection.
  - 4. Samples for verification.
- B. Submit to Milwaukee Water Works for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

### **3.06 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.
- B. Submit for Milwaukee Water Works's knowledge as contract administrator or for City.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. When the following are specified in individual sections, submit them at project closeout:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- B. Submit for City's benefit during and after project completion.

### **3.08 SUBMITTAL PROCEDURES**

- A. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
  - 2. Do not reproduce the Contract Documents to create shop drawings.
  - 3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. All submittals shall be accompanied with a transmittal letter which includes the following:
  - 1. Date
  - 2. City's project title and number
  - 3. Contractor's name and address
  - 4. Title and number of each record document
  - 5. Certification that each document as submitted is complete and accurate, as applicable

6. Contractor's signature or signature of authorized representative
- C. Transmittal Form: AIA G810.
- D. Transmit each submittal with a copy of approved submittal form.
- E. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- G. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- H. Deliver submittals to Carrie Lewis, Superintendent at Milwaukee Water Works, Room 409, Frank P. Zeidler Municipal Building, 841 N. Broadway, Milwaukee, WI, 53202.
- I. Schedule submittals to expedite the Project, and coordinate submission of related items.
- J. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- K. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- N. Submittals not requested will not be recognized or processed.
- O. See individual specification sections for additional submittal procedures.

**END OF SECTION**

**SECTION 01 3554**  
**JOB SITE SECURITY, UTILITIES AND FACILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security and Safety
- B. City of Milwaukee Permits
- C. Occupancy during Construction
- D. Electrical Power and Telephone Service
- E. Heat and Ventilation
- F. Water
- G. Toilet Facilities
- H. Deliveries

**1.02 GENERAL CONDITIONS**

- A. All operations shall be carried on with a minimum of damage and disturbance. All damages shall be repaired to the original condition to the satisfaction of the Water Engineering representative.
- B. All removals become the property of the Contractor and shall be disposed of off-site, unless otherwise specified.

**1.03 TEMPORARY VENTILATION**

- A. Ventilate enclosed areas to assist cure of materials, dissipate humidity and/or prevent accumulation of dust, fumes, vapors or gases.

**1.04 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas and protect existing facilities and adjacent properties from damage caused by construction operations and demolition.
- B. Protect non-owned vehicular traffic, stored materials, site and structures from damage.
- C. Utilize road plates to protect underground utilities and structures, and to minimize disturbances caused by construction traffic.

**1.05 PROGRESS CLEANING**

- A. Waste materials, debris and rubbish shall be removed daily after work. Maintain site in a clean and orderly condition.
- B. Clean and repair damage caused by removals or installations.
- C. Restore existing facilities used during construction to original condition.

**PART 2 – SECURITY AND SAFETY**

**2.01 GENERAL**

- A. The Milwaukee Water Works consists of a number of facilities to treat and deliver drinking water to the City and surrounding suburban communities. To ensure the safety and security of drinking water, the Milwaukee Water Works has instituted protocols for visitors and contractors to control entry to these facilities. It is essential that contractors strictly comply with the security policy outlined in the Specification Section.
- B. For this project, the Contractor shall continuously coordinate building and site security measures, including accessing the site, with the designated Water Engineering representative or the Water Security Manager, Mr. Michael Schaefer, who can be reached at Telephone # (414) 286-3465 or Facsimile # (414) 286-2672.

## 2.02 SCOPE

- A. Any and all City agencies and contractors engaged for work at Milwaukee Water Works facilities shall be required to attend a "Pre-Construction Security Briefing" before any contracted work can be initiated. At this meeting, the contractor and sub-contractors shall have a detailed briefing with discussions regarding the following items:
1. Milwaukee Water Works site security policies and procedures
  2. Contractor & Sub-Contractor Obligations
  3. Permit System

## 2.03 POLICIES

- A. During the "Security Briefing" portion of the "Pre-Construction Meeting", Milwaukee Water Works Security staff shall provide the Prime Contractor with site polices to be reviewed by the Prime and Sub Contractors. These documents may include:
1. Lock-out / Tag-out Policy
  2. Confined Space Entry Procedures
  3. Evacuation Procedure for Propane, Lox, & Ammonia Releases
  4. Personal Protective Equipment Guidelines
  5. No Smoking Policy
  6. Prohibited Materials
- B. MWW Staff shall provide a "walk-through" session with the contractor to review area layout and site plans to establish the specific work areas necessary for the contractors to perform their scope of work. Topics covered in this session include:
1. Site emergency evacuation procedure
  2. Personal Protective Equipment (PPE) guidelines
  3. Contact Phone Numbers for MWW Staff
  4. On-Site Parking Location and designated construction entrance
  5. Site overview to discuss and review any MWW hazards in the work area
  6. Safety Data Sheets for any MWW hazards present in the work area
  7. Fire extinguisher and safety shower placement
  8. Storm water protection policy
  9. Radio Frequency (RF) Hazards – Linnwood 6th Floor
- C. The Prime Contractor shall be required to review these documents and is responsible for conveying the contents of these submittals to their employees, sub-contractors and any other parties working directly or indirectly for them. These policies apply equally to all contractors. Failure to comply with established policies and procedures may result in access privileges being withdrawn.

## 2.04 CONTRACTOR RESPONSIBILITIES

- A. Contractors shall provide the following documents no less than seven (7) business days prior to the start of contracted work:
1. Scope of work to be performed
  2. Name of primary contractor's onsite representative
  3. Names of all companies sub-contracted to do work on the project
  4. Completed "Contract Firm Registration Form" (see attachment 'A') for prime contract firm and every sub-contract firm
  5. A "Contractor Employee Registration Form" completed for the contractors and every employee who needs to be granted site access (see attachment 'B')
  6. List of items to be stored on-site
  7. Material Safety Data Sheets for all Chemicals to be used/stored on-site
- B. Note: It is the responsibility of the Prime Contractor to facilitate gathering and submittal of the "Contractor Employee Registration Form" for all sub-contractors working on the project. A sub-contractor is defined as an individual or firm hired by the primary contractor to perform a specific task as part of the overall project. This would not include an organization making

deliveries of supplies or equipment to the job site; procedures for these firms are covered under Part 9, "DELIVERIES".

- C. In the event it is necessary for the Prime Contractor to add additional employees to the list of approved personnel, a minimum of 72 hours, or 3 business days, must be allowed for processing of the request. Site access will be denied to the additional personnel until processing is complete.
- D. Contract Firms are obligated to notify MWW in a timely manner of any site-authorized staff that leaves the employ of the Contractor.
- E. At no time should anyone but the Prime Contractor be contacting Milwaukee Water Works employees with issues or access requests. If a request for site access does not come from the Prime Contractor, the request will not be processed.
- F. During the time period that the Contractor is on-site, they must agree to:
  - 1. Notify the Plant Manager immediately of any significant chemical spills or leaks.
  - 2. Maintain Normal Non-Toxic Breathable Air Quality, through Adequate Ventilation, at their work site.
  - 3. Perform no equipment isolations or tie-ins without the signed approval of Site Management.
  - 4. Restrict movement to the specific work areas within the site to perform Contractors Scope of Work.

## **2.05 CONTRACTOR SPECIAL WORK PERMITS**

- A. Contractors must notify Engineering / Site Management staff of any welding, torching or potentially hazardous or operational impact request prior to commencing such operations. Special Permits shall be issued to the contractor, and these must also be displayed at the work site.
- B. Failure to comply with the terms of the Special Work Permits, or provisions that provide for MWW Employee Safety shall be cause for revocation of such Permits, and the contractor may be forced to discontinue activities at the site.

## **2.06 CONTRACTOR IDENTIFICATION AND DAILY REGISTRATION**

- A. Every day, all contractors shall be required to show a valid picture ID card, to sign-in at the start of work, and sign out at the end of work. A MWW employee or designated security representative shall be on site to ensure compliance. Any identification tags or lanyards issued by MWW are to be worn while on site and returned to site management upon completion of contracted work. A fee of \$50.00 will be charged for any identification tags or lanyards issued by MWW that are not returned.

## **2.07 CONTRACTOR GATE ACCESS & PARKING**

- A. Contractors must comply with the terms of entry for the site and park only in the areas designated for parking by the MWW site representative.
- B. Parking privileges may be rescinded at any time as Site Operational Requirements dictate.

## **PART 3 - CITY OF MILWAUKEE PERMITS**

### **3.01 GENERAL**

- A. The Contractor shall obtain the necessary permits for this Project.

## **PART 4 - OCCUPANCY DURING CONSTRUCTION**

### **4.01 GENERAL**

- A. The Water Works facility shall be in continuous operation during this contract. Contractor and Sub-Contractors are to take any and all necessary precautions to ensure there is no interference with daily operations or security. MWW personnel shall be continuously occupying the facility. All hours of contractor's operations shall be coordinated with the MWW site or Water Engineering representative.

#### **4.02 CONTRACTOR FIELD OFFICE / JOB TRAILER**

- A. The Prime Contractor is responsible for providing their own field office via a construction job trailer.
- B. The Prime Contractor is responsible for furnishing an engineering field office for the MWW project representative. The lockable engineering field office shall be located in the same trailer with the Prime Contractor. The office shall have access to copier, fax and dedicated computer work station with a high-speed internet connection.

#### **PART 5 - ELECTRICAL POWER AND TELEPHONE SERVICE**

##### **5.01 GENERAL**

- A. On-site electrical service is available for Contractor use during project duration within the Florist Pumping Station. The Contractor is required to request a dedicated service for job trailers from the electric utility.
- B. Contractor shall provide and maintain all necessary power cords and electrical lighting, and shall make all necessary connections in accordance with OSHA regulations.
- C. Contractor shall provide, maintain and pay for his own wireless telephone and internet service.

#### **PART 6 – HEAT AND VENTILATION**

##### **6.01 GENERAL**

- A. Contractor shall provide and maintain all necessary heat and ventilation equipment required for the contract. Contractor shall perform all air treatment procedures and make all necessary connections in accordance with OSHA regulations.

#### **PART 7 - WATER**

##### **7.01 GENERAL**

- A. Water is available for the Contractor at the site and may be obtained from the fixture(s) so designated by MWW staff or Water Engineering Representative.
- B. Contractor and Sub-Contractors must provide their own hoses, back flow preventer and any other connection appurtenances required for the contract.

#### **PART 8 - TOILET FACILITIES**

##### **8.01 GENERAL**

- A. On-site toilet facilities are available for Contractor use during project duration. The specific location of these facilities will be transmitted to the Contractor at the pre-construction meeting. However, if project requirements render the use of on-site facilities impractical, then Contractor shall furnish portable facilities. If portable facilities are required, Contractor shall maintain these toilet facilities in a sanitary condition throughout the duration of the project and shall remove them from site at the end of the project. The placement and location of the temporary portable toilets shall be coordinated with the Plant Manager and Water Engineering Representative.

#### **PART 9 - DELIVERIES**

##### **9.01 GENERAL**

- A. Contractor shall coordinate the delivery of all equipment, material, dumpsters, portable toilets (and their maintenance) and other required items required for the contract work with the MWW staff. A minimum of 24 hours prior notice in advance of the desired delivery date shall be transmitted to the designated Water Engineering Representative.
- B. Contractor shall provide the following information in the notification:
  - 1. Trucking/Delivery Company
  - 2. Driver Name
  - 3. Truck License Plate Number

- C. The driver of the delivery vehicle is required to display picture identification as a pre-requisite for entry to the MWW facility for the delivery. Failure to comply with the above will result in denial of project site access, requiring the contractor to re-schedule delivery.

**END OF SECTION**

# Milwaukee Water Works

*Safe, Abundant Drinking Water.*

## FORM A

### CONTRACT FIRM REGISTRATION FORM

CONTRACTOR: \_\_\_\_\_

PLANT/SITE: \_\_\_\_\_

CONTRACT/SERVICE ORDER No. \_\_\_\_\_

WATER ENGINEERING PROJECT No. \_\_\_\_\_

PRIMARY CONTACT PERSON: \_\_\_\_\_

OFFICE PHONE NUMBER: \_\_\_\_\_

CELL PHONE NUMBER: \_\_\_\_\_

REQUESTED WORK HOURS (00am – 00pm): \_\_\_\_\_

NUMBER OF EMPLOYEES TO BE WORKING ON-SITE: \_\_\_\_\_

**Signature certifies receipt of the materials outlined in  
Contract Section 01500, Part 2 – Security and Safety, Section C, Policies.**

SIGNATURE: \_\_\_\_\_

*PRIMARY CONTACT PERSON*

DATE: \_\_\_\_\_

***Accompanying this form should be a complete listing of all  
equipment to be stored on site for the duration of the project.***

# Milwaukee Water Works

*Safe, Abundant Drinking Water.*

## FORM B

### CONTRACTOR EMPLOYEE REGISTRATION FORM

Contract Firm: \_\_\_\_\_

Plant/Site/Project: \_\_\_\_\_

Employee Name (Printed): \_\_\_\_\_

This certifies that I have received the building site security and safety policies.

EMPLOYEE  
SIGNATURE: \_\_\_\_\_

*Required*

DATE: \_\_\_\_\_

### ONSITE PARKING

- I will always be driving a Company vehicle.
- I will always be a passenger in a vehicle.
- I will be driving my personal vehicle. If checked here complete and sign the next section.

### **Contractor Personal Vehicle Liability Waiver**

EMPLOYEE VEHICLE

MAKE & MODEL: \_\_\_\_\_ LICENSE PLATE: \_\_\_\_\_

I, hereby agree to hold harmless the City of Milwaukee for any and all damage, loss or injury, which may occur as a result of utilizing the contractor onsite parking area.

EMPLOYEE  
SIGNATURE: \_\_\_\_\_

*Required*

DATE: \_\_\_\_\_

**SECTION 01 6000**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Re-use of existing products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 1000 - Summary: Lists of products to be removed from existing building.

**1.03 REFERENCE STANDARDS**

**1.04 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS**

**2.01 EXISTING PRODUCTS**

- A. Unforeseen historic items encountered remain the property of the City; notify City promptly upon discovery; protect, remove, handle, and store as directed by City.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the City, or otherwise indicated as to remain the property of the City, become the property of the Contractor; remove from site.

**2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.

**2.03 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

**2.04 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- B. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to City.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- C. Substitution Submittal Procedure (after contract award):
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. The Milwaukee Water Works will notify Contractor in writing of decision to accept or reject request.

### **3.02 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.03 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.

- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

**SECTION 01 7000**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Cleaning and protection.
- D. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 3554 - Job Site Security, Utilities and Facilities
- D. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of City or separate Contractor.

**1.04 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new 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.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After City occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of City's activities.

**PART 2 PRODUCTS**

**2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

#### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

#### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

#### **3.04 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

- D. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Patching:
  1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.05 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.06 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.07 FINAL CLEANING**

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from area drains and drainage systems.

- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.08 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to Milwaukee Water Works.
- B. Accompany Project Engineer on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Milwaukee Water Works when work is considered ready for Milwaukee Water Works's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Milwaukee Water Works's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Milwaukee Water Works's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Milwaukee Water Works.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to City-occupied areas.
- G. Notify Milwaukee Water Works when work is considered finally complete and ready for Milwaukee Water Works's Substantial Completion final inspection.
- H. Complete items of work determined by Milwaukee Water Works listed in executed Certificate of Substantial Completion.

**END OF SECTION**

**SECTION 01 7800  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Milwaukee Water Works with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. For equipment, or component parts of equipment put into service during construction and operated by City, submit completed documents within ten days after acceptance.
  - 2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Milwaukee Water Works comments. Revise content of all document sets as required prior to final submission.
  - 3. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with City's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by City.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. 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.
- F. Record Drawings : Legibly mark each item to record actual construction including:
1. Field changes of dimension and detail.
  2. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  1. Product data, with catalog number, size, composition, and color and texture designations.
  2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  1. Description of unit or system, and component parts.
  2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for City's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Milwaukee Water Works Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with City's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION**

**SECTION 09 9600**  
**HIGH-PERFORMANCE COATINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. High performance coatings.
- B. Surface preparation.

**1.02 REFERENCE STANDARDS**

- A. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; Fourth Edition.
- B. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel; 2004.
- C. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements; 2015.
- D. SSPC-SP 1 - Solvent Cleaning; 2015.
- E. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
  - 5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
- C. Maintenance Materials: Furnish the following for City's use in maintenance of project.
  - 1. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
  - 2. Label each container with manufacturer's name, product number, color number, and locations where used.

**1.04 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. High-Performance Coatings:
  - 1. Tnemec Company, Inc: [www.tnemec.com](http://www.tnemec.com).
  - 2. Substitutions: Section 01 6000 - Product Requirements.

## 2.02 TOP COAT MATERIALS

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
  - 1. Lead Content: Not greater than 0.06 percent by weight of total nonvolatile content.
  - 2. Chromium Content, as Hexavalent Chromium, Zinc Chromate, or Strontium Chromate: None.
  - 3. Colors: Approved by City.
- B. Urethane Coating for Steel Pipe & Valve Exterior Surfaces:
  - 1. Number of Coats: Two.
  - 2. Product Characteristics:
    - a. Dry film thickness, per coat: 4, minimum.
  - 3. Top Coat(s): Acrylic Urethane, Water Based, Two-Component.
    - a. Sheen: Satin.
    - b. Products:
      - 1) Tnemec Series 30.
      - 2) Substitutions: Section 01 6000 - Product Requirements.
  - 4. Primer: As recommended by coating manufacturer for specific substrate.
- C. Shellac: Pure, white type.

## 2.03 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
  - 1. Anti-Corrosive for Metal, Alkyd.
    - a. Products:
      - 1) Tnemec Series 30.
      - 2) Substitutions: Section 01 6000 - Product Requirements.

## 2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

### 3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP1.
  - 2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and power tools according to SSPC-SP 3 "Power Tool Cleaning", and protect from corrosion until coated.

- E. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

### **3.03 PRIMING**

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

### **3.04 COATING APPLICATION**

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

### **3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

### **3.06 PROTECTION**

- A. Protect finished work from damage.

### **3.07 SCHEDULE**

- A. Substrate: Steel Pipe & Valve Exterior Surfaces, Interior and Exterior.
  - 1. Primer: Tnemec Series 30.
  - 2. Top Coat: Tnemec Series 30.

**END OF SECTION**

**SECTION 33 0110**  
**ROBOTIC INSTALLED PIPE LINING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Robotic Installed Pipe Lining
  - 1. This section specifies the materials and robotic installation and application of a polyurea lining system for pressure pipes intended to provide structural augmentation to the pipe. The work related to this section shall include pipe cleaning, surface preparation, walk through camera inspection, and the application of the interior lining system on all metal surfaces as described herein. If there are conflicts between this section and instruction from the lining material manufacturer, the more stringent document will be used to enforce the work.
  
- B. REFERENCE STANDARDS
  - 1. AWWA M28 – Rehabilitation of Water Mains
  - 2. ASTM D522 – Mandrel Bend Test (Flexibility) of Attached Coatings
  - 3. ASTM D570 – Water Absorption
  - 4. ASTM D638 – Tensile Properties of Plastics
  - 5. ASTM D790 – Flexural Strength/Flexural Modulus of Plastics
  - 6. ASTM D2240 – Durometer Hardness (Shore D)
  - 7. ASTM D4060 – Taber Abrasion Resistance (included in C222)
  - 8. ASTM D4541 – Standard Test Method for Pull-Off Strength of Coatings
  - 9. SSPC-PA 2 – Measurement of Dry Coating Thickness with Magnetic Gages
  - 10. NACE SP0188 – Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
  - 11. ASTM D4787 – Continuity verification for liquid or sheet linings applied to concrete substrates
  
- C. DELIVERY, STORAGE AND HANDLING
  - 1. All lining materials shall be delivered to the project site in sealed containers and labeled with the manufacturer's identification and printed instructions for use.
  - 2. Care shall be taken during transportation, handling and installation of lining material and safety procedures shall be maintained in accordance with SDS.
  - 3. Lining material shall be stored in original sealed containers in a dry environment at a temperature specified by the material manufacturer.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. PipeArmor® high-build polymer plural component liners are engineered for installation with QI Large Diameter (LD) and Small Diameter (SD) Lining Apparatus (LA) class systems. The material comprises the high build thermoset polyurea structural lining which exhibits unique feature functions: the ability to provide a monolithic (seamless) structural liner while covering dissimilar substrate materials (concrete to various metals to wood, etc.) The ability to be applied at different thicknesses throughout a pipeline system depending on the pressure, flow, elevation drop and condition of the pipe, reducing cost of materials and application. It allows for a continuous application through concentric diameter changes. All of this minimizes the need for personnel to be in the pipe.
  - 1. Pipe and fittings, including both new pipe and existing pipe at connection point, shall be lined using a 100 percent solids, two-component PipeArmor® blended polyurea with a minimum 0.20" to 1.5" thickness in accordance with calculations within ASTM F1216 and/or ASME PCC-2
  - 2. The lining material shall consist of a thermoset, aromatic polyurea that is the reaction product of isocyanate and resin, designed for use in underground or surfaced pipeline applications.

3. The lining material shall have low viscosity characteristics that enable the pumping of the components to a remote spray head.
4. The lining material shall provide a hi-build, slump-resistant lining with adequate adhesion.
5. The lining material must be moisture tolerant to produce a hard, smooth lining with excellent water resistance and long-term durability.
6. The lining material must be able to be applied over a wide range of temperatures.
7. The lining material shall be able to achieve desired thickness in one application, completely encapsulating welds, rivets, and edges.
8. The lining material shall have an initial rapid cure time (gel time) necessary to arrest sagging, running, or pooling of lining material.
9. At 75° F, the cure time to be dry to touch shall not exceed 20 seconds, to normal use shall not exceed 8 hours, and to immersion shall not exceed 48 hours.
10. The lining material shall contain no volatile organic compounds (VOC) or solvents.
11. The lining material to be used shall meet all of the material properties shown below as determined by laboratory testing in accordance with ASTM procedures cited.
12. ASTM Procedure Tested Measurements Required
  - a. Flexural Modulus (ASTM D790) – 125,000 psi minimum
  - b. Tensile Strength (ASTM D638) – 3,500 psi minimum
  - c. Elongation (ASTM D638) – greater than 5%
  - d. Hardness (ASTM D2240) – 60 Shore D minimum
  - e. Adhesion to Steel (ASTM D4541 – 2,000 psi minimum
  - f. Water Absorption (ASTM D570) – 0.9% maximum
  - g. Abrasion Resistance (ASTM D4060) - < 100 mg/1000 cycles (CS 17 wheel, 1000g)
  - h. Acceptable products for field-applied lining systems, or equal:
    - 1) Quest Inspar PipeArmor 150SW
  - i. All lining materials within a system shall be the products of a single manufacturer.
  - j. Lining system components shall have a shelf life of no less than one year in sealed containers.
  - k. The two components shall be supplied in two distinct colors that, when mixed together in the proper ratio, shall produce a third distinct color.

#### B. EQUIPMENT

1. The equipment used to apply the lining material shall be suitable for the intended work and meet the requirements of the lining manufacturer.
2. The equipment used for application of lining shall be suitable to store, heat, move and mix the lining material and function in accordance with the lining material manufacturer.
3. Equipment used to supply heat and pressure shall be capable of providing necessary heat and pressure required for installation conditions.
4. Lining equipment shall be capable of individually heating components so that the material temperature at the application head meets the requirements of the lining material manufacturer.
5. Heat sources shall be equipped with suitable monitors to gauge temperatures of lining material components.
6. Lining equipment shall be capable of mixing components so that the material mix ratio achieved at the application head falls within cured state tolerance of the OEM materials supplier.
7. Apparatus used to pressurize and move lining material shall be equipped with flow meters and pressure gauges capable of monitoring the individual components to ensure mixing of components within manufacturer's recommended tolerances for the specified mix ratio.
8. Flow meters and pressure monitors shall provide a continuous record of the following information.
  - a. Volume and flow of material to the application head
  - b. Mix ratio of components by volume
  - c. Pressure in both component hose lines
9. A daily application inspection log shall be completed by the lead technician.

- a. This inspection log shall be submitted to Milwaukee Water Works prior to the commencement of lining operations.
  - 10. Lining equipment shall be capable of internal impingement mixing of components immediately prior to dissipation.
  - 11. Robotic lining equipment shall be capable of oscillating and/or reciprocating the lining material dissipation device (spray head) to apply multiple consistent lining build passes during the retraction of the lining unit.
  - 12. Robotic lining equipment shall be capable of installing unlimited and/or any predetermined and/or calculated liner thickness in a single equipment retraction through the pipe.
  - 13. Robotic lining equipment shall be capable of material dissipation device (spray head) articulation to assure all existing profiles, concave and convex surfaces, joints and other undulations in the pipe are lined with a consistent liner thickness.
  - 14. Robotic lining equipment shall be capable of automated clockwise and counter clockwise rotation of the material dissipation device (application head) during the oscillation/reciprocation sequencing to arrest the potential for 'shadowing' and unlined areas beneath and above existing profiles and other undulation in the pipe.
  - 15. Manual lining equipment shall be capable of internal impingement mixing of components immediately prior to dissipation.
  - 16. Manual lining equipment shall be capable of installing unlimited and/or any predetermined and/or calculated liner thickness in a single equipment retraction through the pipe.
- C. MATERIAL/OPERATOR DOCUMENTATION
- 1. Product Data
    - a. Documentation shall include the technical datasheet for formula named in Part 2, 1.13.a (or approved equal) along with third party tested properties cited along with the Material Safety Data Sheets; one each for Resin Component and one each for Isocyanate Component used in liner construction.
  - 2. Lead Technician
    - a. Contractor shall submit a letter stating that the Lead Technician has greater than five (5) years' experience in performing coating and lining with polyuria systems on underground and elevated pipelines. Documents included with this letter shall identify the size and length of pipeline projects.

## **PART 3 EXECUTION**

### **3.01 LINER INSTALLATION PRE-REQUISITIES**

- A. CONTRACTOR shall provide LINING CONTRACTOR with a sufficient lay down area for ancillary equipment.
- B. CONTRACTOR shall provide lining contractor with unencumbered accesses to the pipeline to be lined and/or remove sections of the pipeline at the locations identified by LINING CONTRACTOR to provide access for lining operations.
- C. CONTRACTOR will provide LINING CONTRACTOR with all scaffolding for both the interior and exterior of the pipe to facilitate ventilation, blasting, cleaning and lining.
- D. CONTRACTOR shall provide LINING CONTRACTOR with an interior pipe surface that has been prepared to remove dirt, scale and loose particulates in accordance with the specified SSPC standard.
- E. CONTRACTOR shall provide LINING CONTRACTOR with a pipe that is free of debris and or accumulated coal, sand, or dirt in the pipes and attached fittings and with no standing water or infiltration of any materials.
- F. CONTRACTOR shall provide a pipe free from obstructions that prohibit the passage of cleaning, inspection and lining equipment.
- G. CONTRACTOR shall provide LINING CONTRACTOR with unencumbered intake and exhaust areas for the required ventilation of the pipe system for the duration of the project.
- H. CONTRACTOR will provide LINING CONTRACTOR with an unencumbered location near all accesses to the pipe for equipment, material and personnel staging.

## I. LINING INSTALLATION

1. LINING CONTRACTOR's certified applicator will install lining material in accordance with the requirements of this section, the lining material application instructions provided by the lining material manufacturer, and the field technical support instructions from the QC/ QA Lining Inspector.
2. All safety procedures established by local, state, and federal agencies regarding job safety, which include confined space access requirements, shall be strictly adhered to by LINING CONTRACTOR and its applicator. LINING CONTRACTOR shall provide full time HSE personnel for the duration of the project.
3. No work shall be performed when the weather is not suitable or proper storage conditions are not in place for the lining operation, as determined by the QC/ QA Lining Inspector.
4. LINING CONTRACTOR shall submit a schedule of lining operations to the customer's representative at least seven (7) days in advance of the start of work.
5. The pipe shall be cleaned before application of lining material. LINING CONTRACTOR shall be responsible to verify cleaning and surface preparation has been achieved for the lining process to the satisfaction of the QC/QA Lining Inspector, and the designated OWNER representative.
6. All flow meters, sensors, temperature probes and any other appurtenances mounted or protruding into the pipe must be removed by OWNER/ CONTRACTOR prior to the commencement of surface preparation operations.
7. LINING CONTRACTOR may specify a mechanical cleaning with devices specifically manufactured for the purpose of proper surface preparation of the pipe. This includes the removal of corrosion by-products; chemicals or other deposits; loose or deteriorated remains of old lining material; and oils, grease, and accumulations of any water, dirt, and debris that is a direct result of the cleaning and or surface preparation process.
8. LINING CONTRACTOR shall specify but not be limited to high pressure water jetting per NACE/SSPC specifications in reference to the above and more specifically to a minimum that will meet or exceed SSPC SP 12/NACE 5 specifications. Certain applications may require a more stringent cleaning standard requiring abrasive blasting. Concrete pipes and mortar surfaces shall be prepared in accordance with SSPC-SP 13.
9. The interior surfaces of the pipe must be clean and free of excessive or standing water before the lining material is applied. Service connections must be carefully inspected to ensure that there is no debris blocking any service taps and there is no inflow of water into the pipe. If any services are leaking, appropriate steps must be taken to remedy the situation to a drip-free condition.
10. The presence of substantial amounts of water after the cleaning and surface preparations are complete suggests leaking valves, lateral intrusions and or groundwater infiltration. OWNER shall be solely responsible for the sealing of any infiltrating water which would compromise the LINING CONTRACTOR lining processes.
11. LINING CONTRACTOR shall inspect the cleaned pipe using either a remotely controlled CCTV camera or a walk through camera inspection.
12. LINING CONTRACTOR shall observe manufacturer recommendations on dehumidifying and/or heating the pipe. The manufacturer's recommendations for both minimum and maximum application temperatures, both ambient air temperature, surface temperature and dew point shall be followed.
13. Only equipment that has been inspected and certified by LINING CONTRACTOR shall be approved to apply the lining material to the interior surface of the pipe.
14. Before the lining material is actually applied, LINING CONTRACTOR shall demonstrate that the equipment is functioning properly by circulation of the lining material components in the equipment.
15. Temperature of the components and ratio of the pumped lining material shall be verified (by weight or volume) to be within the manufacturer's tolerances.
16. In robotic applications after pulling the control and supply umbilical through the length of pipe to be lined and attaching the lining apparatus, the lining applicator shall activate the

lining head to its operating pressure and temperature to inspect the mixed lining material for the uniform color expected of thoroughly mixed components.

17. In manual applications test samples will be sprayed in the proximity of the plural component dispensing equipment.
18. Once an acceptable operation of the lining equipment has been verified, the robotic lining equipment shall be pulled back through the pipe at a speed that is calibrated to apply the desired thickness of lining material to the interior pipe surface in one pass. In both robotic and manual applications the entire process shall be continuously monitored by observing the volume ratios of the pumped components.
19. All structural linings shall meet or exceed AWWA Specification M28 for a Class III Lining unless lining is intended only as a barrier lining.
20. Upon completion of the lining process LINING CONTRACTOR will install stainless steel compression bands on all liner terminations.
21. The QC/QA inspector along with the OWNER's designated representative shall inspect the lined pipe throughout the entire length after the lining material has cured with CCTV equipment as described above. The interior surfaces of the pipe must be completely covered by the lining material at the specified thickness without evidence of poor mixing or excessive ringing. Particular attention must be paid to inspect the service connections to ensure that there is no evidence of blockage. A standard video recording shall be made of the entire inspection and turned over to the OWNER designated representative at the end of the project.
22. Upon completion of the work, debris, and containers of lining materials, cleaners, and other items shall be removed from the site and disposed of by the lining applicator in accordance with local, state, and federal requirements.

#### J. FIELD QUALITY CONTROL

1. The QC/QA Lining Inspector will have the right to perform tests as necessary which include, but are not limited to, thickness testing.
2. LINING CONTRACTOR shall repair the lining damaged as a result from the QC/QA lining testing at no additional cost to the customer.
3. All CCTV recorded inspections, pipe cleaning, surface preparation, and lining activities shall be inspected by the QC Lining Inspector. The lining applicator shall also notify the designated Owner representative sufficiently in advance so as to be present during the following activities to witness the operations on site:
  - a. The completion of pipe cleaning,
  - b. The completing of surface preparation,
  - c. The completion of prepared surface CCTV inspection,
  - d. Prior to lining application,
  - e. During dry film thickness measurements and,
  - f. During lining repair.
4. The QC/QA Lining Inspector shall perform visual inspections and dry film thickness measurements. The QC/QA Lining Inspector shall submit daily reports to the designated owner representative for records. Reports shall include the following information as included but not limited to:
  - a. Environmental conditions prior to liner application, including surface temperature, surface moisture content (where applicable), ambient air temperature, relative humidity and dew point,
  - b. Observations of pipe cleaning and surface preparation,
  - c. Results of ratio check for plural component proportioning equipment,
  - d. Temperature and pressure of material during lining operations,
  - e. Dry film thickness measurements.
5. LINING CONTRACTOR shall touch up areas, where QC/QA lining inspection was performed, to the satisfaction of the QC/QA Lining Inspector.

6. If required, LINING CONTRACTOR shall prepare samples of the lining material on pieces of steel, either salvaged from the removal of steel pipe from the existing pipeline or from material procured by the lining applicator, in a manner consistent with the application technique being used. Curing of samples shall be done in the same environment in which the lining will be cured. The QC/QA Lining Inspector shall test samples for requested properties. Material thickness shall also be measured.

**END OF SECTION**

**SECTION 46 0506**  
**WATER AND WASTEWATER TREATMENT PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carbon steel pipe and fittings.

**1.02 DESCRIPTION OF WORK**

- A. The Contractor shall supply and install all steel piping modifications, valves and fittings relating to the installation of three (3) 24" diameter manway access points on the 36" diameter steel wash water piping and modify the adjacent pipe to facilitate the valve installations. The steel piping modifications shall be complete with all fittings, flanges, couplings, anchors, anchor bolts, gaskets, bolts and nuts, pipe supports, appurtenances and accessories for proper installation and functioning of all parts.

**1.03 REFERENCE STANDARDS**

- A. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2010.
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
- C. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2013.
- D. ASME B16.9 - Factory-Made Wrought Buttwelding Fittings; 2012.
- E. ASME B16.11 - Forged Fittings, Socket-welding and Threaded; 2011.
- F. ASME B31.1 - Power Piping; 2014.
- G. ASME B31.3 - Process Piping; 2012.
- H. ASME B36.19M - Stainless Steel Pipe; 2004; R 2010.
- I. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2014).
- J. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- K. ASTM A105/A105M - Standard Specification for Carbon Steel Forgings for Piping Applications; 2013.
- L. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- M. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service; 2012.
- N. ASTM A727/A727M - Standard Specification for Carbon Steel Forgings for Piping Components with Inherent Notch Toughness; 2014.
- O. ASTM A858/A858M - Standard Specification for Heat-Treated Carbon Steel Fittings for Low-Temperature and Corrosive Service; 2014.
- P. ASTM A865/A865M - Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints; 2006 (Reapproved 2012).
- Q. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2012.
- R. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's descriptive and technical literature for each material and component, showing compliance with requirements and installation instructions.
- C. Shop Drawings:

1. List of piping systems, indicating application, material, size, and pressure rating.
  2. Detailed drawings of piping systems, showing locations of valves, expansion joints, specialties, and instrument connections.
- D. Project Record Documents: Record actual locations of pipe anchors and guides, and layout of piping systems relative to other parts of the work including clearances for maintenance and operation.

### **1.05 FIELD CONDITIONS**

- A. Existing Conditions:
1. Verify existing piping and penetrations.
  2. Prior to ordering materials, expose all existing pipes which are to be connected to new pipelines.
  3. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipes.

## **PART 2 PRODUCTS**

### **2.01 PIPE AND FITTINGS - GENERAL REQUIREMENTS**

- A. Piping and Fittings: New and unused material.
1. Pressure Ratings: As indicated on drawings.
  2. Nominal Sizes: As indicated on drawings.
  3. Fittings: Same pressure rating as pipe, or greater, unless higher rating is specified; same material as pipe unless otherwise indicated.
  4. Sizes: Use standardized nominal sizes for compatibility with future work.
  5. Material Identification: Permanently mark each piece of pipe and fitting with its AWWA or ASTM designation and other markings required for that designation.
- B. Joints: Completed joints are to have working pressure rating for liquids equal to pressure rating of the pipe.
- C. Bolts and Nuts:
1. Non-Submerged: Zinc-plated; on cast iron and ductile iron couplings high-strength, low-alloy steel complying with AWWA C111/A21.11.
  2. Buried and Submerged: Stainless steel, TP304.
- D. Isolation Devices for Dissimilar Metals: Where dissimilar metallic piping, fittings, or valves must be connected, use isolation devices as indicated and as required to separate the different materials to avoid galvanic action.
1. For flanged connections use flange isolation gaskets; gas-tight where underground.
  2. For threaded and welded connections, use dielectric fittings.
  3. For mechanical joints, use joint devices that accomplish separation.
- E. External Coatings: Unless otherwise indicated; finish fittings with same coating as pipe.

### **2.02 CARBON STEEL PIPE**

- A. Steel Pipe: ASTM A53/A53M seamless, Grade A, galvanized where indicated.
1. Galvanized Finish: Hot-dipped galvanized in accordance with ASTM A153/A153M; electroplated zinc or cadmium plating not permitted.
  2. Nominal Size: As indicated on drawings.
  3. Wall Thickness - Above Grade: Schedule 40.
  4. Joints - Above Grade: Welded.
- B. Threaded Fittings: Class 150.
1. Material: One of the following:
    - a. Malleable iron, ASTM A47/A47M, conforming to ASME B16.3, black, banded.
    - b. Forged carbon steel ASTM A105/A105M, conforming to ASME B16.11.
    - c. Low carbon steel, ASTM A858/A858M, conforming to ASME B16.11.
  2. Couplings: ASTM A865/A865M welded, black.
- C. Welding Fittings: ASME B16.9 butt-welding or ASME B16.11 socket-welding type.

1. Material: One of the following:
  - a. Forged steel, ASTM A105/A105M Class 150.
  - b. Forged low-carbon steel, ASTM A858/A858M seamless or welded.
- D. Flanged Fittings: Faced and drilled to ASME B16.5, Class 150, welding neck type.
  1. Material: One of the following:
    - a. Forged steel, ASTM A105/A105M.
    - b. Forged steel, ASTM A727/A727M.
  2. Flange Faces: Raised, 0.0625 inch (1.6 mm) thick.
  3. Backing Flanges: Cast steel, ASTM A216/A216M Grade WCA, Van Stone type, drilled in conformance to ASME B16.5 Class 150.

### **2.03 JOINING DEVICES FOR METAL PIPE**

- A. Dielectric Fittings: Material, shape, and design as required to prevent metal-to-metal contact of dissimilar metallic piping elements; suitable for required working pressure, temperature and corrosion environment.
- B. Flange Isolation Gaskets: Dielectric isolation gasket, isolation washers and full length isolation sleeves for flange bolts; size and type to fit piping flanges.
  1. Gaskets: Full faced with outside diameter equal to flange outside diameter.
  2. Shape and design as required to prevent metal-to-metal contact of dissimilar metallic piping elements.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Keep Interior of Pipes Clean:
  1. Prevent accumulation of weld rod, weld spatter, pipe cuttings and filings, gravel, cleaning rags, and other foreign material inside piping sections during fabrication.
  2. Close pipe openings with caps or plugs before, during, and after installation.
  3. Remove foreign objects and dirt prior to assembly and installation.
- B. Protect pipe coatings from chemical and mechanical damage; do not install damaged products.

### **3.02 INSTALLATION - GENERAL**

- A. Install piping and appurtenances in conformance with ASME B31.3, reviewed shop drawings, if any, and manufacturer's instructions, with all joints tight and no undue marring of finishes.
  1. Install piping to accurate lines and grades.
  2. Run piping as straight as practical in alignment shown with minimum of joints.
  3. Maintain required upstream and downstream clearances.
  4. Install piping without springing or forcing pipe to fit.
  5. Pitch piping toward low points and provide a valved drain at each low point.
  6. Provide a sufficient number of unions or flanges to allow for dismantling of pipe, valves, and equipment.
  7. Where temporary supports are used, make them sufficiently rigid to prevent shifting or distortion of pipe.
  8. Make installed piping, valves, and fittings free from strain and excessive stresses caused by weight or misalignment.
- B. Provide isolation valves and miscellaneous devices as required for an operable installation.
- C. Pipe Jointing: Clean the ends of pipes thoroughly, remove foreign matter and dirt from inside of pipes, and keep piping clean during and after installation.
- D. Thermal Expansion and Contraction: Install piping to allow for thermal expansion and contraction resulting from difference between temperature during installation and during operation.
  1. Anchors: Locate as shown on drawings and reviewed shop drawings, if any, to withstand expansion thrust loads and to direct and control thermal expansion.
  2. Intermediate Pipe Alignment Guides:
    - a. Install adjacent to pipe expansion joints and within four pipe diameters each side.

- b. At pipe mounted on metal channel framing, install intermediate pipe guide at each metal channel framing support not carrying an anchor or alignment guide.
- E. Pipe Tap Connections: Taps direct to pipe barrels are prohibited; make taps as follows:
  - 1. Steel Piping: Use a welded threadolet connection.

### **3.03 METALLIC PIPE JOINTING**

- A. Connecting Dissimilar Metallic Pipe and Appurtenances: Use isolation devices as specified and as required to separate different materials to avoid galvanic action; install in accordance with manufacturer's instructions.
- B. Welded Joints: Welded in accordance with AWS D1.1/D1.1M.
  - 1. Perform welding in accordance with qualified procedures using performance qualified welders and operators.
  - 2. Welding Electrodes: In accordance with Table 3.1 of AWS D1.1/D1.1M as required for applicable base metals and welding process.
- C. Flanged Joints: Make flanged joints up tight, taking care to avoid undue strain on flanges.
  - 1. Install flanged fittings true and perpendicular to axis of pipe.
  - 2. Install so that adjoining flange faces are not out of parallel to such degree that joint cannot be made watertight without overstraining flanges.
  - 3. Align bolt holes in both flanges; use full size bolts; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose is not permitted.
  - 4. Tighten bolts uniformly to prevent overstressing flanges and misalignment.
  - 5. Replace flanged pipe and fittings whose dimensions do not allow making flanged joint as specified.

### **3.04 FIELD QUALITY CONTROL - GENERAL**

- A. Test all parts of piping systems using clean water and hydrostatic pressure and leakage tests, unless otherwise indicated.
- B. Leakage Testing: Perform after pressure tests have been satisfactorily completed, unless otherwise approved by City.
- C. Water: Provide clean test water of such quality to avoid corrosion of piping system materials.

### **3.05 FIELD QUALITY CONTROL - HYDROSTATIC PRESSURE TESTING**

- A. Perform hydrostatic testing in accordance with ASME B31.3 under normal service conditions.
- B. Test Pressure:
  - 1. Rigid Piping: Calculated according to ASME B31.3; not be less than 1.5 times design pressure and not exceeding yield strength of piping system.
- C. Venting Air While Filling: Purge all air in system; open air release vents to purge air pockets; venting may also be provided by loosening minimum of four bolts of flanges or by use of equipment vents.
- D. Rigid Piping Test Procedure:
  - 1. Maintain test pressure continuously for minimum of 30 minutes and during examinations for leakage.
  - 2. Leave piping system full of water after leaks are repaired, unless otherwise directed by City.
- E. Inspect pipe, fittings, joints and connections, and valves for visible leakage; correct leaks and re-test until results are satisfactory.

### **3.06 FIELD QUALITY CONTROL - PIPE LEAKAGE TESTING**

- A. Test piping for leakage by filling with water, or other appropriate test liquid, applying specified test pressure, and measuring amount of additional liquid is necessary to maintain the specified pressure for the specified duration.
- B. Duration of Leakage Test: At least 1 hour after piping has been filled and air has been expelled.
- C. Test Pressure: 150 psig (1.0 MPa) plus/minus 5 psig (34.5 kPa).

D. Locate leaks, repair, and re-test until leakage is within specified limits.

**END OF SECTION**