

**CITY OF LOGAN WATER DEPARTMENT
LOGAN COUNTY, WEST VIRGINIA**

CONTRACT NO. 1 – AUTOMATED METERING INFRASTRUCTURE (AMI) SYSTEM

DECEMBER 16, 2020

ADDENDUM NO. 1

To whom it may concern:

A. BOILER PLATE

1. Bids will be received by the City of Logan Water Department, located at 730 Stratton Street, Logan, West Virginia, 25601. Bid shall be mailed or hand-delivered by December 21, 2020 at 2:00 p.m.
2. Bid Opening for Contract No. 1 is 2:00 p.m. on Monday, December 21, 2020. Social distancing guidelines will be followed. Conference call information is as follows: Call-in Number: +1 (301) 715-8592; Meeting ID: 962 1765 1626; Passcode: 719367; and at the following address:
<https://zoom.us/j/96217651626?pwd=ZlgvZERaSFp0aHZuV0duMVVxY3Aydz09>.
3. The Bid Form has been revised to adjust quantities. The revised Bid Form is included with this Addendum No. 1. **YOU MUST USE THE ATTACHED BID FORM INCLUDED WITH THIS ADDENDUM NO. 1 WHEN PREPARING YOUR BID PACKAGE.**

B. SPECIFICATIONS

1. **REPLACE** Section 011000 – SUMMARY, included with this Addendum No. 1.
2. **REPLACE** Section 012000 – PRICE AND PAYMENT PROCEDURES, included with this Addendum No. 1.
3. **REPLACE** Section 275123 – AUTOMATED METERING INFRASTRUCTURE (AMI) SYSTEM, included with this Addendum No. 1.
4. **REPLACE** Section 331200 – RADIO FREQUENCY BASED WATER METERS, included with this Addendum No. 1.

C. DRAWINGS

1. NOT APPLICABLE.

D. QUESTIONS AND CLARIFICATIONS

The following are clarifications and responses to questions posed by Contractors and Suppliers regarding the above referenced project.

1. Question:

Do you know what size the meter pit lids are? Do you know what brand and size of frames are installed currently?

Answer:

The City of Logan utilizes both 15” and 18” meter pit lids with respective frame sizes. The brand of meter lids is not known. The Bid Form has been revised to account for the sizes of meter lids.

2. Question:

The header on the documents state that the bid is for an AMI (fixed network system) but the specifications call out for an AMR drive-by system. Could you please verify the system?

Answer:

The bid should be for an AMI system, not an AMR system. Specification Section 275123 – AUTOMATED METERING INFRASTRUCTURE (AMI) SYSTEM has been revised to correct this.

3. Question:

The specifications list Kamstrup and then lists other manufacturers. Is the Zenner Brass Meter acceptable to this project?

Answer:

The basis of design for this project are the Kamstrup flowIQ meters. Section 331200 – RADIO FREQUENCY BASED WATER METERS has been revised accordingly. Engineer approved equal meters may be considered for this project.

4. **Question:**

Does the project require prevailing wage rates? And if so, can you provide a wage determination?

Answer:

No. The project does not require prevailing wage rates.

5. **Question:**

Regarding Article 7.13 of the Standard General Conditions of the Construction Contract, is having all employees and Contractors versed on safety training, as well as a field manager responsible for the safety training and the job site acceptable for the Safety Representative? If not, please define “qualified and experienced”.

Answer:

No. The Safety Representative is an individual whose duties and responsibilities are the prevention of accidents and maintaining and supervising of safety precautions and programs. The qualified and experienced Safety Representative shall have the applicable safety training and shall make the decisions on requirements for safety on site with at least three (3) years of experience with projects of similar size.

6. **Question:**

Is the City willing to add more days to the Abnormal Weather Days given the time of the year and potential adverse weather conditions?

Answer:

Yes. A tracking sheet for abnormal weather days is included in the specifications.

7. **Question:**

Does the City have a location for the temporary storage of meters prior to installation? If not, does the City have a secure location for the placement of a storage container?

Answer:

The City has enough room to temporarily store meters at the Water Treatment Plant.

8. **Question:**

Does the Prime Contractor have to do 50% of the work?

Answer:

The Prime Contractor for this project shall be the Manufacturer and the Subcontractor shall be the Installer. The Prime Contractor should perform at least 50% of the work for the project.

9. **Question:**

Does the Manufacturer need to name the Subcontractor now, or can the Subcontractor be named once notified of award?

Answer:

The Manufacturer should name the Subcontractor now as part of the bid.

10. **Question:**

Does a Safety Representative need to be onsite at all times? If not, when is it required? Who makes the decision on requirements for safety?

Answer:

Yes. The Safety Representative must be onsite at all times and shall determine the requirements for safety on site.

11. **Question:**

Does the City have a tax exemption form for equipment and materials?

Answer:

Yes. The City shall give the awarded Contractor the tax exemption number for the purchasing of materials and equipment.

12. **Question:**

Will any additional construction permits be necessary?

Answer:

No. Additional construction permits are not necessary for this project.

13. **Question:**

If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as non-responsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work. What about an exceptions page?

Answer:

The Contractor shall not take any exceptions to the provisions to the Bidding Documents or attempt to alter the contents of the Contract Documents.

14. **Question:**

What is the Contract Work Hours and Safety Standards Act at 29 CFR 5.5 (b)?

Answer:

The Contract Work Hours and Safety Standards Act at 29 CFR 5.5 (b) is additional language that is inserted if the Contract amount is over \$100,000 and is subject to overtime provisions. The information can be found at the following link: <https://www.law.cornell.edu/cfr/text/29/5.5>.

15. **Question:**

Does the 50% limit on subcontracting apply to the total cost of the project including materials?

Answer:

Yes.

16. **Question:**

For inside-set meters, how many homeowner contact attempts by the Contractor are required before turning it back to the City?

Answer:

The Contractor should make at least three (3) attempts in good faith before turning it back to the City.

17. **Question:**

Is Builder's Risk Insurance necessary and required for the project?

Answer:

No.

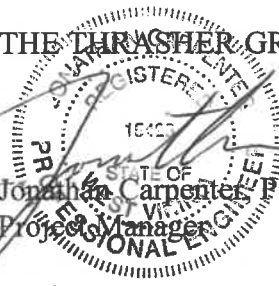
E. GENERAL

1. Wage Rates are NOT required for this project.
2. B&O Taxes are required for this project.
3. Construction efforts are limited to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated per the Summary Specification – 011000.
4. Bidders are hereby notified to acknowledge receipt of all addenda in space provided on the Bid Form.

If you have any questions or need any other information, please do not hesitate to contact me.

Sincerely,

THE THRASHER GROUP, INC.



Jonathan Carpenter
Jonathan Carpenter, P.E.
Project Manager

Enclosures

CITY OF LOGAN WATER DEPARTMENT
LOGAN COUNTY, WEST VIRGINIA
PROPOSED

CONTRACT #1 – AUTOMATED METERING INFRASTRUCTURE SYSTEM
THRASHER PROJECT #010-10091

BID FORM

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

*City of Logan Water Department
730 Stratton Street
Logan, WV 25601*

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No. **Addendum Date**

_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous

Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
 - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

GENERAL

The Bidder shall take notice of and shall be responsible for any local or state taxes levied and applicable, and the cost for the same shall be included as part of the submitted Bid.

The total Bid cost stated includes a complete operating installation including furnishing and installation of any and all changes or additions in plans, piping, mechanical work, additional electrical work, accessories, controls, etc. necessary to accommodate alternative equipment systems or materials used in construction.

BID PROPOSAL

The Bidder agrees to perform all required Work described in the detailed Specifications and as shown on the Plans for the complete construction and placing in satisfactory operation the Automated Metering Infrastructure System. The Project "Sequence of Construction" has been detailed in the Drawings and Specification Division 1, Project Summary, Section 011000. The Bidder agrees to perform all the Work proposed for the total of the following Bid prices.

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

**PROPOSED
CONTRACT #1 – AUTOMATED METERING INFRASTRUCTURE (AMI) SYSTEM
FOR THE**

**CITY OF LOGAN WATER DEPARTMENT
LOGAN COUNTY, WEST VIRGINIA
THRASHER PROJECT #010-10091**

BID SCHEDULE

NOTE: Bid Unit PRICE amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Bids shall include sales tax and all other applicable taxes and fees.

Item	Quantity	Description with Unit Price Written	Unit Price	Total Price
1	1 LS	Mobilization/Demobilization		
			Dollars _____	
			Cents _____	
2	1,704 EA	5/8" x 3/4" Water Meters (Outdoor Installation)		
			Dollars _____	
			Cents _____	
3	85 EA	5/8" x 3/4" Water Meters (Indoor Installation)		
			Dollars _____	
			Cents _____	

Item	Quantity	Description with Unit Price Written	Unit Price	Total Price
4	38 EA	3/4" Water Meters (Outdoor Installation)		
			Dollars	
			Cents	
5	49 EA	1" Water Meters (Outdoor Installation)		
			Dollars	
			Cents	
6	1 EA	1-1/4" Water Meter (Outdoor Installation)		
			Dollars	
			Cents	
7	30 EA	1-1/2" Water Meters (Outdoor Installation)		
			Dollars	
			Cents	
8	55 EA	2" Water Meters (Outdoor Installation)		
			Dollars	
			Cents	
9	4 EA	3" Water Meters (Outdoor Installation)		
			Dollars	
			Cents	
10	1 EA	4" Water Meter (Outdoor Installation)		
			Dollars	
			Cents	
11	50 EA	5/8" x 3/4" Service Meter Settings (High Pressure)		
			Dollars	
			Cents	
12	1 LS	Meter Reading Software		
			Dollars	
			Cents	

Item	Quantity	Description with Unit Price Written	Unit Price	Total Price
13	1 LS	Communication Equipment		
			Dollars _____	
			Cents _____	
14	1 LS	Implementation, On-Site Training (5 days)		
			Dollars _____	
			Cents _____	
15	1,130 EA	15" Meter Lids		
			Dollars _____	
			Cents _____	
16	752 EA	18" Meter Lids		
			Dollars _____	
			Cents _____	
TOTAL BID:				
			(\$ _____)	

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

NOTE: THE CONTRACTOR'S UNIT PRICES SHALL INCLUDE PURCHASE AND INSTALLATION, COMPLETE IN PLACE, PER BID ITEM IN ACCORDANCE WITH THE DETAILED SPECIFICATIONS.

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

METHOD OF AWARD

If at the time this contract is to be awarded, the lowest total bid submitted by a qualified, responsible Bidder does not exceed the amount of funds then estimated by the Owner, as available to finance the contract, the construction contract will be awarded. If such bids exceed such amount, the Owner may reject all bids.

The owner may award the contract on the Total Bid submitted by a qualified responsible Bidder less the amount(s) of the Deductive Alternate(s) subtracted in numerical order, as listed in the contract to produce the lowest bid within the funds available for financing.

- A. Unit prices have been computed in accordance with paragraph 13.03.A of the General Conditions.
- B. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
 - A. Bid Opening Requirements

ARTICLE 8 – DEFINED TERMS

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:

[Signature]

[Printed name]

(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

[Signature]

[Printed name]

Title:

Submittal Date:

Address for giving notices:

Telephone Number:

Fax Number:

Contact Name and e-mail address:

Bidder's License No.:

(where applicable)

NOTE TO USER: Use in those states or other jurisdictions where applicable or required.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Specification conventions.

1.2 PROJECT INFORMATION

A. Project Identification: Contract #1 – Automated Metering Infrastructure (AMI) System.

1. Project Location: Logan, WV.

B. Owner: City of Logan Water Department.

1. Owner's Representative: Herb Staten, Chief Water Treatment Plant Operator.

C. Engineer: The Thrasher Group, Inc.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The Work consists of the furnishing and installation of a complete, operational Automated Metering Infrastructure (AMI) System including, but not limited to, the following: 1 LS Mobilization/Demobilization; 1,704 EA 5/8" x 3/4" Water Meters (Outdoor Installation); 85 EA 5/8" x 3/4" Water Meters (Indoor Installation); 38 EA 3/4" Water Meters (Outdoor Installation); 49 EA 1" Water Meters (Outdoor Installation); 1 EA 1-1/4" Water Meter (Outdoor Installation); 30 EA 1-1/2" Water Meters (Outdoor Installation); 55 EA 2" Water Meters (Outdoor Installation); 4 EA 3" Water Meters (Outdoor Installation); 1 EA 4" Water Meter (Outdoor Installation); 50 EA 5/8" x 3/4" Service Meter Settings (High Pressure); 1 LS Meter Reading Software; 1 LS Communication Equipment; 1 LS Implementation, On-Site Training (5 days); 1,130 EA 15" Meter Lids; 752 EA 18" Meter Lids.

1.4 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to the public, the Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - 2. Deliveries: Schedule deliveries to minimize use of driveways and entrances by construction operations as well as time requirements for storage of materials and equipment on-site.

1.5 SPECIFICATION CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONSTRUCTION SEQUENCE OF EVENTS

- 1. Contact Miss Utility or "Call 811" at 1-800-245-4848 for existing utility locations.
- 2. Coordinate with the Owner to determine location and inventory of existing meters.
- 3. Mobilization to Project site.
- 4. Remove and replace all required water meters. Modify existing water meter lids as necessary.
- 5. Install all water meter hardware and software.
- 6. Perform start-up of Automated Metering Infrastructure System.
- 7. Provide all necessary auxiliary equipment.

8. Provide all necessary training to Owner's employees.
9. Conduct all cleaning, seeding, and mulching, as necessary.
10. Complete all punch list items.
11. Complete all project closeout items.
12. Demobilization from Project site.

END OF SECTION 011000

SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Change Procedures
- D. Defect Assessment
- E. Measurement and Payment.

1.2 SCHEDULE OF VALUES

- A. Submit printed schedule on Progress Estimate schedule on EJCDC C-620 – Contractor’s Application for Payment.
- B. Submit Schedule of Values in duplicate within 20 days after date established in Notice to Proceed.
- C. Format: Identify each line item with number and title of major Specification Section. Contractor shall submit a balanced Schedule of Values. The total value of activities shall equal the identifiable Contract Price. The Schedule of Values shall be accompanied by a proposed cash flow for the duration of the Project. Line items shall be broken down as appropriate and listed as units. Overhead and profit shall be prorated to all the activities.
 - 1. Unless otherwise specified, the Schedule of Values shall include the following percentages for the listed activities:
 - a. Mobilization, Bonds, Insurance, and Demobilization: no greater than 5%.
 - b. Punchlist: no less than 2%.
 - c. All Spare Parts Values not specifically assigned elsewhere: no less than 0.5%.
 - d. Testing: no less than 1%.
 - 2. Schedules whose non-equipment related cash flow exceeds 10% of the total Contract amount (exclusive of equipment) in any one (1) month, or 45% of the total Contract amount (exclusive of equipment) in any three (3) consecutive months shall be deemed unacceptable and require revision. Exceptions may be granted at the discretion of the Engineer for unusual circumstances or non-routine construction.
 - 3. If, in the opinion of Engineer or Owner, the Schedule of Values is unbalanced, Contractor shall submit documentation substantiating the cost allocations of those activities believed to be unbalanced. No pay requests will be accepted until the Schedule of Values submittals has been marked “No Exceptions Taken” or “Make Corrections Noted” by Engineer.

- D. Include within each line item, direct proportional amount of Contractor's overhead and profit.
- E. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

- A. Submit five (5) copies of each Application for Payment on EJCDC C-620 – Contractor's Application for Payment.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule and payment schedule with each Application for Payment.
- D. Payment Period: Submit at intervals stipulated in the Agreement.
- E. Submit submittals with transmittal letter, as specified in Section 013300 - Submittal Procedures.
- F. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 - 1. Current construction photographs.
 - 2. Partial release of Liens from major Subcontractors and vendors.
 - 3. Record Documents as specified in Section 017000 - Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
 - 4. Affidavits attesting to off-Site stored products.
 - 5. Construction Progress Schedule, revised and current as specified in Section 013300 - Submittal Procedures.
 - 6. Affidavit of Previous Payments.
 - 7. Adverse Weather Day documentation.

1.4 CHANGE PROCEDURES

- A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.
- C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.
 - 1. Use Request for Information Form for requesting interpretations (provided by Engineer upon request).
 - 2. Engineer may respond with a direct answer on the Request for Information form, separate Engineer Response, EJCDC C-942 - Field Order, or EJCDC C-940 - Work Change Directive Form.

- D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on EJCDC C-942 – Field Order.
- E. Engineer may issue Notice of Change including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with stipulation of overtime Work required and with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 10 days.
- F. Contractor may propose changes by submitting a request for change to Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change and the effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on the Work by separate or other Contractors.
- G. Stipulated Sum/Price Change Order: Based on Proposal Request or Work Change Directive and Contractor’s maximum price quotation or Contractor’s request for Change Order as approved by Engineer.
- H. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under Work Directive Change. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- I. Work Change Directive: Engineer may issue directive, on EJCDC C-940 - Work Change Directive, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
- J. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- K. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.
- L. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.
- M. Change Order Forms: EJCDC C-941 - Change Order.
- N. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- O. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise Progress Schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of Work affected by the change, and resubmit.

3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Engineer or Owner, it is not practical to remove and replace the Work, Engineer or Owner will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.
- D. Defective Work will be partially repaired according to instructions of Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Owner.
- E. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Owner to assess defects and identify payment adjustments is final.
- G. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
 1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from transporting vehicle.
 4. Products placed beyond lines and levels of the required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected products.

1.6 MEASUREMENT AND PAYMENT

- A. General Requirements
 1. Contractor shall take measurements and compute quantities. Engineer will verify measurements and quantities.
 2. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Actual quantities provided shall determine payment.
 - a. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at Contracted unit sum/prices.
 - b. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim a Contract Price adjustment.
 3. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.

4. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.

B. Measurement of Quantities

1. Weigh Scales: Inspected, tested, and certified by applicable West Virginia weights and measures department within past year.
2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
3. Metering Devices: Inspected, tested, and certified by applicable West Virginia department within past year.
4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel, or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
5. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
6. Measurement by Area: Measured by square dimension using mean length and width or radius.
7. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
8. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.

C. Unit Price Schedule:

1. Bid Item 1 – Mobilization/Demobilization
 - a. This Bid Item shall include all cost associated with the performance of construction preparatory operations, including, but not limited to, the movement of equipment and personnel to and from the Project Site; establishment and decommissioning of Contractor's Field Office, storage buildings, and other facilities necessary to conduct Work under this Contract; payment of all bonding costs incurred by the Contractor; all materials and equipment required for unloading and reloading; and all costs associated with demobilization.
 - b. This Bid Item shall also include any and all costs associated with the following specification sections:
 - 1) Section 013000 – Administrative Requirements
 - 2) Section 013216 – Construction Progress Schedule
 - 3) Section 013300 – Submittal Procedures
 - 4) Section 017000 – Execution and Closeout Requirements
 - c. Payment shall be made at the lump sum (LS) price Bid for Mobilization/Demobilization, but in no case shall the total lump sum Bid Price exceed 5% of the total Bid.
 - d. Partial Payments of the lump sum Bid amount for Mobilization/Demobilization shall be as follows:
 - 1) One-fourth (1/4) of the amount Bid for Mobilization/Demobilization will be released to the Contractor at the first estimate payable.

- 2) The second one-fourth (1/4) of the amount Bid for Mobilization/Demobilization shall be released with the second estimate payable.
 - 3) The third one-fourth (1/4) of the amount Bid for Mobilization/Demobilization shall be released with the third estimate payable.
 - 4) The final one-fourth (1/4) of the amount Bid for Mobilization/Demobilization shall be paid with the final payment.
 - 5) No reduction will be made, nor any increase be made, in the lump sum mobilization item amount regardless of decreased or increases in the final total Contract amount or for any other cause.
2. Bid Item 2 – 5/8” x 3/4” Water Meter (Outdoor Installation)
 - a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 5/8” x 3/4” Water Meter including, but not limited to, removal of existing water meter and installation of new water meter with all necessary fittings, tools, supplies, and incidentals for a complete operable unit.
 - b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
 3. Bid Item 3 – 5/8” x 3/4” Water Meter (Indoor Installation)
 - a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 5/8” x 3/4” Water Meter including, but not limited to, removal of existing water meter and installation of new water meter with all necessary fittings, tools, supplies, and incidentals for a complete operable unit.
 - b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
 4. Bid Item 4 – 3/4” Water Meter (Outdoor Installation)
 - a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 3/4” Water Meter including, but not limited to, removal of existing water meter and installation of new water meter with all necessary fittings, tools, supplies, and incidentals for a complete operable unit.
 - b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
 5. Bid Item 5 – 1” Water Meter (Outdoor Installation)
 - a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 1” Water Meter including, but not limited to, removal of existing water meter and installation of new water meter with all necessary fittings, tools, supplies, and incidentals for a complete operable unit.

- b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
11. Bid Item 11 – 5/8” x 3/4” Service Meter Setting (High Pressure)
- a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 5/8” x 3/4” High Pressure Service Meter Setting with all necessary fittings, pressure reducing valves (PRVs), valves, tools, supplies, and incidentals for a complete operable meter setter. The Contractor shall provide an inventory of existing meter setters found in poor condition to the Engineer for review. At the Owner and Engineer’s discretion, existing meter setters shall be replaced and paid for under this Bid Item.
 - b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
12. Bid Item 12 – Meter Reading Software
- a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of the Meter Reading Software as specified in Section 331200 – Radio Frequency Based Water Meters, with all necessary fittings, tools, supplies, and incidentals for a complete operable system.
 - b. Measurement and payment for this Bid Item shall be made at the lump sum Bid Price for Meter Reading Software.
13. Bid Item 13 – Communication Equipment
- a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of the Communication Equipment as specified in Section 275123 – Automated Metering Infrastructure (AMI) System with all necessary fittings, tools, supplies, and incidentals for a complete operable system.
 - b. Measurement and payment for this Bid Item shall be made at the lump sum Bid Price for Communication Equipment.
14. Bid Item 14 – Implementation, On-Site Training (5 days)
- a. This Bid Item shall include all required training for five (5) days for the City of Logan staff as specified in Section 275123 – Automated Metering Infrastructure (AMI) System.
 - b. Measurement and payment for this Bid Item shall be made at the lump sum Bid Price for Implementation, On-Site Training (5 days).
15. Bid Item 15 – 15” Meter Lid
- a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 15” Meter Lid with all necessary fittings, frame, tools, supplies, and incidentals for a complete operable unit. The Contractor shall provide an inventory of existing meter lids and frames found in poor condition to the Engineer for review. At the Owner and Engineer’s discretion, existing meter lids shall be replaced and paid for under this Bid Item.

- b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.
16. Bid Item 16 – 18” Meter Lid
- a. This Bid Item shall include all required labor, materials, equipment, and all other costs associated with the complete installation of 18” Meter Lid with all necessary fittings, frame, tools, supplies, and incidentals for a complete operable unit. The Contractor shall provide an inventory of existing meter lids and frames found in poor condition to the Engineer for review. At the Owner and Engineer’s discretion, existing meter lid and frame shall be replaced and paid for under this Bid Item.
 - b. Measurement and payment for this Bid Item shall be based on the Unit Bid Price per each for installation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012000

SECTION 275123 – AUTOMATED METERING INFRASTRUCTURE (AMI) SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Scope:

1. This section specifies the requirements for a radio frequency based automatic water metering system manufacturer to provide all equipment as indicated in this specification. The manufacturer shall serve as the prime contractor for this project. The radio frequency based automatic water metering system manufacturer shall utilize an installation contractor to ensure all equipment is installed as indicated in this specification. The installation Contractor shall be required to install all water meters provided as part of this contract. The total number of water meters requiring installation is indicated in a separate Bid Form.

B. Section Includes:

1. Meter Interface Units (MIU)
2. Route Management Software
3. Radio Frequency Storage Devices

1.2 SYSTEM TECHNICAL REQUIREMENTS

- A. A meter interface unit (MIU) shall be purchased and installed with each meter and shall have output encoded meter reading, backflow, tamper data, and duration codes for each status via radio frequency (RF) signal. The MIU modules shall be capable of bi-directional communication. MIU modules shall transmit hourly profile consumption data for a minimum of 90 days when initialized to provide an historic usage profile for the meter.
- B. A meter-reading route shall be provided from the City of Logan Water Department existing host billing software package to a route management program supplied as part of the selected reading system. The City shall provide the interface file from the billing system in the proper file format to facilitate technical assistance and standardize the interface. Since the City has a working relationship with the billing software provider, it shall be the City's responsibility to facilitate the interface and provide it to the operating software provider. If the billing software provider is unable to complete the interface in the proper format, the route management software provider will have the interface completed at NO additional charge. The route management software provider shall bear any additional fees associated with proper formatting.
- C. Once in the route management software, the meter-reading route shall be downloaded into collection devices used for collecting the meter readings via publically owned radio frequency signal.

- D. The collection equipment shall consist of a laptop computer, a smart phone, or other mobile device that will be located at the City of Logan Water Treatment Plant, as well as a radio receiver/transmitter and a rooftop antenna. A dedicated vehicle shall not be required.
- E. The City shall be able to collect the transmitted data via Automated Metering Infrastructure (AMI) collection equipment and should be powered by a wired connection at the antenna site. The collection device (RF receiver/transmitter) shall receive the data by RF signal and then transfer the data to a database to the laptop computer, smart phone, or mobile device for storage in real time. At the end of the process, the collected data shall be uploaded from the AMI equipment into the route management software.
- F. Once the readings have been collected and uploaded into the route management software, the system operator shall be able to view or print statistics and create system management reports. The collected readings shall then be transferred from the route management software to the host billing system.
- G. All software and hardware required to complete this process, shall be supplied as part of this proposal.
- H. Radio Frequency Based MIUs and Meters shall be provided by this Contract. The manufacturer shall ensure the system is compatible with the following manufacturers: Kamstrup, Zenner USA, Neptune Technology Group, Inc., and Sensus Inc.

1.3 SUBMITTALS

- A. Copies of all materials required to establish compliance with the specifications shall be submitted to the City for review and approval prior to ordering equipment. The submittal format shall be in the form of a booklet, suitably tabbed and divided to cover at least the areas noted below for each major equipment item. The submittal booklet shall include adequate detail and sufficient information for the City to determine that all of the equipment proposed meets the detailed requirements of the Specifications. Incomplete or partial submittals shall not be reviewed. Submittals shall include at least the following:
 - 1. A copy of this specification section, with addendum updates included, if applicable, and all referenced sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The City shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined shall signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
 - 2. Product Data: Submit manufacturer information for system materials and component equipment, including connection requirements.

3. Shop Drawings:
 - a. Indicate system materials and component equipment.
 - b. Submit installation requirements and other details.
4. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
5. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
6. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
7. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.
8. Qualifications Statement: Submit qualifications for manufacturer.
9. Contractor shall be responsible for determining the existing customer count and meter inventory prior to purchase and installation of any proposed meters.
10. Contractor shall provide a list with a minimum of five water meter replacements projects involving radio read meters. The projects must include a minimum of 2,000 meters.

1.4 QUALITY ASSURANCE

- A. The Radio Frequency Based Automatic Water Metering System supplier shall be responsible for the system software and purchase and installation of the radio frequency based water meters.
- B. Maintain one (1) copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 METER INTERFACE UNITS (MIU)

A. System Overview

1. MIU modules shall transmit hourly profile consumption data for a minimum of 90 days when initialized to provide an historic usage profile for the meter. **MIU models unable to store and transmit consumption data will not be considered.**
2. The proposed radio MIU system must have at least 100 utilities currently using the proposed meter/radio system combination in the United States. Manufacturers must provide a list of at least ten (10) references with contact information.
3. The MIU units must transmit the encoded reading and event/duration data via radio frequency signal. The MIU units must be capable of operating in bi-direction communication mode.
4. MIU modules must be programmed at the manufacturer and should require no additional field programming.
5. All wiring and connections for MIUs (sizes 5/8" x 3/4" through 4") must be installed and potted by the manufacturer for protection against moisture.
6. MIUs for sizes 5/8" x 3/4" through 1" meters require *integral* mount MIU that has no exposed wire for pit installations.
7. All wiring for MIU's in line connectors shall be installed and potted to the Display/Register by the manufacturer.

8. In line waterproof connections are permitted for meter connection to MIU's to facilitate installation and field analysis of operation.
9. All wiring for MIU's shall be installed and potted by the manufacturer.
10. Assembly:
 - a. MIU shall be permanently sealed so that it is impervious to dust, dirt, moisture, and operate underwater.
 - b. The proposed MIU shall be designed to encode water consumption, leak detection (small and large leaks), backflow, no flow, wire tampering and the duration of these events at the meter, store this data, and transmit this data to the data collection device. This information must be instantly available for viewing by the meter reader as soon as the meter is read by the AMI system.
 - c. If any type of special tools shall be required to remove the MIU, it must be provided by the installer.

2.2 ROUTE MANAGEMENT SOFTWARE

- A. The host billing system will supply all route information such as account number, current reading, high/low range and other data elements. This eliminates the need to maintain redundant data files and avoids opportunity for introduction of errors conflicting with the host system. The Meter Reading Route Management Software shall load and unload data and allow reporting of collected data. Collected data will then be transferred back to the host billing system. No cloud based software shall be permitted.

- a. The MIU shall collect all data and be capable of profiling the data for customer review.

B. System Overview:

The software and hardware shall:

1. Provide a standard interface for utility billing systems as well as the ability to adapt to existing billing system interfaces as stipulated in Section 2.2.
2. Output this route data for reading to the user's choice of any or all of the following types of collection devices:
 - a. Handheld Computer for visual read and entry via alphanumeric keypad
 - b. Handheld Computer/Radio Receiver for radio reading
 - c. Laptop Computer with radio receiver for mobile radio reading
 - d. The Meter Inventory Software shall be provided with the existing and new meter inventory information.
3. Support the use of manual entry and radio receiver/transmitter technology to be implemented as needed within the same route, giving the utility the maximum flexibility in use. Mobile radio frequency based equipment shall be supported in separate routes.

C. Computer Platform:

The software and hardware shall:

1. The radio frequency based water meter system manufacturer shall provide and install a computer platform at a location designated by the City as indicated below.
2. The computer platform shall be a Microsoft™ Windows based application, which is designed meeting the Open Systems Foundation goals. The data utilized in the application shall be compatible with a host of other management and office applications such as spreadsheet and database tools.
3. The manufacturer shall provide and install a computer that meets or exceeds the following minimum requirements: 1.6 GHz Processor or faster, 512 MB of RAM, 2GB of free available hard disk space, 17” SVGA monitor, CD-ROM drive, mouse, and standard COM1 and COM2 serial ports and USB 2.0 for handheld communications.
4. Must be compatible with the City of Logan Water Department’s existing billing software.

D. Communications (PC to Laptop Computer):

1. Permit the transfer of data and generation of reports.
2. All communications during upload and download of laptop computer shall be extensively error checked to ensure data integrity.
3. The system shall load/unload reading data to a laptop computer or mobile device by wireless connection.

E. Absolute Encoder Register Technology:

1. All registers shall record units of gallons. Registers shall have a 9-digit display.
2. The register shall be a true absolute encoder register that provides direct electronic transfer of meter reading information to any number of AMI devices.
3. The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the interrogation device.
4. The encoder register shall transmit the complete digital reading. Identification number shall be factory set and never duplicated.
5. For pit set installations, the encoder register shall be permanently factory sealed with an epoxy coating of all terminal connections. Encoder registers requiring field sealing of the wire connection will not be allowed.
6. No wire connections or wire splicing of any kind shall be required to be performed during installation for pit set encoder registers.

2.3 RADIO FREQUENCY STORAGE DEVICES

A. Scope:

1. This specification covers the collection equipment for mobile radio frequency meter reading equipment only.

B. System Operation:

1. Collection of the meter readings shall be achieved through the use of MIU modules that continuously transmit the meter readings in preset intervals of two (2) seconds to ensure high performance meter reading as well as store a minimum of 90 days of data. As such, the Meter Reading, Reverse Flow, No Flow, Leak (both Small and High), Register

Disconnect, Bad Data, Meter Tampering, and Wheel Location data is always available whenever the meter reader remotely reads the meter, without the need for a wake-up call.

2. Collection equipment includes a radio receiver/transmitter and a laptop computer or mobile device for collection and storage of the readings in real time at the City of Logan Water Treatment Plant.

C. Laptop Computer Specifications:

1. The system shall operate only on radio frequencies that do not require FCC licensing.
2. The mobile collection components shall be lightweight and portable. No dedicated vehicle(s) shall be required.
3. The system shall be capable of registering 25,000 accounts.
4. The laptop computer shall operate on at least a Windows based operating system.
5. The laptop computer shall have a 233 MHz processor or faster.
6. The system shall indicate visually to the operator if the laptop computer loses communications with the radio receiver during operation.
7. The laptop computer shall have an internal time clock for time (hour/minutes/seconds) and date (month/day/year) stamping of meter readings as they are collected.

D. Receiver Specifications:

1. The receiver shall be small and lightweight for ease of handling.
2. The receiver shall be cable connected to the laptop computer RS 232 port or utilize a USB to Serial Adapter in the absence of a serial port.
3. The receiver shall be capable of receiving transmissions on multiple discreet channels to facilitate MIU reception.
4. The system shall operate only on radio frequencies that do not require FCC licensing.
5. The receiver shall incorporate LED lights to evaluate power and communication status.
6. The receiver shall be connected to the laptop by a nine pin serial port cable or at the utility's option, a suitable RS-232 to serial port adapter.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the Automated Metering Infrastructure System per Manufacturer's recommendations.
- B. Manufacturer shall be responsible for the temporary storage of all proposed equipment during the installation period as the City does not have adequate space for the storage of any equipment. Manufacturer shall be responsible for any and all warehouse fees and insurances.

3.2 FIELD QUALITY CONTROL

- A. Comply with Section 017000 – Execution and Closeout Requirements regarding requirements for testing, adjusting, and balancing.

3.3 WARRANTY

A. Warranty:

1. The manufacturer of the Automated Metering Infrastructure System shall provide a one (1) year warranty from the date of Substantial Completion and the equipment shall be free from defects in design, workmanship, or materials.

B. Technical Support:

1. Technical support staff and authorized factory representative with 24-hour on-call availability shall be provided for at least one (1) year with an option to extend annually for up to three (3) years.
2. The selected manufacturer's local sales representative shall be the sole point of contact for all technical support.

END OF SECTION 331200

SECTION 331200 – RADIO FREQUENCY BASED WATER METERS

PART 1 - GENERAL

1.1 SUMMARY

A. Scope:

1. This section specifies the requirements for a radio frequency based water meter manufacturer to provide all equipment as indicated in this specification.

B. Section Includes:

1. Ultrasonic Water Meters
2. Data Register

1.2 SYSTEM TECHNICAL REQUIREMENTS

- A. Each meter shall be supplied complete with a meter interface unit (MIU) that shall output encoded meter reading, small and large leak, backflow, tamper data and duration codes for each status via radio frequency (RF) signal. The MIU modules shall be capable of uni-directional or bi-directional communication. MIU transmissions to the receiver shall occur in the unlicensed 450-470 MHz band. MIU modules shall transmit hourly profile consumption data for a minimum of 90 days when initialized to provide an historic usage profile for the meter.

- B. Meters shall be provided as individual units.

1.3 SUBMITTALS

- A. Copies of all materials required to establish compliance with the specifications shall be submitted to the City for review and approval prior to ordering the water meters. The submittal format shall be in the form of a booklet, suitably tabbed and divided to cover at least the areas noted below for each major equipment item. The submittal booklet shall include adequate detail and sufficient information for the City to determine that all of the equipment proposed meets the detailed requirements of the Specifications. Incomplete or partial submittals shall not be reviewed. Submittals shall include at least the following:

1. A copy of this specification section, with addendum updates included, if applicable, and all referenced sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The City shall be the final authority for determining acceptability of requested deviations. The remaining portions of the

paragraph not underlined shall signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Product Data: Submit manufacturer information for system materials and component equipment, including connection requirements.
3. Shop Drawings:
 - a. Indicate system materials and component equipment.
 - b. Submit installation requirements and other details.
4. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
5. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
6. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
7. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.
8. Qualifications Statement: Submit qualifications for manufacturer.

1.4 QUALITY ASSURANCE

- A. Unit responsibility for the radio read meters and all ancillary equipment shall be borne by the Contractor.
- B. Perform Work according to specified standards.
- C. Maintain one copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The City believes the following manufacturers are capable of producing equipment and products, which satisfy the requirements of this Section. However, this statement shall not be construed as an endorsement of one particular manufacturer's standard product, nor shall it be construed that a named manufacturer's standard product shall comply with the requirements of this Section. Candidate manufacturers include: Kamstrup, Zenner USA, Neptune Technology Group, Inc., and Sensus Inc.
- B. Basis of Design Equipment is:
 1. 5/8" x 3/4", 3/4", 1", and 1-1/4" Ultrasonic Water Meters: Kamstrup flowIQ 2250.
 2. 1-1/2", 2", 3", and 4" Ultrasonic Water Meters: Kamstrup flowIQ 3250.

2.2 ULTRASONIC WATER METERS

A. 5/8" x 3/4", 3/4", 1", and 1-1/4" Ultrasonic Water Meters:

1. Scope:

- a. This Specification covers hermetically sealed cold-water ultrasonic meters compatible with radio frequency equipment, in 5/8" x 3/4", 3/4", 1", and 1-1/4" sizes and the materials employed in their fabrication.

2. Standards:

a. AWWA Standards:

- 1) All Meters shall meet or exceed the latest version of the American Water Works Association Standard C715-18 for Cold Water Meters – Electromagnetic and Ultrasonic Type.
- 2) All Meters equipped with encoder registers shall meet or exceed the American Water Works Association Standard C700 for Electronic-Type Remote-Registration systems for Cold Water Meters when equipped with an open architecture radio MIU or similar device.
- 3) All Meters maximum permissible error should fall in accordance with the American Water Works Association Standard C-718-18 - $\pm 5\%$ in extended low flow range and $\pm 1.5\%$ in normal and high flow range.

- b. NSF-61 Standards: All Meters shall comply with the latest NSF-61, Annex F and Annex G requirements.

3. Measuring Technology:

- a. Measuring technology shall be ultrasonic in nature measuring the water consumption electronically, as a volume, using a pair of ultrasonic signals to determine all flow data. The meter shall be either battery powered or mains powered with battery backup and a microprocessor based signal converter as specified by the Owner.
- b. The ultrasonic flow meter shall be a Kamstrup flowIQ 2250 or equivalent.

4. Material:

a. Composite:

- 1) Meter Housing and Flow Part: Polyphenylene sulfide (PPS) with fiberglass reinforcement
- 2) Reflectors: Stainless Steel
- 3) Top Ring (Seal): Polycarbonate (gray)

b. 2-Part Body:

- 1) Flow part (Threaded or Flanged): 316 Stainless Steel or Brass CW511L
- 2) O-Ring/Gasket: EPDM
- 3) Measuring Tube: PPS with fiberglass reinforcement
- 4) Top Ring (Seal): Polycarbonate (gray)

5. Head Loss:

- a. No mechanical measuring element component may extend into the measuring tube which increases pressure loss.
- b. No strainers shall be used or required for proper operation of the meter. Strainers increase pressure loss and are not desirable.
- c. In the event a strainer is used, acceptable installation is a minimum of five (5) inlet pipe diameters downstream of the meter.

6. Accuracy:

- a. Meters shall be 100% factory tested for accuracy and have the factory test results provided with each meter.
- b. Meters shall be pressure tested to ensure against leakage.
- c. Meters shall comply with the AWWA C715-18 accuracy requirements as specified in of the standard for a period of five (5) years from the date of installation.
- d. Additionally, the manufacturer shall warranty the meter to meet or exceed AWWA repaired meter accuracy standards.

B. 1-1/2", 2", 3", and 4" Ultrasonic Water Meters:

1. Scope:

- a. This Specification covers hermetically sealed cold-water ultrasonic meters compatible with radio frequency equipment, in 1-1/2", 2", 3", and 4" sizes and the materials employed in their fabrication.

2. Standards:

a. AWWA Standards:

- 1) All Meters shall meet or exceed the latest version of the American Water Works Association Standard C715-18 for Cold Water Meters – Electromagnetic and Ultrasonic Type.
- 2) All Meters equipped with encoder registers shall meet or exceed the American Water Works Association Standard C700 for Electronic-Type Remote-Registration systems for Cold Water Meters when equipped with a open architecture radio MIU or similar device.
- 3) All Meters maximum permissible error should fall in accordance with the American Water Works Association Standard C-718-18 - $\pm 5\%$ in extended low flow range and $\pm 1.5\%$ in normal and high flow range.

- b. NSF-61 Standards: All Meters shall comply with the latest NSF-61, Annex F and Annex G requirements.

3. Measuring Technology:
 - a. Measuring technology shall be ultrasonic in nature measuring the water consumption electronically, as a volume, using a pair of ultrasonic signals to determine all flow data. The meter shall be either battery powered or mains powered with battery backup and a microprocessor based signal converter as specified by the Owner.
 - b. The ultrasonic flow meter shall be a Kamstrup flowIQ 3250 or equivalent.

4. Material:
 - a. 2-Part Body:
 - 1) Flow part (Threaded or Flanged): 316 Stainless Steel or Brass CW511L
 - 2) O-Ring/Gasket: EPDM
 - 3) Measuring Tube: PPS with fiberglass reinforcement
 - 4) Reflectors: Stainless Steel
 - 5) Meter Housing: PPS with fiberglass reinforcement
 - 6) Cover: Glass
 - 7) Spring Ring: Stainless Steel
 - 8) Top Ring (Seal): Polycarbonate (gray)

5. Head Loss:
 - a. No mechanical measuring element component may extend into the measuring tube which increases pressure loss.
 - b. No strainers shall be used or required for proper operation of the meter. Strainers increase pressure loss and are not desirable.
 - c. In the event a strainer is used, acceptable installation is a minimum of five (5) inlet pipe diameters downstream of the meter.

6. Accuracy:
 - a. Meters shall be 100% factory tested for accuracy and have the factory test results provided with each meter.
 - b. Meters shall be pressure tested to ensure against leakage.
 - c. Meters shall comply with the AWWA C715-18 accuracy requirements as specified in of the standard for a period of five (5) years from the date of installation.
 - d. Additionally, the manufacturer shall warranty the meter to meet or exceed AWWA repaired meter accuracy standards.

2.3 DATA REGISTER

A. Scope:

1. This specification covers the Data Registers intended for use with all sizes of currently manufactured ultrasonic meters, at a minimum.

B. Construction:

1. The data register shall be completely sealed and impervious to dust, dirt, and moisture to permit installation in any environment; meter pit/vault, basement, crawlspace, fully submerged, or outdoors.
2. The register shall be housed in a composite enclosure that utilizes thermoplastic and a heat treated, tempered glass lens.
3. The permanent markings on the register pad shall include the ID#, the model, size and date of manufacture.
4. The register shall be permanently sealed by the manufacturer including all wire connections for AMI devices and integral options as required. All AMI devices shall be offered with mating connections to facilitate installation and troubleshooting when required.
5. The numerals on the digital display of the register shall be readable at a 45-degree angle.
6. The register shall be secured to the meter main case by an internal tamper-resistant bayonet-style locking mechanism protecting against unauthorized removal of the register.
7. The locking mechanism must not be apparent to utility customers with no visible seal screw or obvious means of removal.
8. The technology deployed for electronic data interchange shall be solid state and not contain any moving mechanical components.
9. The technology deployed for capturing data shall be solid state and not contain any moving mechanical components.
10. Encoder registers requiring mechanical gear trains, plastic lens, metal cans, field sealing of the wire connection or that are oil-filled will not be permitted.
11. The register must conform to the most current revision AWWA C-707.

C. Operation:

1. The register shall be a true absolute encoder register that provides direct electronic transfer of meter reading information to any number of AMI radio frequency device options.
2. The register shall provide for up to 9-digit electronic resolution to the AMI system.
3. The register operation shall utilize sensors and a magnetic coupling with the measuring element of the meter.
4. The register shall provide a means of capturing magnetic tampering and register removal from a meter displaying a numeric indication of these tampers on the LCD display as a deterrent to theft.
5. The register shall display an error code any time the register is removed from the meter body.
6. The register shall display an error code any time magnetic interference is detected in close proximity to the register and meter.
7. The default visual registration shall be 9-digits unless specified otherwise in all cases.
8. The register shall provide a visual indication of all billing digits on the LCD by providing a line above and below these digits.
9. The register shall provide a visual icon/indication when a minimum of six (6) months of battery life remains.
10. The register shall provide a visual icon/indication of specifiable backflow on the LCD.
11. The register shall provide a visual icon/indication of low flow and the direction of such flow on the LCD.

12. The register shall provide a visual icon/indication of high light conditions that may interfere with the optical sensor of the device when changing register modes.
13. The register shall incorporate a test mode that permits field testing utilizing a single universal display that indicates test mode when placed there via the optical sensor.
14. Test mode shall be accessed via the optical sensor on the register face with three (3) light flashes of one (1) second and be returned to normal display mode with three (3) additional light flashes at any time.
15. The register shall automatically revert to the standard display mode from test mode after two (2) hours, with no light flashes required to prevent unnecessary battery drain.
16. The register must be capable of storing, displaying and transmitting up to 8 electronic event codes to any number of AMI radio frequency device options in the extended protocol mode.
17. The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the interrogation device.
18. The encoder register shall transmit 9-digits electronically as specified.
19. Up to 9-digits of the meter reading total shall be provided on the LCD display as requested by the customer.
20. The encoder register shall transmit a 9-digit register identification number that has been factory set and never duplicated.
21. The register error codes for magnetic tampering shall only be reset at the factory after the device is returned to the manufacturer.
22. The register shall offer a specifiable backflow option to set the minimum volume and time required to initiate the backflow icon/alert on the LCD.

D. Installation:

1. No wire connections or wire splicing of any kind shall be required to be performed during the installation of AMI devices unless specified by the Owner.
2. The register shall offer the options of unterminated wire, connectors, or integral AMI devices as required by the Owner.
3. No special tools shall be required to remove the register.
4. The internal ring used to install the register to the body shall be invisible to customers.
5. The internal ring used to install the register shall function in conjunction with the LCD display that notified utilities of tampering.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the Radio Frequency Based Water Meters per Manufacturer's recommendations.
- B. Manufacturer must log the following information:
 1. Longitude and latitude of meter
 2. Condition of meter setter and well
 3. Photographs of meter well
 4. Existing water meter reading

- C. Indoor and outdoor meter installations: MIU must be installed outside of house on all inside meter installations. Manufacturer is responsible for making all arrangements with customers for indoor meter installations. Where customers are non-responsive to the installers request for installation, the installer shall provide a list of these customers to the Owner. The Owner will then contact the customer.
- D. Manufacturer shall be responsible for the temporary storage of all proposed equipment during the installation period as the City does not have adequate space for the storage of any equipment. Manufacturer shall be responsible for any and all warehouse fees and insurances.
- E. If the selected meter manufacturer is unable to read an existing meter in the City's system, the selected meter manufacturer shall replace the existing meter at the cost of the meter manufacturer.
- F. The register shall offer the options of unterminated wire or integral AMI device as required by the Owner.
- G. The internal ring used to install the register shall function in conjunction with the LCD display that notifies utilities of tampering.

3.2 FIELD QUALITY CONTROL

- A. Comply with Section 017000 – Execution and Closeout Requirements regarding requirements for testing, adjusting, and balancing.

3.3 WARRANTY

- A. Warranty:
 - 1. The manufacturer of the Radio Frequency Based Water Meters shall provide a one (1) year warranty from the date of Substantial Completion and the equipment shall be free from defects in design, workmanship, or materials.
 - 2. Cost for all associated meter equipment shall be fixed for a minimum of three (3) years.
- B. Technical Support:
 - 1. Technical support staff and authorized factory representative with 24-hour on-call availability shall be provided for at least one (1) year with an option to extend annually for up to three (3) years.
 - 2. The selected manufacturer's local sales representative shall be the sole point of contact for all technical support.

END OF SECTION 331200