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GREENFIELD, MASSACHUSETTS

Department of Public Works

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THE CITY OF GREENFIELD, MA
RFP No. DPW 20-05

REQUESTS FOR PROPOSALS FOR

WATER METER REPLACEMENT AND
ADVANCED METERING INFRASTRUCTURE (AMI)

DATE OF RELEASE: November 18, 2019

The City of Greenfield is requesting proposals for furnishing and delivering replacement water meters and advanced metering infrastructure (AMI) hardware and software. The City's program goals include the replacement of aging water meters, equitable metering, improved customer service, and improved metering operations efficiency. The City currently uses Neptune T10 meters and will maintain existing meters that are newer and in good condition. It is the intent of the City to replace older meters over a two year time frame with the same type of meters or approved equal completely compatible with the existing system. The awarded proposer shall be responsible for furnishing and delivering replacement meters; furnishing and delivering advanced metering infrastructure (AMI) hardware and software; and providing professional services to include software installation and system training. Furnished equipment shall be installed by Greenfield Department of Public Works personnel.

Proposals must be submitted in separate sealed envelopes marked "City of Greenfield Water Meter Replacement and AMI – Non-Price Proposal" and "City of Greenfield Water Meter Replacement and AMI – Price Proposal". See Section II for details. Proposals must be received by 2 p.m., Tuesday, December 10, 2019. Electronic submissions will not be accepted. Late proposals will be returned unopened. Proposals are to be sent to:

Department of Public Works
189 Wells Street
Greenfield, MA 01301

A complete copy of the RFP may be received electronically by contacting Alan Twarog at alan.twarog@greenfield-ma.gov and will be available starting November 18, 2019.

The Contract/Proposal awarding authority is: Mayor, City of Greenfield, MA.

TABLE OF CONTENTS

		Page
Section I	General Information…….……..…	3
Section II	Proposal Submittal Requirements ……..…	4
Section III	Scope of Services and Product Specifications……..……	5
Section IV	Evaluation Criteria……..……..……	29

ATTACHMENTS:

A	Non-Collusion Form…….…….…..……	32
B	Tax Compliance Certification….……	33
C	Price Proposal Form …….…..……..…	34
D	Sample Agreement……..……..……	37

Section I: General Information

A. Point of Contact and Issuing Office:

City of Greenfield, Dept. of Public Works Alan Twarog, Engineering Superintendent

Email: alan.twarog@greenfield-ma.gov
Phone: 413-772-1528 x6104
Address: DPW, 189 Wells Street, Greenfield, MA 01301

B. Quantities:

Unless otherwise stated, the quantities set forth herein are ESTIMATES ONLY. Any quantities indicated on the Proposal Price Form or elsewhere in the RFP package are estimates only and are given solely as a basis for the comparison of proposals. The Vendor shall have no claim for additional compensation, or refuse to perform the services called for, or provide the requested items, by reason of the actual quantities involved being greater or lesser by any amount than those called for in the RFP.

C. Questions:

All questions are to be submitted **in writing** to the point of contact identified in Section IA. Electronic submissions are acceptable. All submissions must contain the name of the person asking the question, company name, address, phone number and email address. All submitted questions and answers will be distributed to all who received the RFP document.

D. Solicitation Process:

This RFP is being solicited under a multi-step procurement procedure consisting of two phases and in compliance with Chapter 30B of the Massachusetts General Laws. The first phase requires all Proponents to submit technical proposals addressing those items cited in Section II of this RFP. An Evaluation Team will evaluate and rank the proposals based on the evaluation criteria outlined in Section III - Evaluation Criteria.

In the second phase, Price Proposals of the top three (3) Proponents will be opened for consideration.

E. Conditions of Award:

A Request for Proposals (RFP) is being let instead of a bid in order to allow the City to evaluate more than just cost to include the number of years manufacturing water meters, the number of relevant references from similar communities, and the quality of proposals submitted taking into consideration the compatibility of the equipment with the existing water meter system in place, the ease of installation and dependability of the new equipment, customer service and training options, and equipment warranties.

It is the intent of the City to award the contract to the proponent offering the most advantageous proposal, taking into consideration all evaluation criteria as well as price. The City shall be the sole judge of the firm's qualifications and whether the proposal is in the best interests of the City.

The City may conduct such investigations as the City considers necessary to assist in the evaluation of any proposal and to establish the responsibility and qualifications of companies submitting proposals.

Up to the time of signature of contract, the City shall have the right in its sole discretion to terminate negotiations with or without cause if it deems it's in its best interest to do so.

F. Duration of Contract:

The term of this contract shall be for a period of two (2) years. The first year of the contract shall be from January 1, 2020 to December 31, 2020. The second year shall be from January 1, 2021 to December 31, 2021.

G. Amendments to this Request for Proposals:

The City reserves the right to amend this RFP by an addendum up to three days prior to the date set for receipt of proposals. All amendments will be distributed to all who received the RFP document.

H. Additional Information:

The City of Greenfield reserves the right to reject any and all proposals in whole or in part; to waive any technicalities and informalities; to amend and/or cancel the RFP prior to the time of submission; and to correct any proposal erroneously made as a result of a clerical error on the part of the City. The City reserves the right to accept the proposal deemed most advantageous to the City.

I. Confidentially:

Proposals will be kept confidential until after they have been evaluated. A log will be maintained of proposals received, but proposals are not opened publicly.

Section II: Proposal Submittal Requirements

The proponent is to submit four (4) sealed hard copies of the Non-Price Proposal and one (1) sealed hard copy of the Price Proposal to the address listed in Section IA. Proposals must be received by 2p.m., Tuesday, November 26, 2019.

IN SEALED ENVELOPE #1 – Labeled: Water Meter Replacement and AMI – Non-Price Proposal

Each proposal shall include at a minimum the following information:

1. Cover letter describing the background of proponent's company including size, date established, and office location(s). The cover letter must be signed by an official of the firm who has authority to enter into a contract.

2. Evidence of qualifications and experience to fulfill the Owner's equipment and service requirements as described in the scope of services and specifications, to include a listing of the number of years of experience working with or manufacturing the specified components and systems.

3. List of exceptions on equipment specifications.

4. A description/listing of all equipment warranties.

5. A minimum of three (3) relevant references of similar communities utilizing these services and equipment with contact information to include a contact person and phone number.

6. Signed Certificate of Non-Collusion (Attachment A)

7. Signed Certificate of Tax Compliance (Attachment B)

IN SEALED ENVELOPE #2 – Labeled: Water Meter Replacement and AMI – Price Proposal

1. The Price Proposal shall be on the Price Proposal Form included as Attachment C. The City of Greenfield's purchases are tax exempt under the number #E-046-001-163.

Section III: Scope of Services and Product Specifications

It is the intent of the City of Greenfield to maintain its existing stock of Neptune T10 meters that are less than 15 years old and are determined to be in sufficient condition to maintain in use. All replacement meters and advanced metering infrastructure must be fully compatible with the City's existing system and meters must be interchangeable. The following specifications are based on the existing stock of Neptune meters. However, approved equals are acceptable.

Exceptions to Specifications: Proposers are to list exceptions of any and all material, item or design specifications in their submittal, in detail, and further, to select and qualify each exception using one of the following categories:

Category A – As specified
Category B – Material, item or design in specification is not available to the proposer from any source.
Category C – Material, item or design in specification is available to proposer from some source, but proposer chooses not to offer material, item or design at this time for this proposal.
Category D – The proposer chooses to offer in lieu of the material, item or design, as detailed in attachment to this proposal.

COLD WATER METERS/DISPLACEMENT TYPE:

GENERAL
All cold water meters (displacement type - magnetic drive 5⁄8" - 2") furnished shall be produced from an ISO 9001 manufacturing facility, conform to the "Standard Specifications for Cold Water Meters" C700 latest revision issued by AWWA.

LEAD FREE LEGISLATION

There have been federal changes to the acceptable amount of lead in the drinking water system. Knowing that water meters have a life expectancy of approximately twenty (20) years, the City of Greenfield wishes to ensure that meters purchased today will meet the Safe Drinking Water Act (SDWA) per NSF 372.

As a result, the City requires that all water meters submitted in this proposal be compliant with NSF/ANSI 61 and NSF/ANSI 372. Specifically:

- Meters shall be made of "lead free" alloy as defined by NSF/ANSI 61 and NSF/ANSI 372.
- Manufacturer shall provide a copy of a letter from NSF International on NSF letterhead documenting compliance with NSF/ANSI 61 and NSF/ANSI 372.

TYPE

Only magnetic-driven, positive displacement meters of the flat nutating disc type will be accepted because of enhanced low flow accuracy performance.

SIZE, CAPACITY, LENGTH

The size, capacity, and meter lengths shall be as specified in AWWA Standard C700 (latest revision). The maximum number of disc nutations is not to exceed those specified in AWWA C700 latest revision.

The meter maincase and cover shall be cast from NSF/ANSI 61 and NSF/ANSI 372 certified lead free alloy containing a minimum of 85% copper. The serial number should be stamped between the inlet or outlet port of the maincase and the register. Maincase markings shall be cast raised and shall indicate size, model, direction of flow, and NSF/ANSI 61 certification. Plastic maincases are not acceptable.

Maincases for 5⁄8", 3⁄4", and 1" meters shall be of the removable bottom cap type with the bottom cap secured by four (4) bolts on 5⁄8" and 3⁄4" sizes and six (6) bolts on the 1" size. Intermediate meter maincases shall also be made of the same lead free brass material in sizes 11⁄2" and 2" with a cover secured to the maincase with eight (8) bolts. Meters with a frost plug, a screw-on design, or no bottom cap shall not be accepted in 5⁄8"- 1" sizes. The 5⁄8" meters shall have a synthetic polymer or cast iron bottom cap option.

All lead free maincases shall be guaranteed free from manufacturing defects in workmanship and material for the life of the meter.

All meters must be adaptable to a field programmable absolute encoder register without interruption of the customer's service.

BOLTS

All maincase bolts shall be of three hundred (300) series non-magnetic stainless steel to prevent corrosion.

DIRECT READ STANDARD REGISTER

The register shall be of the straight reading sealed magnetic drive type and shall contain six (6) numeral wheels. Registers must be roll sealed and dry. All direct reading register cups shall be copper to prevent corrosion and be covered with a high-strength, impact-resistant flat glass lens to prevent breakage. The lens shall be positioned above the register box to allow for runoff of debris. The register lid shall overlap the register box to protect the lens. The register retaining ring shall be designed to absorb impact from the register. Register boxes and lids shall be of high-strength synthetic polymer or approved equivalent. All registers shall have the size, model, and date of manufacture stamped on the dial face. The dial shall have a red center sweep hand and shall contain one hundred (100) equally divided graduations at its periphery.

The register must contain a low flow indicator with a 1:1 ratio to disc nutations to provide leak detection.

Registers shall be secured to the maincase by means of a plastic tamperproof seal to allow for inline service replacement. Register seal screws are only accepted when supplied with attached sealing wire to at least one bottom cap bolt with seal wire holes of not less than 3 ⁄32" in diameter.

Registers shall be guaranteed for at least ten (10) years. All meters will be guaranteed for one (1) year on material and workmanship.

MEASURING CHAMBER

The measuring chamber shall be of a two-piece, snap-joint type with no fasteners allowed. The chamber shall be made of a non-hydrolyzing synthetic polymer.

The control block shall be the same material as the measuring chamber and be located on the top of the chamber.

The control block shall be located after the strainer.

The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an O-ring gasket.

The flat nutating disc shall be a single piece made from non-hydrolyzing synthetic polymer and shall contain a type 316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller located within the disc slot. The thrust roller head shall roll on the buttressed track provided by the diaphragm.

The chamber shall be warranted for ten (10) years against freeze damage if the meter has been equipped with a frost-proof cast iron or synthetic polymer bottom cap.

STRAINERS

All meters shall contain a removable polypropylene plastic strainer screen. The strainer shall be located near the maincase inlet port, before the measuring chamber. The strainer shall also

function as the device that holds the measuring chamber in place within the maincase. Straps or other types of fasteners shall not be accepted.

PERFORMANCE

To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700.

All meters shall be warranted as follows:

Size	**Low Flow**	**Low Flow New Meter Accuracy**	**Low Flow Repaired Meter Accuracy**
5/8”	1/8 gpm @ 95%	5 yrs or 500,000 gallons	15 yrs or 1,500,000 gallons
3/4”	1/4 gpm @ 95%	5 yrs or 750,000 gallons	15 yrs or 2,250,000 gallons
1”	3/8 gpm @ 95%	5 yrs or 1,000,000 gallons	15 yrs or 3,000,000 gallons
1 1/2”	3/4 gpm @ 95%	2 yrs or 1,600,000 gallons	12 yrs or 5,000,000 gallons
2”	1 gpm @ 95%	2 yrs or 2,700,000 gallons	12 yrs or 8,000,000 gallons

Normal meter operating range shall be as follows:

Size	**Accuracy Range ± 1.5%**
5/8”	1/2 - 20 gpm
3/4”	3/4 - 30 gpm
1”	1 - 50 gpm
1 1/2”	2 - 100 gpm
2”	2 1/2 - 160 gpm

MANUFACTURER

Meters and meter parts shall be manufactured, assembled, and tested within the United States. Manufacturers may be required to provide proof of where and what percentage of the meter register, chamber, and maincase is manufactured in the United States.

Manufacturers shall have a minimum of fifteen (15) years of field and production experience with all sizes and models quoted.

Manufacturers shall provide only one (1) model of meter which complies with these specifications. Suppliers must have been manufacturing meters for at least fifty (50) years.

SYSTEMS GUARANTEE

All meters shall be guaranteed upgradeable to the following Neptune systems without interruption of the customer's service.

ProRead™ (ARB® VI) AutoDetect Absolute Encoder
E-CODER® (ARB VII) Solid State Absolute Encoder
R900®
FLOSEARCH® II
TRICON/E®3
TRICON®
ProCoder™

REMOTE CAPABILITY OPTIONS

All meters shall be equipped with encoder remote registers per AWWA C707 and meet all AWWA C700 performance standards.

Acceptable meters shall be Neptune T-10® or approved equal.

8-WHEEL ABSOLUTE ENCODER REGISTER:

It is the preference of the City of Greenfield to obtain an encoder-based remote metering system capable of providing digitally encoded meter information as described in the enclosed specification. Specifications for the required cold water meters can be found in the enclosed documentation. Proposals should be submitted with detailed information of the features and benefits to the City to adequately evaluate the proposed system. Proposals without adequate information may not be considered.

DESCRIPTION – GENERAL

These specifications cover a self-contained encoder register metering system designed to obtain remote simultaneous water meter registration directly from the register odometer. The metering information shall be obtained through a remotely-located receptacle using a compatible data capture system. The above system shall be configured as follows:

>> Encoder meter register – Direct-mounting, encoded odometer wheels, digital data stream. Batteries or pulses are not allowed.

>> Remotely mounted receptacle providing a communication link for the transmission of information from the register.

>> Data acquisition equipment with which the above components can be interrogated. Such equipment shall be configured in two types:

- A device that captures information and displays it visually to confirm correct system installation and wiring.
- A device that is pre-programmed with route information and is capable of storing collected data in solid state memory.
- This device shall also electronically transfer the data for use by the utility billing computer.

ENCODER REGISTER UNIT

>> **Registration**

- The register shall provide at least an 8-digit visual registration at the meter.
- The unit shall provide an 8-digit meter reading for transmission through the radio MIU.
- The dial shall have a red sweep test hand and shall contain 100 equally divided graduations at its periphery.
- The register shall provide remote leak detection through an ASCII format to the RF AMR/AMI MIU.
- The register shall provide reverse flow detection, communicated as ASCII format data to the RF AMR/AMI MIU.
- Reverse flow detection shall be calculated based on 15-minute interval consumption.
- The register shall provide an indication of days of zero consumption, communicated as ASCII format data to the RF AMR/AMI MIU.
- Registers using pulse generation or conversion of pulses to digital output are not permitted. Batteries shall not be allowed.
- The manufacturer will guarantee that the reading obtained electronically matches the mechanical odometer reading on the register.

MECHANICAL CONSTRUCTION

The registers should be manufactured in two different versions; one for inside set application and one for pit set.

>> **Inside Set Version**

- The unit must be constructed of high-strength polycarbonate and possess a hermetic sonic-weld seal. Registers for inside set applications should be oil-free designs.
- The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamperproof seal pin shall be used to secure the register to the maincase.

- The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service.
- Provision shall be made in the register for the use of seal wires to further secure the register.
- Terminal screws must be accessible on the register for wire connection to the remote receptacle or a future AMR/AMI system. A permanently potted wire connection shall be available as an option.

>> **Pit Set Version**

- The unit must be constructed in a roll-sealed copper shell and glass lens assembly to provide a hermetic seal.
- The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamperproof seal pin shall be used to secure the register to the maincase.
- The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service.
- Provision shall be made in the register for the use of seal wires to further secure the register.
- Terminal connections must be permanently potted so that the terminal cover cannot be removed.

>> **Electrical Construction**

- The number wheels used in the register assembly shall be provided with light emitting diode (LED) technology to ensure data transmission.
- Connection shall be made to the register by three screw-type terminals sonically inserted into the register top. Access to the terminals shall be available to all models of register, with the exception of a permanently potted version. A port cover shall be provided to cover the terminals after they have been wired.
- The absolute encoder register shall automatically detect between two-wire and three-wire register protocol.

>> **Meter Reading Information**

- The absolute encoder register shall provide to the reading equipment an 8-digit meter reading. An identification number of up to 10 digits shall be provided with each reading when read using a probed reading device.

  The solid state absolute encoder register shall provide additional value-added information remotely when connected to a radio MIU (e.g., detailed leak detection data, days of leak state, days of no consumption, and backflow indication). This

information shall be communicated through the encoder protocol and RF MIU to the route management software to allow the seamless integration of data into a CIS package.

REMOTE RECEPTACLE

>> **Mechanical Construction**

- Where indicated, a remote receptacle must be provided for attachment to a pit meter lid with another unit also designed for attachment by wall mounting.
- The materials employed shall be corrosion resistant, resistant to ultraviolet degradation, unaffected by rain or condensation, and compatible with rugged service and long life.
- The pit receptacle shall be installed into the meter lid either using two screws provided by the utility or mounted in a single 1¾" hole while not extending more than 4½" into the pit.
- The pit-mounted receptacle shall be provided with a minimum length of six feet of wire connected and sealed at the receptacle without terminal exposure.
- The remote receptacle shall not contain a battery or data storage capability.

900 MHz AMR/AMI SPECIFICATION:

This following provides specifications for a meter reading system (the System) that operates seamlessly as BOTH an Automatic Meter Reading (AMR) and/or an Advanced Meter Infrastructure (AMI) system.

1. SCOPE OF SERVICES

The City of Greenfield issues this RFP to procure a System capable of meeting the current and future meter reading needs within the City. The scope of services involves, but is not limited to, furnishing and delivering the System which includes software, hardware, and all necessary training and installation support. Installation of the System will be done in-house by Department of Public Works staff. The reading equipment shall be capable of receiving meter readings while utilizing a handheld reading device and/or a mobile reading unit (collectively as "AMR" or "mobile") and/or permanently mounted data collector units (collectively "AMI" or "fixed network").

The System must have the capability to improve meter reading efficiency, increase meter reader safety, and provide data that facilitates resolution of customer bill complaints, water conservation initiatives, and distribution system management efforts. The vendor shall describe the upgrade requirements to incorporate radio frequency (RF) technology.

During upgrade to RF meter reading, the System shall still be able to read probed water meters, direct read water meters via manual keyed entry, and meters equipped with RF meter interface

units (MIUs) within the same meter reading route without detaching the receptacle or RF meter interface unit or switching modes within the meter reading equipment.

All System components furnished (software, reading equipment, RF MIUs, meters with absolute encoders) shall be produced from an ISO 9001 certified manufacturing facility.

2. SYSTEM OVERVIEW

The System shall be comprised of RF MIUs, data collection devices, and host software. The System shall be capable of operating simultaneously in a walk-by (handheld), mobile (drive-by), full fixed network (permanently mounted data collectors), or any combination of these data collection methods without the need for reprogramming RF MIUs.

The transition from walk-by, to mobile, to fixed network shall be seamless and allow all meter reading methods to operate together simultaneously. MIUs shall transmit messages required for both mobile AND fixed network operation on an interleaved basis, allowing both mobile AND fixed network data collection capability at the same time. Systems with MIUs that must be configured or programmed to operate in either one “mode” or the other will not be allowed.

The System shall provide 8-digit meter reading resolution capability for encoders using Neptune E-Coder® or Sensus UI-1203 protocol in mobile as well as fixed network data collection applications.

For reliability and meter reading integrity, the vendor shall be the sole manufacturer of the different components of the System (water meters, RF MIUs, meter reading equipment, and meter reading software) and provide a turnkey system offering to the utility.

2.1 Mobile AMR Functionality

When used as mobile AMR, the System shall provide 96 days of hourly consumption data storage at the MIU, retrievable from mobile data collection devices. Mobile data devices shall facilitate retrieval of consumption data for field presentment on a handheld, laptop, or Android/iOS powered mobile device, as well as storage for later use with the host software application.

The System shall provide capability of mobile retrieval of individual off-cycle (specific date) reads as stored for 96 days in the MIU. Mobile data devices shall facilitate retrieval of off-cycle reads for field presentment on a handheld or Android/iOS powered mobile device, as well as storage for later use with the host software application.

2.2 AMI Network Functionality

When deployed as a fixed network, the System shall provide hourly consumption interval data, time synchronized at the host meter reading software. The host software shall provide individual account consumption interval data displayed in graphical as well as tabular format and readily accessible to utility Customer Service Representatives to facilitate customer bill complaint resolution without the need for a truck roll.

When deployed as a fixed network, the System shall provide priority alarm notification of potential leak and/or reverse flow events with user configurable email or text messages for notification to utility personnel.

When operating as a fixed network, the System shall provide the capability for a demand read initiated from the host software application. The number of demand read requests made over the lifetime of an MIU shall not impact the battery life or warranty.

3. METER INTERFACE UNITS (MIUs)

Meters connected to RF MIUs shall collect meter usage from an encoder meter register and shall transmit the meter reading and a unique ID number to the data collection device.

The MIUs must be compact electronic devices connected to the water meters. They shall interrogate the encoder register and transmit the meter reading and other information to a remote reading device. They shall be compatible with encoder registers using either Neptune ProRead/E-Coder® protocol or Sensus-protocol (UI-1203). MIUs shall feature "auto detect" functionality to detect the type of encoder connected and shall not require reprogramming in the field. The same RF MIUs must be capable of being read by a walk-by handheld computer equipped with a RF receiver, a mobile system with an RF receiver mounted in a vehicle, and a fixed network data collection system. This shall allow an easy migration between the three-meter reading systems without any change to the MIU devices or revisiting the site.

The MIU shall log 96 days of hourly consumption data, available for retrieval via RF activation from the handheld or mobile data collection device.

The MIUs shall be attached to new meters or shall retrofit to existing meters in the field. The MIUs shall be manufactured in both wall and pit models. The wall MIU shall have the ability to be mounted in a basement or on the outside of a house. The pit MIU shall have the ability to be mounted in a pit or an underground vault and offer an optional through-the-pit-lid antenna. The wall and pit MIUs shall have a fully-potted, submersible design.

MIUs shall also be available as integrated devices in which the encoder register, and RF transmitter module are integrated into a single module. The unit shall interrogate the integrated absolute encoder register and transmit the meter reading and other information to a data collection reading device.

The absolute solid-state encoder register with integrated MIU shall be attached to new meters, or they shall retrofit existing meters in the field via a bayonet mount on top of the meter main case. The absolute solid-state encoder register with integrated MIU shall be manufactured in both inside and pit models. The inside MIU shall have a water-resistant enclosure and a permanent internal antenna. The pit MIU enclosure shall be a roll-sealed copper can and glass lens, designed to ensure a watertight seal with a permanent internal antenna and offer an optional through-the-pit-lid antenna to optimize performance in hard-to-read or fixed network applications.

3.1 Physical/Mechanical Requirements

3.1.1 Wall Unit

- The MIU housing shall be constructed of a polycarbonate plastic compound and be capable of mounting both indoors and outdoors on wall or pole or attached directly to the meter. The device must be water resistant and capable of exposure to spray and splash. The device must be able to withstand a 200-hour salt fog test as specified in NEMA 4 standard.
- The device shall provide a location for a tamper-deterrent seal. Tampering with the device functions or connections shall not be possible without causing visible damage to the device exterior or to the seal.

- The device shall be capable of operating at temperatures of -22°F to +149°F (-30°C to +65°C) with operating humidity of 0 to 100% condensing.
- The circuit board and the battery will be protected by a potting material.
- The unit must retrofit to existing installations.
- The MIU device must be protected against static discharge without loss of data per IEC 801-2, issue 2.

3.1.2 Pit Unit

- For pit or vault applications, the MIU antenna shall be designed to be installed through the industry standard 1¾" hole in the pit lid with no degradation of transmission range. The MIU antenna unit will be capable of mounting to various thicknesses of pit lids from ½" to 2½".
- The device shall be capable of operating at temperatures of -22°F to +149°F (-30°C to +65°C) and operating humidity of 0 to 100% condensing.
- The range will not be affected when the pit is flooded.
- The circuit board and the battery will be protected by a potting material.
- The antenna shall be made of a metallic and polymer material to withstand traffic and shall have a dual seal connection to the MIU housing.
- The MIU device must be protected against static discharge without loss of data per IEC 801-2, issue 2.

3.1.3 Integrated Unit – Inside Set

- The integrated MIU housing shall be constructed of a polycarbonate plastic compound and be capable of mounting indoors.
- The MIU shall be designed with an internal antenna.
- The device shall provide a location for a tamper-deterrent seal. Tampering with the device functions or connections shall not be possible without causing visible damage to the device exterior or to the seal.
- The device shall be capable of operating at temperatures of -22°F to +149°F (-30°C to +65°C) and operating humidity of 0 to 100% condensing
- The radio circuit board and battery will be protected by encapsulation in a hard potting.
- The unit must retrofit to existing installations.
- The MIU device must be protected against static discharge without loss of data per IEC 801-2, issue 2.

3.1.4 Integrated Unit – Pit Set

- The MIU shall be sealed in a roll-sealed copper can and glass lens to allow for submersion in a flooded pit environment.
- For pit or vault applications, the MIU shall be designed with an internal antenna.
- The device shall provide a location for a tamper-deterrent seal. Tampering with the device functions or connections shall not be possible without causing visible damage to the device exterior or to the seal.
- The device shall be capable of operating at temperatures of -22°F to +149°F (-30°C to +65°C) and operating humidity factor of 0 to 100% condensing.
- The radio circuit board and battery will be protected by a hard-potting material.
- The device shall be designed for an optional remote antenna capable of being installed through the industry standard 1¾" hole in the pit lid for maximum transmission range.
- The optional through-the-lid antenna will be capable of mounting to various thicknesses of pit lids from ½" to 2½" and various distances from meters.
- The optional through-the-pit-lid antenna shall be rigid in design to withstand traffic and shall have a dual-seal connection to the MIU housing.
- The MIU device must be protected against static discharge without loss of data per IEC 801-2, issue 2.

3.2 Operating Specifications

3.2.1 FCC Licensing & Certification

- The MIU shall operate within FCC Part 15.247 regulations for devices operating in the 902 MHz to 928 MHz unlicensed band. The output power of the devices will be governed by their conformance to these relevant FCC standards.
- To minimize the potential for RF interference from other devices, the MIU shall transmit using the frequency hopping, spread spectrum technique comprised of alternating pseudo-random frequencies within the 902 MHz to 928 MHz unlicensed band.
- For ease of implementation, the System shall not require any special licensing, including licenses from the FCC. The System must, therefore, operate in the 902 MHz to 928 MHz unlicensed band.
- The System must be expandable at any time without getting authorization from the FCC.
- No wake-up tone shall be necessary.

3.2.2 Field and Installation Operations

- No MIU programming shall be necessary for installation.
- The MIU shall be mounted per the manufacturer's installation instructions to ensure a reliable and quality installation throughout the life of the MIU
- The handheld reading equipment shall provide a test mode to verify proper operation of the MIU by displaying the MIU ID number and meter reading.
- The handheld reading equipment shall provide a test mode to verify proper operation as well as troubleshooting of the MIU on the AMI network by displaying the MIU ID number and latest meter reading.
- The MIU shall be capable of being received by a handheld receiver, mobile receiver, or fixed network data collector without special configuration, programming of operation modes, or re-manufacture.

3.2.3 Data Transport

- The MIU shall provide 8-digit reading resolution from encoded registers using either Neptune E-Coder® or Sensus UI-1203 protocol in mobile as well as AMI network data collection applications, simultaneously, without need for programming.
- The MIU shall read the encoded register at 15-minute intervals to provide accurate leak and reverse flow detection using 8-digit resolution reads.
- The MIU shall transmit readings from the encoder that are not older than 15 minutes.
- The MIU shall transmit the meter reading continuously at a predetermined transmission interval.
- The MIU shall transmit AMI network messages every 7 ½ minutes – standard. No programming shall be necessary to activate transmission of AMI network messages.
- Each AMI network message shall include capability to include 3-meter readings for redundancy to improve read success rates.
- The MIU shall transmit mobile messages every 14 seconds – standard. No programming shall be necessary to activate or revert to transmission of mobile messages.
- In the event of a cut wire, the MIU shall not send the last good read as this can lead to miss-billing. The MIU shall transmit a trouble code in lieu of the meter reading.
- Tamper – If wiring has been disconnected, a "non-reading" shall be provided indicating wire tamper; a reading that gives the last available reading is an incorrect reading.
- Each device shall have unique pre-programmed identification numbers of ten (10) characters. ID numbers will be permanent and shall not be altered. Each device shall be labeled with the ID number in numeric and barcode form. The label shall also display FCC approval information, manufacturer's designation, and date of manufacture.
- The MIU shall transmit the encoder meter reading and a unique MIU ID number.
- The MIU shall interface to encoder registers using Neptune ProRead, Neptune E-Coder® or Sensus UI-1203 communication protocol via a 3-conductor wire without need for special configuration to the MIU.
- The MIU shall periodically transmit a packet that includes the register information such as register ID, register type, and other status information no less than weekly.

3.2.4 Operational Characteristics

- Power shall be supplied to the MIU by a lithium battery with capacitor.
- The number of radio-based meter reads performed must not affect the battery life.
- The battery life shall not be affected by outside erroneous wake-up tones (e.g., other water, gas, or electric utilities reading and therefore sending out a wake-up tone).
- The battery shall be a fully potted component of the MIU with no external wires.
- The vendor shall warrant that the MIUs shall be free of manufacture and design defects for a period of twenty (20) years – the first ten (10) years from the date of shipment from factory without prorating and the second ten (10) years with prorating, as long as the MIU is working under the environmental and meter reading conditions specified.

4. DATA COLLECTION DEVICES

The System shall provide a means of communication between the MIU installed at the meter site and the host software. In a walk-by system, it must be a handheld computer capable of reading meters using keyed-entry, inductive encoder probing, or RF communications with an attached receiver device without the need to switch modes within the handheld.

In the case of a mobile application, the data collection device must be a portable personal computer, tablet, or smartphone integrated to an RF receiver that can be installed in any vehicle.

For the fixed network application, the data collection device must be an environmentally sealed control box able to adapt to various installation settings and must have the capability to receive, store, and communicate meter readings to the host software for further use and analysis.

4.1 Walk-by Application

For Walk-By applications, the System must give user the ability to collect metering data in several ways:

- Keyed entry.
- Inductive probing.
- RF communication: The handheld must connect via Bluetooth to an RF receiving device.

The proposed walk-by data collection system must include:

- Handheld data collector device Bluetooth paired RF receiving device
- Communication cradles for charging and loading the handheld unit (only for devices running Windows Mobile OS).
- Probes for interrogating Neptune ProRead/E-Coder® or Sensus UI 1203 protocol absolute encoders (optional).

4.1.1 Handheld Data Collector Device

4.1.1.1 Basic Functions

The handheld data collection device shall have the capability to collect and store meter readings at any time of the meter reading route by any of the following methods:

- Manual use through an alphanumeric keypad.
- Probing of water meters equipped with supported absolute encoders.
- Via radio frequency through a Bluetooth-paired receiver.

The unit shall be able to obtain all types of readings on any particular route without requiring:

- Reprogramming of the handheld computer.
- Physical change of software contained within the unit while in the field.
- Access through special software menus contained within a given route/program.

The handheld data collection device must be able to multitask by collecting data while in keyed entry (manual) meter reading mode.

4.1.1.2 Hardware Requirements

4.1.1.2.1 Operating System

The System must support a variety of handheld data collection devices. These devices must run Windows Mobile 6.1 or 6.5 Operating System, Android Operating System, or Apple iOS Operating System.

4.1.1.2.2 Case (Only for devices running Windows Mobile OS)

- The unit must be able to withstand 26 drops at room temperature from four (4) feet onto plywood over concrete.
- The handheld must meet and exceed MIL-STD 810F standard, method 516.5, procedure IV for drop tests.
- The handheld shall be ergonomically designed to be comfortable for handheld meter reading.

4.1.1.2.3 Display

- The size of the display characters must be selectable, allowing the use of larger characters that are easier to read. The screen must support a minimum resolution of 480 by 640 pixels or 640 by 480 pixels.
- There must also be a manual contrast adjustment feature which will allow the user to adjust the contrast to his or her satisfaction.

4.1.1.2.4 Keyboard (Only for devices running Windows Mobile OS)

- The handheld must support one of the two keyboard options:
  - The keyboard must have independent numerical keys with adequate separation for use with a gloved hand. Must have a full-on screen, customizable alphanumeric keyboard.
  - Full QWERTY keypad with adequate separation with a gloved hand with number pad as well as directional buttons with four programmable buttons.
- There must be an auto-repeat function on keys and a rapid response between keying and seeing results on the screen.

4.1.1.2.5 Battery

- The battery capacity must be sufficient for a minimum of ten (10) hours of meter reading.
- The handheld must come with a power management system designed to conserve power.

4.1.1.2.6 Memory

- The handheld data collection device must include a minimum of 128 MB of DDR SDRAM.
- The handheld must have 512MB or greater of on-board non-volatile flash storage.

4.1.1.2.7 Carrying Method (Only for devices running Windows Mobile OS)

- A carrying mechanism must be provided with each unit and must provide ease of use for right- or left-handed operators.

4.1.1.2.8 Size

The handheld data collection device dimensions must not be larger than:

- Length: 10.5” (17.6 cm)
- Width: 5.2” (10 cm)
- Height: 1.9” (5.0 cm)
- Or device specific for Android and iOS powered devices

4.1.1.2.9 Weight

The unit’s weight must be no more than 2.3lbs with battery installed.

4.1.1.3 Environmental Characteristics (Only for devices running Windows Mobile OS)

The handheld must include but not be limited to the following:

- The unit must operate in a temperature range of -30°C to +60°C (-22° F to +140° F).
- The device shall be water-resistant, capable of unlimited exposure to spray or splash (such as rain or snow).
- The handheld unit must be capable of being immersed in 3.3ft (1 meter) of water for 30 minutes.
- The device must be protected against an 8kV static discharge without loss of data.
- The unit must be resistant to various chemical products and must be sealed to keep out dust, humidity, and water.
- The device must be shock-resistant exceeding IEC 68-2-32 method 1 (a one-meter drop on concrete).
- The unit must be CE and FCC certified.

4.1.1.4 Handheld Software Requirements

4.1.1.4.1 Basic Functions

The handheld software must be easy to use and give the meter reader control over the route in searching for accounts, tagging accounts for later action, entering related notes, and manually reading meters.

The handheld software must include entry of meter readings.

In addition, the handheld software shall include but shall not be limited to the following basic features:

- User customizable key assignments.
- Allow manual or automatic entry of meter readings, ID numbers, and note codes.
- Perform high/low test on readings.
- Date and time stamped to each reading.
- Identify type of reading – manual keyed, probed, or RF MIU.
- Perform unread meter search.
- Found meter processing for new accounts.
- Allow forward and reverse walk order.
- Data search capability (display, notes, and ID).
- Auto-search for automatic reading of encoded meters.
- Display the number of read and unread accounts on demand.
- Enable left-to-right, right-to-left, or calculator entry of manual meter readings.

4.1.1.4.2 Sounds

Successful meter readings must be confirmed by an audible tone.

4.1.2 Communications / Charging Equipment

4.1.2.1 Communication

Communications between the handheld and the PC software must be established using a wireless synchronization or cradle connected via Ethernet or USB. In addition, the following basic features must be included:

- Extensive error checking is provided to ensure data integrity during communications between the handheld and the PC.
- A typical route of 400-500 accounts can be loaded or unloaded in less than one minute with the ability to load more than 5,000 records into a single handheld unit.
- Routes/books can be split at the PC level.
- Once loaded, routes may be individually selected on the handheld.

4.1.2.2 Communications / Charging Cradles

- The communications/charging cradle will be housed in a suitable material that can be wall or tabletop mounted.
- It will have the capability of recharging the handheld unit within four hours and also provide the communication port connection to the computer.
- The cradle will be capable of communicating with the host computer at 10 Mbps.
- The cradle must be capable of both USB and Ethernet communications with a PC.
- The charging units must carry the Underwriters Laboratory (UL) seal of approval.

4.1.3 Probes

The handheld must be compatible with a wireless probe capable of reading Neptune ProRead/E-Coder or Sensus UI 1203 protocol absolute encoders.

4.1.4 Radio Frequency Capability

The meter reading system must be capable of being upgraded to radio frequency communications. Utility plans to read water meters equipped with radio frequency MIUs. Only absolute encoder registers using Neptune ProRead/E-Coder® or Sensus UI-1203 communication protocols shall be acceptable. For the radio frequency-based meter reading system, the encoder registers will be connected to an RF MIU that shall provide the radio link from the meter to the handheld interface unit. MIUs shall feature “auto detect” functionality and shall not require reprogramming in the field.

The handheld radio frequency receiver must be separate from the handheld unit itself.

4.1.4.1 Radio Frequency Reading Function

The function of the handheld and external receiver in radio frequency mode is to provide utility the capability of reading meters via radio signals transmitted by the RF MIUs. The external receiver must be capable of receiving RF readings and transferring those readings to the handheld via Bluetooth connection. All transmissions from supported MIUs will be collected. The reading of any MIU shall be automatically stored in the proper account record without the intervention of the meter reader.

Should any MIU not be able to be read during the route, the software shall support storage of a flag in the account record, indicating clearly that the MIU could not be read. When reading the meters in the RF mode, it should not require the meter reader to activate any wake-up tone.

The handheld with the external receiver reading equipment must provide a test mode to verify operation of the MIU. This test mode must be accessible from within the meter reading application as well as accessible from a handheld’s main screen (no login required). The test

application must be capable of reporting statistics for an individual MIU or displaying all MIUs within range.

4.1.4.2 Walk-by RF Transceiver

- The walk-by RF transceiver must be a separate belt clip, wearable, transmit/receive device which communicates via Bluetooth to the handheld.
- The walk-by RF transceiver must support the ability to remotely command the MIU to transmit data log interval data.
- The walk-by RF transceiver antenna shall be internally mounted.
- The walk-by RF transceiver must meet FCC Class B certification.
- The walk-by RF transceiver must contain an SD card.
- The walk-by RF transceiver must utilize SDR (software-defined radio) technology.
- The walk-by RF transceiver must contain a mini-USB port for both battery charging and PC communications.
- The walk-by RF transceiver must contain a field replaceable battery.
- The walk-by RF transceiver must have four (4) LEDs displaying the following:
    - o Battery/Power status
    - o RF status
    - o Bluetooth status
    - o Mode status
- The external RF transceiver must be capable of unattended operations where the receiver is not paired with any handheld device but hears and stores any received reading packets to the SD card. This data must be able to be imported into the host software for use as billing reads.

The following specifications must be met:

4.1.5 Radio Characteristics

- Receiving Frequency: 910-920 MHz unlicensed RF.
- The walk-by RF transceiver must have 50 channels.
- The walk-by RF transceiver must support reading eight (8) channels simultaneously.
- The walk-by RF transceiver must be capable of processing 360 RF packets per second.

4.1.5.1 Size and Weight

Physical specifications of the external RF receiver must be within the following parameters:

Length:	5.75” (14.6 cm)
Width:	1.66” (4.22 cm)
Height:	3.58” (9.1 cm)
Weight:	(with battery): 1.3 lbs.
	(without battery): 1.1 lbs.

4.1.5.2 Environmental Operating Conditions

- Operating conditions: -4°F to +122°F (-20°C to +50°C)
- Storage temperature: -40°F to +185°F (-30°C to +70°C)
- Designed to and tested to MIL-STD-810F specifications
- Designed to withstand electrostatic discharges per EN61000-4-2

4.1.5.3 RF Walk-by Receiver Battery Life

The data collection device battery must provide enough power to support RF meter reading for a minimum of eight (8) hours.

4.2 Mobile Data Collection System

The mobile data collection device must be a portable, compact electronic system mountable in any vehicle. It must collect the data transmitted by the MIUs and store it onto a USB flash drive or other storage medium to be downloaded to the host computer at the utility office.

The mobile data collection device shall be easily transportable from vehicle to vehicle or from vehicle to office.

4.2.1 Hardware Specifications

The key components of the mobile data collection device must consist of a portable personal computer (PPC) or Android/iOS mobile device, an integrated radio receiver unit, and remote rooftop magnet mount antenna.

The mobile data collection device must be easily installed in any vehicle that will drive to the field for meter reading. It must be mounted securely in the passenger seat with a standard seat belt. Through a 12V DC plug-in power cord, the unit must be powered from the vehicle's power supply (cigarette lighter).

The mobile data collection device must include a magnetic base antenna and the antenna cord as well as all necessary power and communication cables.

The mobile data collection device shall draw no more than one (1) AMP of power. The mobile data collection device dimensions must be no larger than the following parameters: 11.0" x 8.0" x 3.15". The weight shall not be more than five (5) lbs.

The mobile data collection device shall support the connection to any mobile device that meets the following minimum system requirements:

- Operating System: Android Operating System 6 and above, iOS Operating System 11 and above
- Communication: Internal 801.11 b/g wireless LAN or Cellular Connectivity
- Bluetooth

The mobile data collection unit should also be capable of supporting Itron R300 and Itron electric bubble-up ERTs in the event the utility supports electric meters.

4.2.2 Environmental Conditions

The mobile data collection device must work in the following environmental conditions:

- Operating Temperature: 32° to +122°F (0° to +50°C)
- Storage Temperature: -40°F to +185°F (-40°C to +85°C)
- Operating Humidity: 5 to 95% non-condensing relative humidity

4.2.3 Mobile Data Collection Software Requirements

4.2.3.1 Basic Functions

The software must be a dialog-based, intuitive, easy-to-use meter reading application.

After the meter reader starts the reading process, the software must automatically collect the meter reading data received from the radio receiver unit. The software should capture all readings for any routes loaded without having to select the route for reading.

The software should have an option to wirelessly synchronize meter reading routes and reading data with the host software in real-time or on-demand.

The software shall be touchscreen friendly and operate on Android or iOS devices.

Unit must be capable of optimizing the memory storage space by filtering out duplicate readings from the same MIU and keeping only the last reading received.

Each reading record must contain an MIU ID and a time stamp of the reading.

The software must have the option to provide found meter processing for new accounts.

The software must be capable of performing high/low test on readings.

The software must provide a progress bar that provides route reading status for individual as well as all routes combined.

The software must support retrieval and graphing of 96 days of data logging intervals from the MIU.

The software must contain a test mode used to validate MIU installation. The test mode must provide MIU ID reading, as well as flag status.

The software must have an option to geocode meter reading routes by address

The software must allow a manual reading to be entered into the account record.

The software must allow freeform notes to be entered to record conditions in the field that require noting and may require an additional work order created to address at a later date.

The software must have a GIS mapping option compatible with ESRI ArcGIS.

The software must have advanced filtering to allow the user to view route mapping data by conditions such as flag type/status, audit status, and read status.

The software must be capable of displaying meter points and read success and unread accounts via GIS mapping interface. The software must be capable of collecting the following information for the host to generate reports; leak detection, tamper detection, and backflow conditions.

The software must allow for GPS location tracking of the meter reading vehicle.

The software must allow for GPS breadcrumb tracking of the meter reading vehicle during the route reading process.

4.2.4 Mobile Data Collection Device Performance Requirements

The magnet mount antenna must be omni-directional and support a gain of 5 dB minimum.

The receiver utilized must operate with a minimum sensitivity of greater than 110 dBm.

The receiver module must process at minimum 72 discreet channels across a 10 MHz bandwidth utilizing a digital signal processor capable of capturing eight-meter readings simultaneously from these channels. The receiver module must operate with a dynamic range of greater than or equal to 100 dB with a message success rate greater than 50%.

The mobile data collection device must be able to maintain a minimum sustained processing rate of 70 unique meter reading accounts per second. The mobile data collection device must reject a minimum 45 dB of noise energy above the target message in adjacent channels. The mobile data collection device must operate effectively at posted speed limits.

4.3. FIXED NETWORK COMPATIBILITY

4.3.1 Basic Requirements

The fixed network functionality must be able to operate in parallel with other meter reading technologies such as walk-by, handheld, and mobile systems and utilize a common interface to the CIS/billing software system. The fixed network functionality must also support the migration of technologies (example: handheld to mobile, mobile to fixed network).

The fixed network functionality is comprised of two major components; data collection software and fixed network data collection units.

The fixed network functionality must be capable of automatically retrieving reading information from the same MIUs being read by walk-by and mobile data collection devices to manage customer account and meter reading data, to provide usage analysis, and to provide a flexible host interface to utility's CIS system.

The fixed network functionality must be capable of retrieving consumption information from MIUs via walk-by, mobile drive-by, and fixed network data collection without the need for mode changes or reprogramming.

The host software must be capable of storing meter readings with the capability to store up to 96 readings per day per meter. The host software must also provide meter reading management reports, usage analysis reports (flow profiling, leak detection, tamper detection, and reverse flow conditions), off-cycle reads, and system management diagnostics. Must provide comprehensive coverage for all selected strategic commercial and industrial customers, including indoor, outside, and in pits/vaults, utilizing a single or hybrid technology solution. The network architecture should provide scalability and adequate bandwidth to provide hourly reading requirements.

The WAN architecture must be flexible to allow communications via common public communication networks such as CDMA, GSM, and LTE cellular systems.

The fixed network functionality must utilize an unlicensed radio frequency band for LAN communications.

Network management tools must be available to properly monitor the performance of the system to ensure reliable data delivery to utility for all billing and/or other customer service applications.

Both the fixed network WAN and host software shall remain the property of utility. All costs associated with the ongoing operation of the system will be the responsibility of utility.

Utility shall be responsible for the operation and maintenance of the fixed network infrastructure.

4.3.2 Hardware Requirements

Fixed network data collection must support flexible installation configurations for rooftop, pole, and wall installations.

The fixed network data collection units must utilize a 50-channel, software-defined radio (SDR) capable of processing up to 360 readings per second and eight (8) readings simultaneously. The fixed network data collector must support a web service connection to the host software.

The fixed network data collection units must provide USB flash drive data retrieval in the event of a backhaul outage. All data stored to the USB flash drive must be encrypted via AES128.

The fixed network collector shall utilize an SD card for flash memory storage.

The fixed network shall encrypt all stored reading files via AES128.

The fixed network data collection units with AC power must have an uninterruptible power supply (UPS) capable of powering the data collector for eight (8) hours in the event of a power outage.

The fixed network data collection units must support the following backhaul options:

- EVDO Rev A (CDMA)
- UMTS/HSPA (GSM)
- 4G LTE
- Fiber
- Ethernet

The data collection units shall consist of the following:

- NEMA 4X enclosure
- 100-140V power supply with UPS or solar cell with battery backup
- LAN: Receiver shall support unlicensed communication protocol from MIUs and comply with FCC part 15.247
- WAN: Multi-carrier cellular modem or Ethernet

Must be able to provide a minimum daily meter reading resolution.

Must be able to store a minimum of seven (7) days of data in the fixed network data collector.

The data collection unit must meet the following environmental operating requirements:

- Temperature range: -20° F to +140° F (-30° C to +60° C)
- Humidity: 0 to 95% non-condensing inside enclosure

5. AMI/AMR Utility Software Application Overview

The utility application must provide all the controls needed in the network for the essential functions of the metering data output received from the communication with field collection devices. The application must present this data within an intuitive user interface that is easy to

interpret and understand. It must integrate seamlessly with other third-party applications the utility utilizes such as CIS/billing software applications and work order management systems.

5.1 Basic Functionality for AMR & AMI

The utility application shall have the capability of interfacing with the utility's CIS/billing software through a file layout that meets the specifications provided by the systems vendor.

The application must have a method to import and export files for billing processes.

- A method must be available for a user to specify the routes to be exported and for transferring files from the application to the billing system.
- The application must be accessible through an internet web browser for accessibility anywhere.
- The utility application must operate within a Microsoft Windows platform and is hosted by the systems vendor.
- A geographical view of metering assets shall be available within the user interface.
- The utility application must allow Mobile AMR and AMI networks metering processes to be run in parallel within a single user interface.
- Graphical presentation of consumption data must be viewable within the user interface.
- The application must have a method to display individual account consumption based on meter size, meter type and unit of measure.
- Multiple levels of user security access must be available within the utility application.
- A method to search for records matching an MIU ID, Account, Name, or Address must be available within the application.
- The application must support meter readings (4-8 digits) and MIU ID numbers up to 10 digits.
- All metering output data, such as leaks and reverse flow indications, shall be viewable within the application. Granular reporting shall be available that defines all accounts that have triggered the event.
- The utility application shall display the top 10 consumers with the highest consumption within the user interface. A method to view additional high usage consumers should be available.
- Reading performance reports and usage analysis capabilities shall be available within the utility application.
- All available reports shall be exportable to Microsoft Excel or PDF formats.
- The utility application shall present to the user the number of successful, unsuccessful and invalid readings.

5.2 Mobile AMR System Functionality

The cloud platform must provide the capabilities of collecting metering data from the Mobile AMR collection devices and present the data in a user-friendly view for consumption by utility users. The following functionality shall be provided within the software:

- The utility application must have a method to view, load, and make route assignments for meter readers.
- A method of loading routes to handheld, mobile drive-by handheld, cellular phones and tablet devices shall be viewable within the application.

- The application shall provide a method of data transfer to the mobile drive-by device and accept data from the device.
- The application shall manage the routes that are loaded into the data collection device.
- The application shall have a method to communicate wirelessly to handheld, cellular phones or tablet devices.
- The utility application shall have a method to split routes by collection method or into equal parts for managing meter reading load activities.

5.3 AMI Network Software Functionality

- The application must have the capability to store all meter data information obtained from the AMI Data Collection Devices.
- The application must provide system critical alarms, such as reverse flow and potential continuous consumption, in a statistical view within the utility application and provide notification to utility personnel.
- The utility application shall have a method to clone a specific AMI collection device for a replacement device when required.
- The application must have the capability to monitor MIUs that have transmitted for the first time to identify reading success.
- Monthly, daily and hourly consumption shall be viewable within the user interface in a tabular and graphical data presentment.
- Daily and hourly readings shall be viewable within the user interface in a tabular format.

5.4 Mobile Application Device Compatibility

- The mobile application shall contain a method of completing meter reading tasks via an Android or an iOS mobile phone or tablet device.
- The mobile application shall contain a method to provide data log capabilities via a mobile phone or tablet device.
- When using a mobile device for meter reading, the software platform shall provide a method of real-time synchronization for loading and unloading routes on the device.
- The mobile application shall have a method to data log a meter endpoint, and it shall include graphical and tabular views that include any meter output such as leaks and reverse flow indications.

5.5 Software-as-a-Service(SaaS)

The utility requires a vendor that is responsible for ownership of the software and all associated hardware to operate the software. The utility shall only be responsible for the computers or laptops needed to access the applications via a web browser. The City shall maintain ownership of all data received by the AMR system or the AMI network and shall be provided online access to all data during an active subscription. In the event the subscription terminates, the vendor shall provide the data to the utility in an agreed upon media format.

The vendor shall provide the following services to the utility during the subscription:

- The SaaS vendor must have a minimum of two years' experience providing hosting services within the water utility space.
- The SaaS subscription must cover all software patches, operating system updates, security and network monitoring, and platform preventive maintenance.

- The vendor shall provide the utility with a service level agreement that meets 99% application availability during business hours of operation, excluding corporate holidays.
- A disaster recovery plan for any failures at the managed services center to ensure continuity of the utility's data and continued access that meets agreed upon contract SLAs shall be provided by the SaaS vendor.
- The SaaS vendor must have a data backup strategy and process.
- A method of communicating or alerting the utility in the event of system failure or downtime must be provided by the vendor.
- The vendor shall have security and monitoring services in place that ensures the privacy and security of the utility's data.
- The vendor shall ensure that the data and all redundant data is housed in the country in which the utility resides.

All data in transit to the cloud must be encrypted.

6. TRAINING AND SUPPORT

An approved, detailed training plan must be developed by the vendor with approval by the City based on results of pre-implementation meetings. The following are items to be determined during these meetings:

- Identify the training personnel and the employees to be trained.
- Identify training schedules for hardware, software, and complete system products.
- Define acceptance criteria for system deployment.

The vendor shall be responsible for fully training utility personnel in the system mapping, deployment planning, and installation of all end-point hardware and reading systems.

7. SUPPORT SERVICES

The vendor shall have a customer support department. The customer support department is required to maintain a telephone help desk and must have the capability of continuing the support through the use of a service agreement. A list of required services to be provided by the help desk includes but is not limited to the following:

- Answer and resolve hardware/operation/maintenance questions and problems.
- Answer and resolve software operation questions and problems.
- Evaluate information for updates or revisions.
- Evaluate personnel for training needs.
- Perform additional on-site training or evaluation as needed.

The help desk must be available weekdays between 8:00 a.m. and 6:00 p.m. EST with after-hours numbers available as needed.

8. INSTALLATION AND TRAINING

Complete installation and operating instructions will be included for all supplied hardware and software equipment. The training must be supplied by the System manufacturer or approved VAR. Proposal must include any additional costs for training and assistance to install and begin operation of the System. The vendor will also inform the customer of what pre-installation activities are to be completed and what support material will be needed for all hardware installation.

9. PERFORMANCE WARRANTIES

In evaluating RFP submittals, warranty coverage will be considered. The vendor shall be required to state its warranty and/or guarantee policy in writing with respect to each item of proposed equipment. The procedure for submitting warranty claims must also be provided.

10. SYSTEM MAINTENANCE SUPPORT

In addition to warranty periods, vendors are required to supply information on required or optional maintenance programs beyond the warranty period for both hardware and software.

Vendor must offer multiple-year maintenance contracts, so utility can take advantage of multi-year discounts.

The location of and procedures for obtaining such support shall be stated. A toll-free help desk number must be provided for system support.

11. VENDOR QUALIFICATIONS

The qualified vendor will have a minimum of thirty (30) years' experience with meter reading systems. The selected vendor shall be thoroughly versed in encoder meter and RF AMR/AMI technology and be a major supplier in the marketplace. The proposed System shall be manufactured and maintained by the selected vendor or an equity partner.

All vendors shall document which water meter manufacturers and models with which they are capable of interrogating with the proposed meter reading equipment. A customer reference list shall be enclosed with the proposal.

Section IV: Evaluation Criteria

All proposals will be evaluated by the Selection Team based upon minimum and comparative criteria. The City will award a contract to the company that submits the most advantageous proposal based on consideration of the specified minimum and comparative criteria as well as price.

1. **Minimum Criteria:**
   Each proposal must meet all of the following criteria in order to be considered for further evaluation:

   - Cover letter describing the background of proponent's company including size, date established, and office location(s). The cover letter must be signed by an official of the firm who has authority to enter into a contract.

   - Evidence of qualifications and experience to fulfill the Owner's equipment and service requirements as described in the scope of services and specifications, to include a listing of the number of years of experience working with or manufacturing the specified components and systems.

   - List of exceptions on equipment specifications.

   - A description/listing of all equipment warranties.

- Company must have a customer support department with a telephone help desk available weekdays between 8:00 a.m. and 6:00 p.m. EST with after-hours numbers available as needed.

- Company must be able to furnish and deliver all specified equipment within the specified timeframe of two (2) years.

- A minimum of three (3) relevant references of similar communities utilizing these services and equipment with contact information to include a contact person and phone number.

- Signed Certificate of Non-Collusion (Attachment A)

- Signed Certificate of Tax Compliance (Attachment B)

- Price Proposal (Attachment C)

2. Comparative Criteria:

The following rating will be used to evaluate those proponents that meet the minimum evaluation criteria above. Those proposals that do not meet the minimum criteria may be reviewed at the City's discretion. If a proposal scores *Non Advantageous* on any of the following comparative criteria, the City may consider the proposal unacceptable and not review it any further. The City will consider the following comparative criterion for award:

Highly Advantageous	Proposal excels on the specified criterion
Advantageous	Proposal meets evaluation standard for the criterion.
Not Advantageous	Proposal does not fully meet the evaluation criteria, leaves a question or issue not fully addressed or does not address the element.

The criteria that will be used for comparative purposes are as follows:

a) <u>Suppliers Number of Years Manufacturing Water Meters</u>

Highly Advantageous: The supplier of the specified equipment has been manufacturing water meters a minimum of seventy-five (75) years.

Advantageous: The supplier of the specified equipment has been manufacturing water meters a minimum of fifty (50) years but less than seventy-five (75) years.

Not advantageous: The supplier of the specified equipment has been manufacturing water meters less than fifty (50) years.

b) <u>Proponent's References</u>

Highly Advantageous: The proponent provides five (5) or more relevant references from similar communities utilizing the specified equipment and services.

Advantageous: The proponent provides at least three (3) but less than five (5) relevant references from similar communities utilizing the specified equipment and services.

Not advantageous: The proponent provides less than three (3) relevant references from similar communities utilizing the specified equipment and services.

c) <u>Quality of Proponent's Proposal</u>

<u>Standard:</u> *The City will evaluate compatibility of proposed water meters and associated equipment hardware and software with the City's existing stock of Neptune meters; warranties and guarantees of equipment; customer service and training opportunities; and a delivery schedule that best meet the needs of the City of Greenfield.*

Highly Advantageous	Proposal excels on the specified criterion
Advantageous	Proposal meets evaluation standard for the criterion.
Not Advantageous	Proposal does not fully meet the evaluation criteria, leaves a question or issue not fully addressed or does not address an element.

Attachment A

CERTIFICATE OF NON-COLLUSION FORM

The undersigned certifies under penalties of perjury that this bid has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, entity, or group of individuals.

_____
(Name of person signing bid)

_____
(Name of business)

Attachment B

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. Ch. 62C, Sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____
(Name of person signing bid)

_____
(Name of business)

Attachment C

PRICE PROPOSAL FORM

Item Number	Estimated Quantity	Brief Description; unit price in both words and figures	Total in Figures
1.	4,292 EA.	5/8" Positive-displacement Meter _____dollars and _____cents ($_____)	$_____
2.	133 EA.	3/4" Positive-displacement Meter _____dollars and _____cents ($_____)	$_____
3.	252 EA.	1" Positive-displacement Meter _____dollars and _____cents ($_____)	$_____
4.	119 EA.	1.5" Positive-displacement Meter _____dollars and _____cents ($_____)	$_____
5.	51 EA.	2" Positive-displacement Meter _____dollars and _____cents ($_____)	$_____
6.	11 EA.	3" Compound Meter _____dollars and _____cents ($_____)	$_____

7.	6 EA.	4” Compound Meter _____dollars and _____cents ($_____)	$_____
8.	3 EA.	6” Compound Meter _____dollars and _____cents ($_____)	$_____
9.	3,974 EA.	Inside Set Encoder Register Unit _____dollars and _____cents ($_____)	$_____
10.	318 EA.	Pit Set Encoder Register Unit _____dollars and _____cents ($_____)	$_____
11	3,974 EA.	Meter Interface Units (MIUs) – Inside Set Version _____dollars and _____cents ($_____)	$_____
12	318 EA.	Meter Interface Units (MIUs) – Pit Set Version _____dollars and _____cents ($_____)	$_____
13	5 EA.	Stationary Data Collector for 90% _____dollars and _____cents ($_____)	$_____

14	11 EA.	Stationary Data Collector for 99% _____dollars and _____cents ($_____)	$_____
15	1 EA.	Mobile Data Collector _____dollars and _____cents ($_____)	$_____

The total price for Items 1 – 15 inclusive, is $_____.

Attachment D

SAMPLE AGREEMENT

Agreement made this _____ day of _____, 2020, by and between the City of Greenfield, Massachusetts, ("Client") with principal offices at 14 Court Square, Greenfield, MA 01301 and "Awardee" with its office at _____.

1. Awardee's Services

   Awardee's services are described in Attachment A, Scope of Services and Specifications, which is attached to and made part of this Agreement by reference.

2. General Conditions

   These General Conditions specify the general understandings, representations, and obligations of Awardee and Client.

3. Special Conditions

   The Scope of Services and Specifications specify: 1) the scope of services and equipment to be provided; and 2) specific obligations of Awardee and Client which are not part of these General Conditions.

4. Changes in Scope of Services

   If Client or Awardee request changes in the Scope of Services, the Parties will, by mutual agreement, execute a written amendment describing the changes to the Scope of Services, project schedule and authorized budget. If the Parties cannot agree to the changed scope of services, or budget, Awardee will continue to provide the services initially approved by Client.

5. Compensation and Payment

   A. Compensation

      1) Except when indicated otherwise in a written agreement between Client and Awardee, Awardee will invoice all equipment sales in accordance with Awardee's price proposal, which is attached to and made part of this Agreement (Attachment B).

      2) Awardee shall submit invoices for payment on or about the 1st of each month, for all sales rendered the previous month. Client will process all invoices within thirty (30) days of approval. If Client objects to any portion of the invoice, Client must notify Awardee in writing within ten calendar days from receipt of the invoice, identify the cause of disagreement, and pay when due all charges that are not in dispute. In the event Awardee and Client cannot resolve a dispute regarding the invoiced amount within thirty days after Awardee receives Client's notice of disagreement, the dispute shall be subject to the Dispute Resolution provision of this Agreement. Awardee will provide reasonable documentation to substantiate all claims for payment.

   B. Effect of Client's Delay in Payment

1) If any undisputed amount is not paid within thirty calendar days after Client receives Awardee's invoice, Awardee may, without notice, suspend all services until all outstanding amounts have been paid or Awardee may terminate this Agreement and its services for cause and regardless of any other provision of this Agreement to the contrary, such action by Awardee shall not be a breach of this Agreement.

2) All unpaid invoices and other invoiced amounts not in dispute and all of Awardee's costs of collection, including all reasonable legal fees and related costs shall constitute Awardee's continuing and valid claim against Client and its heirs, successors and assigns until paid in full.

6. Awardee's Standard of Care

A. Awardee will perform all services in a manner consistent with the level of care and skill generally exercised by firms providing similar services in the same general locality under similar conditions at the time the services are provided. Awardee will, without additional compensation, correct or replace any deliverables not consistent with Awardee's proposal, subject to Client providing reasonable notice to Sandri.

B. Cooperation of Client and Awardee

Client and Awardee will cooperate to complete the services in a timely, efficient, and cost-effective manner, with each Party designating an authorized project representative who shall have the authority to make decisions.

7. Confidentiality

A. Nondisclosure

With the exception noted below, Awardee shall consider all Clients' information as confidential and will not disclose such information to any other party unless requested by Client or directed by subpoena or court order. In such event, Awardee will cooperate with Client by providing Client with as much notice as possible under the circumstances and by all other lawful means as Client may request. All of Awardee's costs in responding to or attempting to minimize the effect of any subpoena or lawful order at Client's request will be invoiced to Client on a time and expenses basis and shall be paid by Client within thirty business days after Client receives Awardee's invoice. Client's failure to pay Awardee as specified in this paragraph shall be a material breach of this Agreement.

8. Indemnity

A. General

Awardee agrees to indemnify, and hold harmless Client and its officers, directors, and employees from and against claims, suits, damages, or losses incurred by Client, to the extent caused by the negligent acts or willful misconduct of Awardee or its agents, officers, directors, employees and contractors. Awardee's agreement to indemnify, and hold Client harmless shall not extend to any suit, claims, damages, or losses caused by the negligent acts, omissions, or conduct of Client.

Client agrees to indemnify, defend, and hold harmless Awardee and its agents, officers, directors, employees and contractors from and against all claims, suits, damages, and losses, arising out of, relating to, or based on Client's negligent acts, omissions or other negligent conduct.

9. Duration of Agreement

A. The term of this Agreement shall be for a period of two (2) years. The first year of the Agreement shall be from January 1, 2020 to December 31, 2020. The second year shall be from January 1, 2021 to December 31, 2021.

10. Termination

A. Termination for Cause

Either party may terminate this Agreement for cause if the other party fails to substantially perform its responsibilities under this Agreement or substantially violates or breaches any provision of this Agreement.

The terminating party shall provide at least ten calendar day's written notice of its intent to terminate, specifying the reasons and an opportunity for the terminated party to consult with the terminating party and cure the alleged failure or violation within ten business days.

11. Dispute Resolution

A. The parties shall attempt in good faith resolve any dispute, controversy or claim related to this Agreement within twenty business days after the date any such issue arises (the "Issue Date").

B. If the parties cannot resolve a dispute within this period, the parties agree to submit the dispute to mediation within thirty business days after the Issue Date and may use any mediator upon which they mutually agree. If the parties cannot mutually agree on a mediator within forty business days after the Issue Date, the parties will each select a mediator. The two mediators will then select the mediator. The cost of any mediation will be split equally between the parties.

C. If the parties are unsuccessful in their good faith attempt to mediate the dispute, the dispute may, by written agreement settle the dispute by binding arbitration.

D. The parties agree that a judgment on an arbitration award may be obtained from and enforced in any court having appropriate jurisdiction.

12. Miscellaneous

A. This Agreement shall be binding on Awardee and Client and their respective heirs, successors, legal representatives and assigns.

B. Neither party shall assign or transfer any rights, responsibilities, or interests in this Agreement without the written consent of the other party, such consent not to be unreasonably withheld. An assignment shall not relieve the assigning party from any responsibility, duty, or obligation under this Agreement, unless expressly agreed to in

writing. Any attempt by either party to assign this Agreement in violation of the above provision shall be null and void.

C. All duties, responsibilities, rights, and interests created by this Agreement are for the sole and exclusive benefit of Awardee and Client, and not for the benefit of any third party.

D. Any written notice required or authorized under this Agreement shall be personally delivered, sent by certified mail or overnight delivery to the authorized representatives designated under this Agreement. The party providing notice must be able to document this.

E. If any provision of this Agreement is determined to be void or unenforceable by a court or mediator, all remaining provisions shall continue to be valid and enforceable. The parties also agree to reform or replace any void or unenforceable provision with a valid and enforceable provision that comes as close as possible to expressing the intention of the void or unenforceable provision.

F. The paragraph headings in this Agreement are included solely for reference, and shall not define, limit, or affect the construction or interpretation of this Agreement.

G. The Agreement, as supplemented by any documented changes and Exhibits, constitutes the complete and final Agreement between Awardee and Client and it supersedes all prior or contemporaneous Agreements, communications, representations, undertakings or understandings between the parties, whether oral or written, including but not limited to, purchase orders relating to services rendered, except as they are expressly incorporated into this Agreement. Modifications to this Agreement shall not be binding unless made in writing and signed by Awardee and Client.

1) To the extent that they are inconsistent or contradictory, these General Terms and conditions shall take precedence over all other documents, except amendments expressly revising these General Terms and Conditions.

2) Any term and/or condition set forth in a change order executed after the date of this Agreement shall take precedence over any inconsistent or contradictory term in this Agreement.

H. Awardee shall be fully independent in performing the Services set forth herein and shall not act as an agent or employee of Client. Awardee is solely responsible for its employees and contractors and for their actions, compensation, benefits, contributions and taxes.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written.

CITY OF GREENFIELD, MA	AWARDEE
By: _____ William Martin, Mayor	By: _____
Date: _____	Date:_____