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ADDENDUM NO. 1

DATE: November 19, 2019

FROM: Baxter & Woodman, Inc., Consulting Engineers

TO: Planholders of record for the Work titled:

City Of Joliet, Illinois
Mills Road Water Main Improvements
Water Main Improvements
City of Joliet Contract No. 2441-0220
IEPA Loan No. L175430

The Bidding Documents are amended as follows:

1. SPECIFICATIONS

A. Section 33 01 30.85, WATER MAIN REHABILITATION:

Delete Section 33 01 30.85, WATER MAIN REHABILITATION, in its entirety and insert the attached Section 33 01 30.85, WATER MAIN REHABILITATION, revision dated November 19, 2019 in lieu thereof.

Nothing in this Addendum shall be construed as changing other requirements of the Bidding Documents. Each Bidder shall acknowledge receipt of this Addendum where indicated in the Bid Form.

END OF ADDENDUM NO. 1

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SECTION 33 01 30.85

WATER MAIN REHABILITATION

PART 1 - GENERAL

1.1 INTENT

- A. It is the intent of this section to provide for the reconstruction of existing water mains by the installation of a resin-impregnated flexible tube that is inflated within the existing pipe to form a hard, impermeable, corrosion resistant pipe within a pipe. When cured, the cured-in-place-pipe (CIPP) will be formed to the original water main. This work shall be completed within (30) calendar days from the "Notice to Proceed".

1.2 REQUIREMENTS

A. DESCRIPTION OF WORK

1. All work shall comply with the terms of this specification and with the manufacturer's standards set forth for cured-in-place-pipe lining method selected by the Contractor and approved by the Engineer.
2. Under this method the Contractor shall reconstruct existing water mains by the insertion of a flexible lining tube consisting of two concentric, tubular, felt or woven polyester jackets with a watertight polymeric membrane bonded to the interior that has been saturated with a thermosetting resin. **It is critical that a watertight bond is achieved between the host pipe and the new liner at all the insertion/extraction end points of the newly installed liner.** The liner shall be inserted into the existing water main either by direct inversion (ASTM F1216) using a head of water, or by pulling the tube into place by winching and then inflating it by inversion of a calibration hose (ASTM F1743). The shaping of the liner may be achieved by pushing a pig through the hose using water pressure or steam. The thermosetting resin shall then be cured by circulating hot water or steam through the tube to cure the resin into a hard impermeable pipe.
3. The Contractor shall be responsible for the successful completion of all work required herein; Failure of the Contractor's selected cured-in-place-pipe lining method to be satisfactorily installed in the existing water main shall not relieve him of his responsibility to provide satisfactorily reconstructed water mains.
4. Any cost associated with the removal of the unsatisfactorily installed liner and the subsequent, satisfactory reinstallation of an approved liner shall be borne solely by the Contractor, and he shall not make any claim against the City for this additional required work.
5. Once installed, the liner shall extend from start to end points specified in a continuous tight fitting watertight pipe-within-a-pipe,

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and the service connections shall be installed. During the warranty period any defects that might affect the integrity or strength of the liner shall be immediately repaired or replaced by the Contractor, at his expense, pursuant to the manufacturer's recommendations, and to the satisfaction of the Engineer.

6. All connecting joints shall be attached to the host pipe, installed using mechanical joint fittings, and shall be incidental to CIPP liner. No additional payment shall be made. These mechanical joint fittings must be submitted for approval prior to the start of this project. The water main sizing on the plans is correct to the best of our knowledge and can not be verified until the cleaning process. Any additional cleaning, chlorination & sampling will be the responsibility of the contractor. No additional payment will be made. Additionally, any future dry or pressure tapping of this water main for service connections are expected to be done with City personnel without additional training or specialize equipments. Any deviation from this work process must be submitted prior to contract approval.

B. REFERENCE SPECIFICATIONS AND STANDARDS

1. The latest editions and revisions of "Standard Specifications for Water & Sewer Main Construction in Illinois", ASTM D638, D790, F1216 and F1743, and NSF/ANSI 61, AWWA Standards, and the manufacturer's standards are hereby made a part of this specification.

C. DELIVERY, STORAGE, AND HANDLING

1. The Contractor shall transport, handle, and store liner and thermosetting resin as recommended by manufacturer.
2. The Contractor shall deliver, store and handle other materials as recommended by the manufacturers to prevent damage.
3. Liner materials that are defective or damaged prior to installation shall be rejected and replaced at the Contractor's expense. Liner materials damaged during installation shall be repaired or replaced as recommended by the manufacturers and approved by the Engineer.

D. QUALIFICATIONS

1. The Contractor shall be certified by the cured-in-place-pipe liner manufacturer and that the Contractor is a fully trained user of the liner method. The installation of the liner method shall be performed by trained personnel, and such training shall have been conducted by a qualified representative of the liner method manufacturer. Certificates of such training for all personnel involved in the operation of the liner method shall be provided to the Engineer prior to the start of liner installation.
2. The product installed shall be certified by NSF to ANSI/NSF Standard 61, and shall meet the requirements of (Sect G) and shall have been commercially proven with a 10 year history of installation in North America.

E. LINER SIZE AND LENGTH

1. The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the water main to be lined. The exact sizing of these sections of water main should only be verified during the cleaning

process. Any additional cleaning, chlorination & sampling will be the responsibility of the contractor. No additional payment shall be made.

2. The liner thickness shall be designed to adequately resist the full internal pressure and all external pressures and conditions (e.g. deflection, ring bending, buckling and minimum stiffness). The length of the liner shall be that deemed necessary to effectively span the distance and carry out the insertion and seal of the liner at the end points. **It is critical that a watertight bond is achieved between the host pipe and the new liner at all the insertion/extraction end points of the newly installed liner.** The Contractor shall verify the lengths in the field before cutting the liner to length. Prior to the start of work the manufacturer of the cured-in-place-pipe liner will be required to submit design calculations for wall thickness to the Engineer.
3. Allowance for circumferential and longitudinal stretching of the liner during insertion shall be made as per the manufacturer's standards.

F. DESIGN PARAMETERS

1. The following design parameters shall be used in the design of pipe liners in addition to the manufacturer's standards and ASTM F1216:

(1)	Ovality of Existing Pipe	2% Minimum
(2)	Existing Pipe Condition	Fully Deteriorated
(3)	Modulus of Soil Reaction	700 psi Minimum
(4)	Factor of Safety Against Buckling	2 Minimum
(5)	Live Load	AASHTO HS20-44 Loading under Roadways
6)	Soil Unit Weight	120 pcf Minimum (If no Boring Data is available in vicinity.)
(7)	Creep Reduction Factor	50% Maximum
(8)	Internal Pressure	1.5 times system working pressure
(9)	Depth of cover	Varies (5-10')

2. Liner material shall be tested in accordance with ASTM F1216, Section 8 – Inspection Practices. Certificates of tests shall be provided to the Engineer.

G. LINER MATERIAL

1. The cured-in-place-pipe liner shall be composed of two concentric, tubular, felt or woven polyester jackets with a polymeric membrane bonded to the interior. The polymeric inner membrane shall be designed to ensure water tightness. The fully cured-in-place-pipe liner shall conform to the minimum structural standards as follows:

Tensile Strength @ Yield	3,000 psi	(ASTM D638)
Flexural Strength	4,500 psi	(ASTM D790)
Flexural Modulus	250,000 psi	(ASTM D790)

2. The Contractor shall furnish, prior to use of the lining materials, satisfactory written guarantee of his compliance with these specifications and the liner manufacturer's standards for all materials (felt or woven polyester jackets, watertight polymeric membrane bonded to the interior, and the thermosetting resin) and techniques being used in the method.
3. Prior to the start of work the Contractor will be required to submit to the Engineer the types of resins and the resultant cure schedules for each length and size of water main to be lined. The finished liner shall incorporate thermosetting materials that will withstand the corrosive effects of normal existing chemical additives to the water supply.

H. SAFETY

1. The Contractor shall carry out his operations in strict accordance with all OSHA and manufacturer's safety requirements. Emphasis shall be placed upon safety requirements for entering confined spaces and working with hot water or steam.
2. The Contractor shall erect such signs and other devices as are necessary for the safety of the work site and shall secure the site and conform all work to the safety requirements of all pertinent regulatory agencies.

I. AIR QUALITY

1. The Contractor is advised that all liner installation work shall be carried out in full compliance with all City, State, and Federal laws, rules, and regulations regarding Air Quality and Safety.

J. PREPARATION OF EXISTING WATER MAIN

1. Excavation of Insertion/Extraction Pits, Removal of Pipe, and Route Survey:
 - a. The exact location of insertion/extraction pits shall be as shown or determined by the contractor in the field, specified or ordered and shall be of a length and width as recommended by the pipe liner manufacturer, and as approved by the Engineer.
 - b. The Contractor shall excavate the insertion/extraction pits at the predetermined locations and to the dimensions specified and approved by the Engineer.
 - c. The Contractor shall excavate and remove the minimum length of pipe necessary for the liner insertion and receiving operations as per manufacturer's recommendations and as ordered by the Engineer. All connecting joints shall be attached to the host pipe, installed using mechanical joint fittings, and shall be incidental to CIPP liner. No additional payment shall be made.
 - d. The existing main shall be cut square using an approved cutting machine, leaving no split or fractured ends. All cut faces of the existing main shall be chamfered on the inside surface to a suitable profile to prevent damage to the liner pipe during or after insertion.

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- e. Edge guards or other means of protecting the liner from host pipe edges at insertion points must be submitted to the Engineer for review and approval.
 - f. A thorough examination of the route of the existing water main shall be made by after cutting of the main. This should include a pipeline location survey at no additional cost with equipment for locating any changes in direction, valves, bends, intrusions, and other fittings that may impede the insertion and/or proper inflation of the cured-in-place-pipe liner.
2. CLEANING
- a. The cleaning of the existing water main is a critical step in the reconstruction of the existing water main with a cured-in-place-pipe liner method. It is anticipated that the existing water main will have a fair amount of rust and scale deposits on the inside walls of the pipe.
 - b. The Contractor shall clean the existing water mains using a cleaning method that is approved by the Engineer. The cleaning method shall remove all rust, scales, tuberculation, deposits, loose or deteriorated remains of any original coatings and other foreign materials from the inside of the pipe so as to produce a smooth metal surface finish that will allow the new composite liner to adhere to the existing host pipe.
 - c. After cleaning, and again immediately before pipe liner insertion the main shall be plunged with a tight fitting rubber plunger and foam swab to clear the pipe bore of debris and water.
- K. TELEVISION INSPECTION PRIOR TO INSTALLATION
- 1. The Contractor shall perform a television inspection and video recording of the existing water main after the cleaning of the water main is completed. This inspection will be performed, utilizing a radial eye camera, to determine that the rust and scale deposits have been adequately removed, that the latest condition of the water main makes lining feasible. The Engineer shall be notified if the existing water main is determined to be non-feasible.
- L. EQUIPMENT SPECIFICATION
- 1. The Contractor shall provide suitable temperature and pressure gauges in accordance with the manufacturer's standards and specifications. Puller unit/winch cable shall be equipped with manufacturer recommended tension gauge and shall be smooth running and variable speed. The cutting device shall be a remote monitored device for use inside the lined pipe.
 - 2. The Contractor shall prepare and inspect all necessary tools and any spare parts that are required for equipment that suffer frequent breakdowns, and shall ensure that said tools and spare parts are available at the site. The Contractor shall also prepare and make operable all necessary communication equipment for his field crew.

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M. INSTALLATION OF LINER

1. Prior to the installation of liner, the Contractor shall fully comply with **Subsections 1.2.C through 1.2.L**, inclusively, and with any additional requirements set forth in the specific provisions applicable to the respective lining method. The Contractor shall not proceed with the installation of liner until the Engineer, in writing, certifies such compliance and directs the Contractor to proceed with the lining installation. The approved liner shall be installed pursuant to the specific provisions set forth for the lining method. If any problem occurs during the installation operation the Contractor shall investigate with a television camera from the remote end.

N. PRELIMINARY TELEVISION INSPECTION OF INSTALLED LINER

1. After the liner is sufficiently cool (below one hundred degrees Fahrenheit (100°F), a preliminary television inspection and video recording of the newly installed liner shall be performed to determine if the liner is properly installed.

O. PRESSURE TESTING

1. After preliminary television inspection is completed, the lined existing water main shall be pressure tested in accordance with "Standard Specifications for Water & Sewer Main Construction in Illinois", or as ordered by the Engineer. The Contractor shall subject the water main and appurtenances to a proof test as per ASTM F1743 Section 8.3 (with zero loss in pressure). With no joints, it's important to remove all trapped air in the liner to achieve zero loss.

P. FINAL TELEVISION INSPECTION AFTER INSTALLATION

1. A final television inspection and video recording of the newly lined water main shall be performed immediately after work is completed. Should the results of this final inspection reveal any defects that are determined by the Engineer to be repairable the Contractor will be required to repair these defects as ordered by the Engineer at the sole expense of the Contractor. Should the results of this final inspection reveal any defects that are determined by the Engineer not to be repairable the Contractor will be required to remove and replace the existing water main as ordered by the Engineer at the sole expense of the Contractor.
2. This final television inspection will be considered incidental to this contract. A DVD format videotape of the final televising inspection shall be made, submitted and become the property of the Owner.

Q. PIECING-UP

1. After final television inspection after installation is completed the removed sections of the existing pipeline (e.g. at insertion/reception pits, valves, connections, etc.) shall be reconstructed in accordance with the contract plans and specifications, using mechanical joint fittings and/or as ordered by the Engineer. The necessary end pieces shall be installed so as to make proper connection to the cut and lined existing water main pipe. All

connecting joints shall be attached to the host pipe, installed using mechanical joint fittings, and shall be incidental to CIPP liner. No additional payment shall be made.

R. DISINFECTION/CHLORINATION

1. Once all pipe work is completed to the satisfaction of the Engineer, the Contractor shall perform chlorine disinfection of the newly installed liner in accordance with "Standard Specifications for Water & Sewer Main Construction in Illinois" specifications and/or as ordered by the Engineer.

S. RE-COMMISSIONING

1. Re-commissioning of water main shall be done in accordance with "Standard Specifications for Water & Sewer Main Construction in Illinois", or as ordered by the Engineer. The water main shall be restored after acceptable samples have been obtained and approved by the Engineer.

T. WORK SCHEDULE

1. All work to be performed at the site of installation of cured-in-place-pipe liner work, including cleaning, television inspections, all necessary excavation and restoration, complete installation of the liner, reconnections, restoration of all disturbed pavement areas and all incidental work necessary and required to complete the work as specified, shall be conducted pursuant to these specifications and shall be completed within the timeframe specified in the Bid Form.
2. During the time specified for work, the Contractor shall be permitted to occupy the right-of-way of Jefferson Street and Essington Road. Unless otherwise specified in the traffic stipulations, no roadway closures or other traffic restrictions shall be permitted.

PART 2 - INSTALLATION

2.1 PREPARING AND INSERTING THE LINER

- A. The Contractor shall designate a location where the uncured resin in the original containers and the un-impregnated liner will be impregnated prior to installation. The Contractor shall allow the Engineer and/or his representative to inspect the materials and chemical impregnation "wet out" procedure. A resin and catalyst system recommended by the liner manufacturer and approved by the Engineer shall be used. The quantities of the liquid thermosetting materials inserted into the lining tube shall be as per manufacturer's standards so as to fully saturate the liner material and provide the lining thickness specified.

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- B. Immediately after cutting and prior to installation of liner, the ends of the adjacent existing water main that are not to be lined at the insertion/extraction points shall be covered/plugged so that no debris shall enter into them during reconstruction work.
- C. The chemical impregnated liner material shall be inserted into the water main being reconstructed through the insertion point by either the direct inversion method or by the pull-in-place method, as recommended by the manufacturer. The head used to extend the liner tube shall be sufficient enough to fully extend the tube both circumferentially and longitudinally. The shaping of the liner may be achieved by pushing a pig through the hose using water pressure. The head used will fall within the manufacturer's guidelines to insure that a proper finished thickness is achieved and that the liner fit snug to the existing pipe wall producing dimples and/or at service connections and flared ends at the entrance and exit points.
- D. Puller unit/winch cable shall be equipped with a tension gauge to measure tension during pull through.
- E. Inflation of liners used shall be accomplished in accordance with manufacturer's standards and specifications. The heat sources for curing the resin into a hard impermeable pipe by using circulating hot water or steam.
- F. Curing temperatures and pressures shall be monitored so as not to overstress the liner and cause damage or failure of the liner prior to cure.
- G. The use of a lubricant is recommended and such lubricant shall be compatible with liner and resin. Lubricant must be certified by NSF to ANSI/NSF Standard 61.

2.2 CURING OF LINER

- A. After inflation or inversion is completed, the Contractor shall supply a hot water or steam heat source. The equipment shall be capable of delivering hot water or steam to the far end of the liner to uniformly raise the temperature in the entire liner above the temperature required to initiate and effect curing of the resin system. The temperature shall be determined by the resin/catalyst system employed. The heat source shall be fitted with suitable monitors to gauge the temperature and pressure of the incoming and outgoing heat exchanger circulating heating medium. Thermocouples or temperature gauges or infra-red gun shall be used at insertion and extraction points so as to determine and record the temperature of the liner and time of exotherm.
- B. Initial cure shall be deemed to be completed when inspection of the exposed portions of the liner show it to be hard and sound; and when temperature reading(s) at the interface of the liner with the host pipe indicate sufficient heating has occurred. The cure period shall be of a

duration recommended by the resin manufacturer; modified for the site specific conditions at the time curing is effected. During this cure time, the temperature inside the liner will be continuously maintained in the range required.

- C. Once the cure is complete, the Contractor shall cool the hardened liner to a temperature below one hundred degrees Fahrenheit (100°F) before relieving the internal pressure. Cool down shall be accomplished as recommended by the manufacturers. Care shall be taken in the release of the internal pressure so that a vacuum will not develop that could damage the newly installed liner.
- D. The finished lining shall be continuous over the entire length and be free from visual defects such as foreign inclusions, dry spots, pinholes and delaminations. The lining shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to the inside of the lined pipe.
- E. **It is critical that a watertight bond is achieved between the host pipe and the new liner at all the insertion/extraction end points of the newly installed liner.** If at the insertion/extraction ends the lining fails to make a tight seal, the Contractor shall apply a seal of a resin mixture compatible with the liner. Mixture must be certified by NSF to ANSI/NSF Standard 61.
- F. After the curing has been completed, any residual water that adheres to the inner wall of the liner shall be removed. This residual water shall be collected and pumped from the channel of the insertion/extraction points and circulated through a separate carbon filtration unit before discharge into a downstream storm manhole.

PART 3 - MEASUREMENT

- 3.1 The quantity of reconstructed existing water main using cured-in-place-pipe liner to be measured for payment shall be the number of linear feet of existing water main actually reconstructed by a cured-in-place-pipe lining method, complete, all in accordance with the contract drawings and specifications and to the satisfaction of the Engineer, measured along the centerline of the water main from insertion point to extraction point.

PART 4 - PRICE TO COVER

- 4.1 The contract price for Cured-In-Place-Pipe (Water Main Rehabilitation) shall be the unit price bid per linear foot for the size water main reconstructed by a cured-in-place-pipe lining method and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary for the designing, fabricating, furnishing, delivering, cleaning, inspecting/surveying, installing, testing, reconnecting, disinfecting, and re-commissioning of the

existing water main reconstructed by using a cured-in-place-pipe liner method and do all work incidental thereto, all in accordance with the contract drawings and specifications and as directed by the Engineer.

- 4.2 Included in the price bid hereunder shall be the cost of all labor, material and equipment required to locate, excavate and setup insertion and receiving pits (including saw cutting and removal of the existing pavements where necessary, earth excavation of all materials of whatever nature encountered (See Section 20 – EXCAVATION & CLEAN UP of the “Standard Specifications for Water & Sewer Main Construction in Illinois”); sheeting and bracing; pumping; bridging; carefully hand excavating if required, removal of existing pipe, backfilling and compaction, cleaning up, disposal of surplus and rejected excavated materials, etc.), and cut/remove portion of water main at insertion and extraction points.
- 4.3 Also the Contractor shall employ a subcontractor suitable to the Owner. The contractor shall obtain written approval from the Owner for the subcontractor before the work is performed.
- 4.4 In addition, included in the price hereunder shall be the cost for all television inspection and video tape recording required herein. No separate or additional payment will be made for this work.
- 4.5 CLEAN UP
 - A. Upon acceptance of the installation work and testing, the Contractor shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.
- 4.6 GUARANTEE
 - A. The Contractor shall guarantee his work against any defect in material or workmanship. This guarantee shall continue for a period of one year from the date of final payment.

END OF SECTION