1. SCOPE OF WORK

The AMI Fixed Base solution, issued through this RFP, must meet all of the current and future needs within the service area for the City of Florence (City). The scope of work involves, but is not limited to, providing and installing the major components of a fixed network system which includes: Installation of new meters, software, hardware, and all necessary training and installation support. The fixed network system must be capable of receiving meter readings over fixed network Advanced Metering Infrastructure (AMI) system architectures. Acceptable AMI manufactures are: Badger, Neptune, Sensus, and Kamstrup

For reliability and meter reading integrity, all system components (Meter's or meter Interface Units (MIU's), base stations, repeaters, software, and meter registers), should be of a single brand, purchased through a single vendor in order to provide a turnkey system offering to the utility with verified compatibility. Available system parts furnished will include: meters, Radio Frequency (RF) transmitter MIU, with and without, integrated register, base station / network infrastructure, and fixed network software.

Proposals will be evaluated on initial capital costs, reoccurring maintenance costs, and replacement costs over a twenty (20) year period to establish a life cycle cost of the AMI system.

2. SYSTEM OVERVIEW

The fixed base solution must provide secure two-way communications from the fixed network host software/head end to the base station and to the RF MIUs, allowing for remote configuration and firmware updates of the MIUs over the air. The RF communication method from the base station to the RF MIUs must utilize an FCC-licensed, two-way frequency to assure reliable, extended range, and interference free communications between the RF MIU and the base station. The system must be capable of automatically migrating between data delivery modes and operating in a hybrid mode to allow for the transition from mobile read system devices to fixed network devices or vice versa.

The fixed network system must record hourly system-wide, time-synchronized readings from all MIUs – to support Non-Revenue Water and conservation initiatives and eliminate off-cycle readings for high water bill complaints and/or move-ins/move-outs. The network must utilized smart sensing activation of the MIUs, allowing for auto-discovery of the MIUs throughout the network.

The fixed network software must be designed to support key departments within the utility organization (customer service, billing, operations) by providing data in user-friendly, function specific screens as well as reports to help the City manage day-to-day operations. The fixed network software must provide users with easy system monitoring, over-the-air system upgrades, auto-discovery throughout the network, hourly time-synchronized meter readings, monthly/daily/hourly customer usage graphs, enhanced reporting, priority alarms, customizable security and administrative user levels. The software must interface with the City's existing CUSA utility billing system for meter reading and customer alarms.

Definitions:

- Fixed Network System (the “system”): The fixed network system is comprised of fixed network software, wide area network (WAN), base station and repeater, and radio frequency meter interface unit (MIU) with integrated register, to enable the remote collection of metering data from water meters or other compatible devices.
- Fixed Network Software: The software must manage the communication with the base station and MIUs, issue configuration commands to the base stations and MIUs, and transfer collected meter data to the billing/CIS system. The software must also provide an easy-to-use graphical user interface (GUI) allowing utility personnel to manage the system and analyze the resulting data.
- Wide Area Network (WAN): The WAN is the communications link between the software and fixed network base station. The standard WANs utilized in the fixed network base station are GPRS and Ethernet.
- Base Station: The hardware/software that enables communication between the MIU installed at the meter site and the software. The base station must have two-way communication capabilities to receive, store, and transmit meter data and commands.
- Repeater: The hardware/software that enables communication between the base station and the MIUs (if required). The repeater must have two-way communication capabilities to transmit and receive meter data and commands, and must be housed in a NEMA-4X environmentally-rated enclosure.
- Radio Frequency MIU: The RF MIU must transmit on an FCC-licensed frequency. The MIU must be a high-power, two-way communication device designed to transmit the meter reading data associated to a unique register ID number to the base station. The standard mode of operation of the MIU is to transmit a minimum of twice daily, hourly time synchronized meter readings and daily consumption data comprised of 12 hourly consumption intervals to host software. The MIU must be capable of being configured to transmit priority alarms for leak and reverse flow events within 5 minutes of the event. MIU must be capable of On Demand reads which deliver the requested information within 10 minutes. The MIU must be able to have its firmware upgraded remotely from the host software.
    - ID Number - Each MIU must have a unique, non-programmable permanent ID number.
    - Programmability - Register integrated MIUs must be ground shipped programmed. However, the MIU must be capable of two-way communication for field re-programming of a user selected ID number or for resetting specific alarm codes and updating customizable attributes. Programming must be accomplished without removing the MIU from a pit, basement or wall application.
    - Leak Detection - The MIUs within the system should monitor water consumption through the meter and must specifically indicate possible leaks, as alarm flags to the software, whenever the meter has not detected zero consumption for 15 minutes (programmable) within a single twenty-four hour time period.

- Tamper Detection - The MIUs within the system must contain tamper detection circuitry and software, which identifies tamper as alarm flags to the route management software, whenever the MIU has been tampered.
- Back Flow Detection - The MIUs within the system should specifically indicate, as alarm flags to the route management software, whenever there is an unusual amount of counter clockwise registration or back flow.
- Data Logging - All MIUs must possess data logging capabilities with a minimum of 5760 data points. Data must be downloaded from the MIU through the base station to the software without the need for physical contact or connection with the MIU.
- Environmental tolerance - The MIUs must operate in conditions subject to water submergence (i.e., meter boxes or vaults) with a water submergence rating consistent with IP68. External or wired MIU enclosures must be composed of UV-inhibiting ABS or similar material further sealed and totally encapsulated with an electrostatic gel that eliminates moisture intrusion.
- Labeling - The MIU must be permanently labeled with manufacturer's name, model number, Identification Number, required FCC labeling. External or wired MIUs must also include input/output connections and date of manufacture.
- Meter box installation - The MIU must operate from within a meter vault box, basement, or wall mount. Standard installation will require that no antenna or other portion of the MIU may project through the lid or cover unless the pit is continually submerged in water or dirt or there exists a harsh "RF interference" environment. The system must provide for optional external antennas for any "hard to read" units that meet these conditions.

3. FIXED NETWORK SOFTWARE OVERVIEW

The host software must have the basic capability of supplying the following features to the end user:

- Employ thin-client (browser-based) architecture wherein the database is centralized and the host application requires no local install, but is accessed through an Internet browser.
- Utilize a standard file layout format to interface with the utility's CIS for both on-cycle and off-cycle meter reading.
- Interface with third-party applications such as work order systems via a standard interface (e.g., web services).
- Customizable reporting engine which provides key reports on advanced usage analysis included within the application: district metering, consumption reporting, troubleshooting, leak report, tamper report, reverse flow report, and non-billable report.
- Customizable dashboard that provides key performance indicators (KPIs) to allow for proactive monitoring of system health and performance. Provides a wizard-driven priority

alarm configuration capable of sending information directly to key utility personnel (via email or SMS) based on predefined triggers and thresholds.
- Able to export data to Microsoft Excel and Word applications.
- Designed to hold two (2) years of history for direct access, with an option for secondary direct access storage and reporting of older usage history.
- Provide an export of key data for third-party meter data management or customer web presentment.
- The software must provide all the control needed in the network and provide for the essential functions of network management, meter communications, reporting, database configuration, and alarm monitoring. It must comply with prevailing industry standards and should run on a Windows-compatible PC.
- Provide at a minimum hourly data to both utility users and utility customers.
- Be able to provide 15-minute interval leak and reverse flow monitoring and alerts via email to utility's customers. These alerts can be generated by the MIUs themselves, or, if an MIU option is not available, by the data repository system.
- Provide a method to export data in Adobe PDF and MS Excel formats.
- Be able to store up to ten (10) years of once daily reads of AMI data for immediate realtime access.
- Be able to support network meters, deduct meters, and compound meters.

4. FIXED NETWORK DATA COLLECTORS – BASE STATION AND REPEATER

Basic Requirements:

The fixed network must be comprised of a main base station for covering large areas and a smaller repeater or extender, designed to cover minor gaps in coverage to be used in pole mount applications.

The base station must demonstrate the capability to read the MIU in the system and communicate back to the host software.

The Base Station:

- Must support two-way communications over an FCC Part 90-licensed frequency with the MIU and provide such functionality as priority alarms, over-the-air programming, and remote firmware upgrades.
- Must have an available UPS that can provide at least four (4) hours of battery backup.
- Must store a minimum of seven (7) days of meter reading data.
- Transceiver must utilize the 450 – 470 MHz FCC Part 90-licensed frequency.
- Must utilize a Linux operating system running on an industrial Small Form Factor PC with an Intel Processor.

The repeater must demonstrate the capability to read the MIU in the system and communicate back to the base station.

The Repeater:

- Must support two-way communications over an FCC Part 90-licensed frequency between the base station and the MIU.
- Must provide flexible mounting options such as pole-mounts, stand-alone configuration, and wall mounts.
- Must provide an AC-power option.
- Must have an internal battery that can provide at least eight (8) hours of battery backup.
- Transceiver must utilize the 450 – 470 MHz FCC Part 90-licensed frequency.

Environmental Characteristics

- The base station and repeater must have an operating temperature of (+15°F to +120°F).
- The base station and repeater must have an operating humidity of 0 to 95% noncondensing.

5. METER INTERFACE UNIT (MIU)

Operation Specifications

The MIU must operate on an FCC-licensed frequency within the 450 MHz to 470 MHz licensed band and operate within FCC Part 90 regulations for this band. The output power of the device will be no less than 1.7 watts and will be governed by their conformance to these relevant FCC standards.

No programming of the MIU must be necessary during field installation. The MIU must be shipped pre-programmed to the customer and must be able to be initialized via flow or magnetic reboot.

The MIU:

- Must utilize two-way communications with the base station to allow for over-the-air communications for reprogramming, time synchronization, firmware upgrades, alarm notifications, and On Demand reads.
- Must utilize on-demand reads to deliver usage data in 15 minute intervals.
- Must be capable of operating at temperatures of (-4°F to +149°F) and operating humidity of 0 to 95% condensing.
- Must incorporate a dual band antenna capable of providing consistent and reliable connections while the pit environment is flooded or dry.
- Range will not be affected substantially when the pit is partially flooded.

6.0 TRAINING AND SUPPORT

A proven, detailed training plan must be developed by the vendor with approval by the City based on results of the pre-implementation meetings.

The following areas must be document and available:

- Identification of the training personnel and the recommended employees to be trained.
- Identification of training schedules for hardware, software, and total system products.
- Identification of training materials and collateral to support the project.
- Definition of acceptance criteria for system deployment.

Support Services

The vendor must have an in-house 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 5:00 CST with afterhours numbers available as needed.

The customer support department of the vendor must provide metrics demonstrating that it routinely meets or exceeds the following minimum support performance metrics:

- 95% Same Call Resolution
- 95% Same Day Resolution

Installation and Training

Complete installation and operating instructions will be included for all of the supplied hardware and software equipment. The training must be supplied by the system manufacturer or approved distributor. 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 any preinstallation activities that are to be completed and the support material that will be needed for the initial installation.

7.0 WARRANTIES

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

of the warranty coverage for: base station and repeater, along with the all MIUs, register integrated or non-integrated, supplied in connection with this proposal are covered under the Warranty Document.

8.0 SYSTEM MAINTENANCE AND 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 multiyear discounts. The location of, and procedures for, obtaining such support must be stated.

9.0 VENDOR QUALIFICATIONS

The qualified vendor will have a minimum of twenty (20) years of experience with meter reading systems. The selected vendor must be thoroughly versed in meter and RF AMR/AMI technology and have been a major supplier in the US marketplace. The proposed system must be of a single brand, purchased through a single vendor and maintained by the selected vendor to ensure compatibility among system components.

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

10.0 PRICING

The vendor shall provide pricing for a complete turnkey fully functional system. The costs shall be listed as separate, unit cost, line items for the following items:

- Meter installation (labor)
- Meter cost to include required MIU
- Initial software costs including licensing and installation
- Annual software costs including licensing, software updates and support
- Network infrastructure setup and installation costs
- Network infrastructure annual costs

Initial pricing shall be based on the assumed number of meters to be replaced listed below:

- 5/8 X ¾ - 496
- 1 inch – 3
- 1.5 inch – 12
- 2 inch – 8
- 3 inch – 2
- 4 inch – 1
- 6 inch - 1

Meters are located in meter boxes or vaults depending on size.