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Advanced Metering Infrastructure/Smart Utility Solution – Water & Sewer Compliance Table

1.	Endpoints	Product Capability	Notes
1.1.1.	Must be able to monitor Chlorine in real-time		
1.1.1.2.a.	The chlorine analyzer must be accessible for 4-20mA Output configuration		
1.1.1.2.b.	Must be able to analyze chlorine by RS-485 Modbus RTU		
1.1.1.3	Chlorine analyzer must have the capacity to integrate API with built-in manual Quality control		
1.2.1.1	Must have a McCrometer Ultra-Mag with Pro-Comm converter		
1.2.1.2.a.	Electro-Magnetic Flow meter must be accessible for 4-20mA Output configuration		
1.2.1.2.b.	Electro-Magnetic Flow meter must be able to develop RS-485 Modbus RTU		
1.2.1.3	Electro-Magnetic Flow Meter must have the capacity to integrate API with built-in manual Quality control		
1.2.2.	Must have proper pressure management and balancing		
1.2.2.1.	Must be able to retrofit existing ¾" NPT valves with pressure sensors		
1.2.2.2.	Must be able to install/tap a 12"x1" Saddle for a ¾" NPT fitting to install pressure sensors.		

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1.2.2.3.a.	Must be configurable 4-20mA Output		
1.2.2.4.	Must be integrated into an existing Water AMI platform. Must include manual Quality control.		

SECTION 2

2.1.	Must integrate pressure sensor for every District Metering for regional pressure monitoring to correlate data with the Water Treatment Plant		
2.1.1.	Must be able to identify branch-off areas and water loss.		
2.1.1.1.a.	Electro-Magnetic flow meter must have an accuracy of +/- .5%		
2.1.1.1.b	Solution must be battery powered with a 5-year power supply for the flow meter.		
2.1.1.1.c.	Solution must have an integrated pressure sensor with 10-year power supply.		
2.1.1.1.d.	Solution must be capable of being installed and removed under pressure.		
2.1.1.1.e.	Meter must be metallic with a fusion bonded epoxy coating to insure longevity of service life, because of environmental conditions.		

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2.1.1.1.f.	CONTRACTOR must have experience with installing these type of flow meters.		
2.1.1.1.g.	CONTRACTOR will be responsible for conducting site surveys, digging to access the service line and installing a meter pit for the proposed insertion mag meter.		
2.1.1.1.h.	CONTRACTOR will be responsible for conducting a 2" full port service tap on the service line. This tap will be conducted under pressure to avoid any system shutdowns.		
2.1.1.2.	Must have a Fixed Base AMI Communication Network		
2.1.1.3.	Must have a software that allows for virtual district metering. These will be permanent installations. As such, the isolation of basins will not be possible as it would interfere with day-to-day operations.		
2.2.	Must have the ability for near real-time service level pressure monitoring		
2.2.1.	Pressure monitoring must be able to integrate directly with the provided solutions network and shall provide near-real time data.		
2.2.1.1.	Solution must be capable of setting up alarms based on pressure thresholds to detect abnormal conditions.		

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2.2.1.2.	Solution must be capable of validating field repairs and activities by tracking pressure before, during, and after changes are made.		
2.2.1.3.	Solution must be capable of accessing 1,000+ days of historical data.		
2.2.1.4.	Third party solutions must not be accepted		
2.2.1.5.	Solution must be capable of exporting pressure and total head data at all sites and sensors to compare with expected values.		
2.2.1.6.	Solution must assist with calibration & validation of hydraulic models.		
2.2.1.7.	Solution must seamlessly integrate with IWSD GIS platform and all ESRI solutions.		
2.2.1.8.	Solution must provide data layers such as property parcels, streets, pressure zones, and the Utility network layer.		
2.2.2.	Must be able to integrate with the District Metering Solution to provide distribution line pressure monitoring.		
2.2.2.1.	Must have the hardware which references to have a pressure sensor integrated into Insertion Electro-magnetic flow meter.		

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2.2.2.2.	Must have a Fixed Base AMI Communication Network		
2.2.2.3.	Must have a Head-End System to allow for near real-time data analysis		
2.2.3.1	The solution must have a fully integrated 2-way acoustic monitoring system that communicates directly to the NaaS Network.		
2.2.3.2	The solution calls for a system that utilizes sounds waves to monitor distribution lines and localize leaks.		
2.2.3.3	Sensor must activate overnight, to listen to the distribution system when ambient noise is at its lowest and to report pipeline condition back to the utility via the NaaS Network.		
2.2.3.4	Sensor must attach magnetically to gate valves, meter service connections and other metallic utility assets/access points.		
2.2.3.5	The system must have a minimum of a 3-year battery solution with a 3-year warranty and can store up to 29 days of data.		
2.3.1.a.	Must be able monitor chlorine analyzer with chlorine residual to balance the Water Treatment Plant		
2.3.1.b.	Requires dissolved oxygen sensor, which solution monitors various aspects of water quality with flexible parameter options enabling monitoring across a large spectrum of water quality concerns		

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2.3.1.b.ii.	Must have a fixed Based AMI Communication Network		
2.3.1.b.iii.	Must have a Head-End System to allow for near real-time data analysis		
2.4.	With AMI, must be able to collect usage data in near real-time.		
2.4.	With AMI, must have the ability to easily integrate additional water & sewer assets without network expansion or incurring additional telemetry fees from cellular or other third-party solutions		
2.4.	Has the ability to integrate desired third-party sensors and metrology products without the need for additional fees for data “translation” into the head-end system.		
2.4.	Has a prioritized communication network, which will have the ability to work under emergency operations conditions.		
2.4.1.a.	Residential metering must have a solid-state electromagnetic flowmeter hardware		
2.4.1.a.1.	Must have solid state residential meters.		
2.4.1.a.2.	Must have a Fixed Base AMI Communication Network		

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2.4.1.a.3.a.	Must be a 20-year solid state meter		
2.4.1.a.3.b.	Must have a 20-year accuracy warranty		
2.4.1.a.3.c.	Must be a 20-year product warranty (minimum 10 years full & 10 years prorated)		
2.4.1.a.3.d.	Must have the ability for Water loss balancing with District Metering Solution		
2.4.1.a.3.e.	Customer side leak detection		
2.4.1.a.3.f.	Must have wastewater I&I balancing with Sewer Flow Meter at Pump Station		
2.4.1.a.3.g.	Must have inactive account consumption notification.		
2.4.1.a.3.h.	Must detect reverse / backflow.		
2.4.1.a.3.i.	Must have tamper alarming.		

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2.4.1.a.4.	Must have Head-End system to allow for data analysis and ease of use.		
2.4.1.b.	Must have the ability for integrated remote disconnect, pressure sensors, and temperature sensors without the need for retrofitting		
2.4.1.b.	Meter shall have an at minimum 15-yr accuracy warranty		
2.4.1.b.1.	Must have Smart Metering Distribution technology.		
2.4.1.b.1.a.	Must have an Integrated 3-way Valve Remote disconnect.		
2.4.1.b.1.b.	Must have an Integrated Temperature Sensor		
2.4.1.b.1.c.	Must have an Integrated Pressure Sensor		
2.4.1.b.1.d.	Must show a Solid-State Flow measurement.		
2.4.1.b.2	Must have a Fixed Base AMI Communication Network		

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2.4.1.b.3.a.	Must have a 3- Way Valve Remote disconnect capability.		
2.4.1.b.3.b.	Must have a seasonal disconnect capability.		
2.4.1.b.3.c.	Must have temperature monitoring		
2.4.1.b.3.d.	Must have pressure monitoring (distribution level pressure monitoring, leak detection, etc.)		
2.4.1.b.4.	Must have a Head-End system to allow for data analysis and ease of use		
2.4.2.a.	Commercial metering must include high-accuracy water meters for low and high-flow applications.		
2.4.2.a.	Commercial metering must contain a built-in access point for pressure, temperature, and water quality monitoring		
2.4.2.a	Commercial meter must have a minimum 10-year commercial rated with replaceable register and measuring element, 20-year capable meter.		
2.4.2.a.1.	Commercial Metering Must have Inferential Metering technology		

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2.4.2.a.2.	Must have Fixed Base AMI Communication Network		
2.4.2.a.3.a.	10 year rated commercial meter with replaceable measure element. Making it a 20-year capable meter		
2.4.2.a.3.b.	Must have a balance between water loss and District Metering Solution		
2.4.2.a.3.c.	Customer side leak detection		
2.4.2.a.3.d.	Must have a balance between wastewater I&I and Sewer Flow Meter and Pump Station		
2.4.2.a.3.e.	Must notify inactive account consumption.		
2.4.2.a.3.f.	Must detect reverse / backflow		
2.4.2.a.3.g.	Must have tamper alarming		
2.4.2.a.3.h.	Must include a distribution pressure monitoring.		

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2.4.2.a.3.i.	Must be possible through meter test port		
2.4.2.a.4	Must have a Head-End system to allow for data analysis and a ease of use.		
2.4.2.b.	Must require the ability to retrofit pressure sensors to the proposed commercial meters.		
2.4.2.b.	Must transmit data into the same head-end system that is used for all other Water Metering AMI solutions.		
2.4.2.b.1.a.	Capable of retrofitting to existing 3” – 8” Sensus OMNI™+		
2.4.2.b.1.b	Capable of being fitted to proposed commercial metering solution.		
2.4.2.b.2.	Must have Fixed Base AMI Communication Network		
2.4.2.b.3.	Must have Head-End System to allow for near real-time data analysis		
2.4.3.1.	Receive meter data from water meters equipped with absolute encoder registers. The CONTRACTOR shall state which brands and models of encoder registers are compatible with the proposed radio module.		

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2.4.3.2	Communicate via a strong, secure, and reliable radio frequency that include provisions to ensure data transmission accuracy, and immunity from outside interference as well as fading and other forms of signal degradation or attenuation to prevent accidental loss of customer or meter reading data.		
2.4.3.3	It is the desire of the IWSD to procure meters separate from the AMI RFP. Please detail connector solutions with outside the proposer's meter lines. Please include whether single or dual connection options are available for transmitting up to two (2) meter readings and alarms per transmission, including any cost savings associated with this orientation.		
2.4.3.4	Identify customer leaks, tamper and backflow parameters when connected to an encoded register. The alarm parameters shall be configurable and programmed for each meter. This feature must work with any brand of encoded register. These parameters must be capable of being changed through the network after installation is completed.		
2.4.3.5	Must be able to detail programming adjustments that may be needed to retrofit existing encoder outputs.		
2.4.3.6	Must be designed and built for installation in meter pits.		
2.4.3.7	Housed in a single package designed for rugged, harsh environments and capable of complete submersion in water without damage.		

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2.4.3.8	Function accurately and not be damaged when an operating temperature range exceeds -40 degree C to +70-degree C.		
2.4.3.9	Operate in the above conditions and have a minimum battery life of 20 years.		
2.4.3.10	Transmit battery life data to the Host System alerting of low battery levels for preemptive maintenance.		
2.4.3.11	Store meter data including date and time stamps in non-volatile memory.		
2.4.3.12	Have two-way communication with a minimum capability of on-demand reading from the AMI Network for customer complaint resolution. This shall allow us to obtain real-time data upon request. Receive and process commands from the AMI Network for all firmware updates to eliminate the need to manually perform the update function to each locale. AMI Modules must support group firmware updates to reduce system maintenance time.		
2.4.3.13	The AMI Module shall be capable of migrating to both AMR/AMI capable reading without additional visits and equipment.		
2.4.3.14	Alerts such as: tamper alert or meter disconnected, back read or communications failure, leak detected, no flow detected during a specific period of time set in the host software, reverse flow/backflow, high flow rate detected and battery health		

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2.4.3.15	Update each AMI Module's clock date & time settings to match reference date & time that shall be regularly provided to the meter stored in the transmitter's memory.		
2.4.3.16	Provide data about the AMI Network and handheld collectors in the field for use in diagnostics and maintenance activities.		
2.4.3.17	Must have the ability to deliver smart utility functionality including UOM such as: PSI, F as temperature, level, water flow, sewer flow, H2S, chlorine residual and dissolved oxygen.		
2.4.3.18	Must be able to analog (4-20mA) IO device to the system outside of what standard requirements are.		
2.4.3.19	Be warranted free from defects in material and workmanship for a minimum of twenty (20) years. In the event any defects are found within the warranty period, the CONTRACTOR shall correct the defect at its own expense.		
2.4.4.	Must be compatible with at least three different meter registers. More compatibility is desirable.		
2.4.5.	Must have the technology capable of reading the existing system without the requirement of running a dual platform. All reads must come into a single meter reading platform for ease of integration with the District's billing software.		
2.4.5.1.	Solution must be capable of utilizing a radio frequency-based vehicle collection system for automated meter reading for the Neptune R900 RF Drive by solution.		

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2.4.6.1	Consist of a reliable and tested network to ensure billing data quality along with other Smart Utility capabilities. Please describe how your network meets these specifications.		
2.4.6.2	Include a 98.5% billing read success over a 72-hour period.		
2.4.6.3	Custody of control of network architecture		
2.4.6.4	Operations before during and after emergency conditions		
2.4.6.5	AMI endpoint stores and frequency of deliver of meter data daily to the AMI Network from all the AMI Modules and how this process can maximize read interval success		
2.4.6.6	Communicate on demand to AMI endpoint and other related endpoint devices		
2.4.6.7	Use state-of-the-art data security techniques to prevent unauthorized access to the data.		
2.4.5.8	Time synchronizes all devices to within five (5) seconds at least once per day and allow daily upload of meter data and system health checks.		
2.4.6.9	Established architecture to include backup/failover options for the entire communication path from the meter to the Meter Data Management System.		

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2.4.6.10	Use AC and solar powered units and optional battery backup if applicable.		
2.4.6.11	Allow self-diagnosis of any problems associated with the back haul of the communication and the ability to automatically seek an alternate communication path if initial daily or real-time upload is unsuccessful.		
2.4.6.12	Accommodate over the air firmware and software upgrades.		
2.4.6.13	Have icons that permit viewing operational health of the system components.		
2.4.6.14	Be capable of changing read interval sampling, alarm frequency sampling, and communication mode over-the-air.		
2.4.7.2.	CONTRACTOR shall provide a managed hosting service, where it will own and manage the server hardware and software including monitoring to ensure the server continues to work effectively, provide backup services, installation of security patches and various levels of technical support. The CONTRACTOR hosted solution shall utilize a secure web-based application.		
2.4.7.3.	CONTRACTOR shall provide software, support and documentation that will enable the IWSD to self-host the data on IWSD owned equipment in the future.		
2.4.7.4.	An upgrade path shall be defined to support the IWSD transitioning from one hosting option to another at a time of their choosing.		

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2.4.7.5.	The Host Software solution shall utilize a secure web-based application user interface.		
2.4.7.6.	The Host Server shall act as the central collection point for the data within the system. The server collects data from all of the remotes and stores the gathered data in a secure database. Once the data is stored and analyzed on the server, the data shall be available for display via an easy-to-use web based graphical interface.		
2.4.7.7.	The Host Server shall manage and archive data for a minimum of two (2) years in order to be accessed by any IWSD computers, handheld devices both locally and remotely via the web.		
2.4.7.8.	The data shall be available via a user interface that will allow for analysis, as well as bill generation.		
2.4.7.9.	The Host system software shall be web browser based. Standard interfaces shall be available to connect to current and future IWSD applications.		
2.4.7.10.	The Host Software shall have flexible meter reading data formats that are compatible with IWSD's current billing application, a custom designed Customer Information System. Data transfers shall utilize a secure transfer protocol (SFTP) utilizing American Standard Code for Information Interchange (ASCII) file transfers.		
2.4.7.11.	The Host Software shall be used to generate reports, view demand graphs, determine usage patterns, and request transfer of readings to billing software.		

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2.4.7.12.	The Host Software shall use information from alerts uploaded in the data and have the ability to generate specific e-mail alerts or short message service (SMS) messages for each status code, configured by the User interface.		
2.4.7.13.	Each AMI endpoint generated alert shall be accompanied by a duration for which the alert has been active, and which shall be stored and optionally sent out by the server.		
2.4.7.14.	The User interface shall permit the sending of alert outages, tampering, out-of-range system operating parameters to appropriate utility personnel via cell phone or e-mail.		
2.4.7.15.	The User Interface shall allow IWSD to correlate consumption with meter data available on the user interface.		
2.4.7.16.	The CONTRACTOR shall offer an integrated consumer portal for customer access to consumption data.		
2.4.7.17.	The customers shall have the ability to see their usage, compare their current usage with previous periods, configure individual alerts and set monthly and yearly budget goals.		
2.4.7.18.	Customers shall have access to simple canned queries and the option to select more advanced queries for more detailed analysis.		
2.4.7.19.	Reports shall be available in graphical and table views for reading and consumption for various intervals. Graphs shall have the ability to change views, daily/weekly/monthly.		

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2.4.7.20.	The customer portal home page shall include a display that can be configured for IWSD. The display shall have the ability to show informational alerts from IWSD.		
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SECTION 3

3.1.	Gravity sewer monitoring must be able to identify when issues occur in the system in near real time by identifying blockage and pinpointing sources of inflow and infiltration through micro metering.		
3.1.1	SmartCover Systems must provide SSO Monitoring		
3.1.1.a.	Cleaning optimization: Provide level data during normal operations and nighttime level monitoring, proactively enabling the District to monitor sanitary sewer overflows and sewer basin maintenance needs.		
3.1.1.b.	Blockage detection: Provide level monitoring and triangulation with other level monitoring devices to detect blockages in near real-time by identifying upstream and downstream trends from different level monitoring devices.		
3.1.1.c.	The system remote field units (RFU) shall be capable of using one or more of the following sensors without any physical change in configuration of the system control box		
3.1.1.c.1.a.	Ultrasonic resolution shall be no more than 0.1"		

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3.1.1.c.1.b.	Pressure resolution shall be no more than 0.5"		
3.1.1.c.1.c.	Must be able to build-in algorithm to minimize false distance readings.		
3.1.1.c.1.d.	Must have a total dynamic range of 0 inches to 30 feet.		
3.1.1.c.1.e.	Must be fully potted and capable of withstanding 10G of force and have an IP-68 rating.		
3.1.1.c.1.f.	Does not require field calibration.		
3.1.1.c.1.g.	Temperature compensated		
3.1.1.c.1.h.	Must be small enough (less than 4" x 4" x 6") and independent physically of the system control box.		
3.1.1.c.1.i.	Must be able to be positioned easily anywhere in a manhole, CSO structure or similar structure with a connecting cable to the system control box up to 300 feet from the system control box.		
3.1.1.c.2.a.	Ultrasonic resolution shall be no more than 0.1"		

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3.1.1.c.2.b.	Pressure resolution shall be no more than 0.5"		
3.1.1.c.2.c.	Must be able to build-in algorithm to minimize false distance readings.		
3.1.1.c.2.d.	Must have a total dynamic range of 0 inches to 30 feet.		
3.1.1.c.2.e.	Must be fully potted and capable of withstanding 10G of force and have an IP-68 rating.		
3.1.1.c.2.f.	Does not require field calibration.		
3.1.1.c.2.g.	Temperature compensated		
3.1.1.c.2.h.	Must be small enough (less than 4" x 4" x 6") and independent physically of the system control box.		
3.1.1.c.2.i.	Must be able to be positioned easily anywhere in a manhole, CSO structure or similar structure with a connecting cable to the system control box up to 300 feet from the system control box.		
3.1.1.d.1.	The system shall provide full two-way, satellite communication between the User and the RFU location.		

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3.1.1.d.2.	Monitoring data must be able to transmit from the RFU to the User dashboard.		
3.1.1.d.3.	Commands must be sent from the User to the remote site to request data or change operational set points.		
3.1.1.d.4.	The commands will be received by the RFU and executed within one (1) hour or less.		
3.1.1.d.5.	Communications will remain in operation during short- or long-term electrical grid power loss, loss of local cellular networks, loss of local power.		
3.1.1.d.6.	Communications to/from remotely monitored sites shall be enabled through a smartphone or smart device application.		
3.1.1.d.7.	The system shall communicate using two-way, digital-radio signals directly to orbiting satellites for uninterrupted operations when there are local, regional, or massive power outages due to weather, forced blackouts or other extraordinary circumstances.		
3.1.1.d.8.	The orbiting satellite system shall have 66 active satellites and an additional six (6) back-up satellites in low earth, polar orbit and to assure communication redundancy.		
3.1.1.d.9.	No additional terrestrial communications systems shall be required to send or receive information to or from the installed RFU.		

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3.1.1.d.10.	Satellite communication will be 'backward' compatible with the existing Iridium satellite network and 'forward' compatible with the recently launched Iridium Next satellite network for the next 20 years.		
3.1.2.a.	Inflow and Infiltration Analysis (I&I) shall provide permanent sanitary sewer flow meter to monitor inflow and infiltration through rainfall or groundwater. Monitoring the basin during dry weather and wet weather conditions enables the District to monitor flow profiles and detect anomalies proactively.		
3.1.2.b.1.	Flow meters can be submerged area/velocity of non-contact area velocity. Level sensing with Manning's equation will not be acceptable.		
3.1.2.b.2.	Flow meters shall be plus or +/- 5% accuracy.		
3.1.2.b.3.	Flow Meters must be IP-68 rated for full submersion up to 20 feet.		
3.1.2.b.4.	Flow Meters shall have the ability to communicate via Modbus RS-485 protocol. Analog (4-20mA) or digital pulse output shall not be accepted.		
3.1.2.b.5.	Flow Meter must be battery powered with a minimum battery life of 6 months at 15-minute sampling intervals with a transmission rate of every 4 hours.		
3.1.2.b.6.	Flow Meter must be capable of reading during night flow isolation periods. The sensor must be capable of a level reading of +/- 1".		

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3.1.2.b.7.	Flow Meter may be either Ultra-sonic or radar for level.		
3.1.2.b.8.	Flow Meter must utilize either doppler ultra-sonic (submerged area/velocity) or radar for velocity (non-contact) flow monitoring.		
3.1.2.b.9.	Flow Meter must have minimum sample intervals of 15 minutes with the 1-minute interval capability through dynamic data logging during a rain event to ascertain accuracy of the rain derived inflow & infiltration (RDII).		
3.1.2.c.1.	Gauge Adjusted Radar Rainfall (GARR) helps the District to identify sources of rain-derived inflow and infiltration (RDII) in near real-time without negatively impacting maintenance on other basins that may not require it.		
3.1.2.d.1.	The solution must have the capability of deploying GARR data in each of the 42 Sewer basins at IWSD. These data points must operate independently from the other, however, must be capable of integrating directly into the Smart Utility software so it can be correlated with the Inflow & Infiltration data.		
3.1.2.d.2.	The GARR data solution must utilize a minimum of 10 rain gauges to ensure data integrity.		
3.1.2.d.3.	Area of covered: Approximately 25 sq. miles.		

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3.1.2.d.4.	Primary radar coverage must be KAMX (Miami, FL)		
3.1.2.d.5.	Secondary radar coverage must be KTBW (Tampa, FL)		
3.1.2.d.6.	Primary radar product must be NEXRAD Level II & Level III		
3.1.2.d.7.	Spatial resolution must be either .39 square miles (1x1 KM) or basin-averaged		
3.1.2.d.8.	Time increments must be in line with flow metering sample rates at 15-minute intervals.		
3.1.2.d.9.	Data must be delivered in a 2-way Application program interface (API)		
3.1.2.e.1.	Micrometering must be able to provide level monitoring to reduce the additional cost of flow monitoring to isolate the inflow and infiltration issues. Multiple triangulated level sensors and their trending data identify anomalies outside normal operational thresholds.		
3.1.2.e.1.	Micrometering must be able of simultaneously monitoring the permanent flow meters and correlate them with the corresponding SmartCovers in that Sewer basin.		
3.1.2.e.2.	Flow Meter data and SmartCover data must be converted into a single source platform to organize the data and develop the Micrometering solution.		

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3.1.2.e.3.	Contractor shall work with IWSD Engineering post contract to develop the full Micrometer project plan. Quantity of SmartCover's required for Micrometering in pricing attachment.		
3.1.2.f.1.	Regulatory Compliance must be able to monitor the capacity of a sewer basin and utilize existing EPA formulas for capacity management and monitoring.		
3.1.2.f.1.	Must be able to monitor the sewer basin compliance status in near real-time.		
3.1.2.f.2.	CONTRACTOR must have LOCAL team member with experience in Inflow & Infiltration analysis while performing as part of a Sanitary Sewer Evaluation Survey (SSES).		
3.1.2.f.3.	Smart Utility software must be capable of incorporating EPA formulas in line with EPA guidelines for Sewer capacity evaluation.		
3.1.2.f.4.	Smart Utility software must be capable of setting thresholds for monitoring this capacity not only during normal operations but during emergency operations conditions.		
3.1.2.f.1.	The network must be able to insure critical data capture during the worst environments for data collection. The first redundancy is the Lower Earth Orbit satellite communication requirements with horizontal line of sight capability. Must be able to operate during moderate to catastrophic storm conditions.		
3.1.2.f.2.	Flow metering systems must be capable of not only monitoring the I&I but the real time flow data to report back to the WWTP to give warning of abnormal flow conditions.		

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3.1.2.f.3.	Consist of a reliable and tested network to ensure billing data quality along with other Smart Utility capabilities.		
3.1.2.f.4.	Include a 98.5% read rate of Sewer sensors over a 72-hour period.		
3.1.2.f.5.	Custody of control of network		
3.1.2.f.6.	Network operates during emergency conditions		
3.1.2.f.7.	AMI endpoint stores and frequency of delivery of meter data daily to the AMI Network from all the AMI Modules and how this process can maximize read interval success.		
3.1.2.f.8.	Must be able to communicate on demand to AMI endpoint and other related endpoint devices. Please describe the two-way command turnaround time between the endpoint and AMI Network. Please explain capability of reading in emergency operations conditions.		
3.1.2.f.9.	Must use state-of-the-art data security techniques to prevent unauthorized access to the data.		
3.1.2.f.10.	Time synchronizes all devices to within five (5) seconds at least once per day and allow daily upload of meter data and system health checks are required.		

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3.1.2.f.11.	Established architecture to include backup/failover options for the entire communication path from the meter to the Meter Data Management System.		
3.1.2.f.12.	Use AC and solar powered units and optional battery backup if applicable.		
3.1.2.f.13.	Allow self-diagnosis of any problems associated with the back haul of the communication and the ability to automatically seek an alternate communication path if initial daily or real-time upload is unsuccessful.		
3.1.2.f.14.	Have icons that permit viewing operational health of the system components		
3.1.2.f.15.	Must be capable of changing read interval sampling, alarm frequency.		
3.2	Pump Stations must be able to proactively monitor the levels inside their sewer pump stations during emergency operation conditions when power outages occur at the pump station.		
3.2.1	Emergency Level Monitoring must be able to monitor should the pump station lose power. This approach enables the utility to proactively identify where maintenance personnel and activities are most needed to help avoid		

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	possible overflows at the pump stations during storm events.		
3.2.1.a.1.	CONTRACTOR must provide a solution that is battery powered as it must operate during blackout conditions.		
3.2.1.a.2.	Sensor must have a minimum of 5-year battery at 15 minute intervals.		
3.2.1.a.3.	Sensor must utilize Radar ultra-sonic sensor. Transit time ultra-sonic solution will not be accepted.		
3.2.1.a.4.	Sensor must be IP-68 and handle high level of Hydrogen Sulfide (h2S) up to 300 ppm		
3.2.1.a.5.	Sensors must be rated for high temperature environments from –4 degrees F to 149 degrees F.		
3.2.1.b.1.	Consist of a reliable and tested network to ensure billing data quality along with other Smart Utility capabilities. Please describe how your network meets these specifications.		
3.2.1.b.2.	Include a 98.5% read rate of Sewer sensors over a 72-hour period.		
3.2.1.b.3.	Network architecture		

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3.2.1.b.4.	Emergency conditions		
3.2.1.b.5.	AMI endpoint stores and frequency of delivery of meter data daily to the AMI Network from all the AMI Modules and how this process can maximize read interval success.		
3.2.1.b.6.	Communicate on demand to AMI endpoint and other related endpoint devices		
3.2.1.b.7.	Use state-of-the-art data security techniques to prevent unauthorized access to the data.		
3.2.1.b.8.	Time synchronizes all devices to within five (5) seconds at least once per day and allow daily upload of meter data and system health checks is required.		
3.2.1.b.9.	Established architecture to include backup/failover options for the entire communication path from the meter to the Meter Data Management System.		
3.2.1.b.10.	Use AC and solar powered units and optional battery backup if applicable.		
3.2.1.b.11.	Allow self-diagnosis of any problems associated with the back haul of the communication and the ability to automatically seek an alternate communication path if initial daily or real-time upload is unsuccessful.		

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3.2.1.b.12.	Have icons that permit viewing operational health of the system components.		
3.2.1.b.13.	Be capable of changing read interval sampling, alarm frequency.		

SECTION 4

4.0.	Wastewater Treatment Monitoring must be capable on identifying mass inflow and infiltration during storm events.		
4.0.	Wastewater Treatment Monitoring will allow the utility to automate and assist wastewater treatment operations during dry and wet weather conditions.		
4.1.	Raw Wastewater Influent Monitoring must solution integrate this data from these existing devices into one consolidated platform, providing data-driven insight to improve the District's operations.		
4.2.	Wastewater Inflow and Infiltration Balancing must allow the wastewater treatment plant to identify flow conditions in the collections system before arriving at the plant.		

SECTION 5

5.0.	CONTRACTOR shall supply all equipment and labor necessary to install Water Meters, Wastewater Open Channel Meters and accompanying sensor IoT Monitoring & Advanced Metering Infrastructure (AMI) system endpoints.		
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5.1.1.1.	CONTRACTOR shall employ competent, efficient employees skilled in the work assigned to them. The CONTRACTOR shall provide the Water Utility with a list of names, photo identification, background checks, vehicle information and other required information for the employees performing work.		
5.1.1.2.	CONTRACTOR employees shall always display in a clear manner, photo identifications. Each photo identification shall have the CONTRACTOR name, employee's name, title, and signature.		
5.1.1.3.	All service staff, technicians, drivers, and field supervisors will be equipped with smart phones and/or tablets. Electronic and Wireless Communication, through a cellular network, must be available to the installation team.		
5.1.1.4.	CONTRACTOR employees shall be neat and presentable always to present a professional appearance. All Employees shall have the same color uniforms including shirts, pants, and jackets. The CONTRACTOR logo shall be permanently attached to shirts and jackets.		
5.1.1.5.	CONTRACTOR vehicles used for work shall have company logos prominently displayed and shall be registered with the Water Utility.		
5.1.1.6.	All work shall be performed by competent, skilled personnel, to be conducted in accordance with good trade practices and all applicable codes.		
5.1.1.7.	CONTRACTOR must be skilled in handling both small and large water meters, both indoors and outdoors, including confined space meter vaults, ranging in size from 5/8" to 12."		

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5.1.1.8.	CONTRACTOR shall be responsible for the proper care and protection of the work site, for all materials and articles delivered to the site where the CONTRACTOR will perform the work, until completion and final acceptance of the work. The CONTRACTOR shall exercise proper precautions and safety measures in performing the work, which shall be in accordance with all applicable laws, rules, and regulations. The CONTRACTOR shall be responsible for the protection of all persons and/or property at the location in which the work will take place.		
5.1.1.9.	CONTRACTOR shall keep the work site free from unnecessary accumulations of waste materials. Upon the completion of all the work, the CONTRACTOR installers will be instructed to remove all tools, equipment, and surplus materials, as well as all rubbish and waste resulting from the work. Upon the completion of the work, the work area shall be left “broom clean” or its equivalent, to the reasonable satisfaction of the Water Utility.		
5.1.1.10.	Method of endpoint installation		
5.1.1.11.	CONTRACTOR explanation on implementation of a dual port solution if the meter boxes are in proximity and the meters are not in the same box		
5.2.1.	CONTRACTOR technicians must be equipped with tablets/mobile devices that communicate through a cellular network providing a real time paperless solution in the field for every installation.		

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5.2.2.	Tablets/mobile devices must be capable of capturing: pictures, meter data, endpoint data, customer information, bar code data, and any other required information through the use of the field service software.		
5.2.3.	The mobile application on the tablet must allow the installation technicians to access all information including installers schedule, office calendar, existing meter and radio data, all account information, and material inventory.		
5.2.4.	CONTRACTOR technicians must be equipped with all equipment and software required by AMR/AMI Manufacturer to program radio endpoints.		
5.3.1.	The Field Service Software must provide the capability to record, manage, store, retrieve, and access all relevant data for each customer location, including customer signatures.		
5.3.2.	The Field Service Software must allow for scheduling of all appointments if required, logging all customer interactions, and handling of service requests.		
5.3.3.	Regarding notifications, the Field Service Software shall send an email or text message to customers when a required appointment is scheduled as confirmation. A second email or text message shall be sent to the customer the day before the appointment as a reminder. Finally, a third email should be sent to the customer the day of the appointment, when the technician is enroute to the location. The third email must contain a picture of the technician that will be completing their installation.		

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5.3.4.	CONTRACTOR Shall provide the ability for Water Utility customers to schedule appointments online at their convenience. Once the appointment is scheduled, the customer shall receive an email confirmation of their appointment. The email confirmation shall contain an informational video explaining the installation process.		
5.3.5.	All account management is to be completed through the Field Service Software. All relevant customer account information and new product data collected after installation must be accessible by all Utility personnel, and project management using a Utility Portal.		
5.4.1.	CONTRACTOR must have a cloud-based Utility Portal made accessible, by secure invitation only, for the Water Utility to monitor in real time the complete installation process.		
5.4.2.	Field Service Software utilized by the technicians must be completely integrated with IWSD Portal to provide the Water Utility real-time updates on the progress of installations.		
5.4.3.	There must be five statuses available on IW-SD Portal for all users to quickly review the status of entire installation project		
5.4.4.	IWSD Portal must have built in search/filter capabilities to provide a status of each individual account as shown. IWSD Portal must be able to filter account statuses by day, week, month, etc. to monitor the project.		
5.4.5.	IWSD Portal must be able to provide a list of accounts that are incomplete and indicate the reasons why they cannot be completed (Denial of Access, Meter not Accessible, Meter not Found, Plumbing Conditions, Vacant Property,		

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Advanced Metering Infrastructure/Smart Utility Solution – Water & Sewer Compliance Table

	Change Order, No Show, Miscellaneous).		
5.4.6.	Field technicians must have the capability to enter the reason for an account being on hold through the mobile application of the field service software.		
5.4.7.	All incomplete devices, along with the reason they are incomplete shall be listed within the grid data.		
5.4.8.	When an installation is completed, an electronic work order must be created and added to IWSD Portal with old and new data, before and after pictures, and a customer signature.		
5.4.9.	IWSD Portal shall have the ability to track all service calls required when adjustments need to be made to completed installations (Leaks, Backward Meters, Endpoint, Property Conditions, Low Pressure, Mismatched Data, Meter box, No Water, Programming, etc.)		
5.4.10.	All service calls, along with the reason for the service call shall be listed within the grid data. An electronic workorder for each service call shall be generated, with associated pictures, and accessible through the grid data. All pictures are expandable by clicking on the image within IWSD portal.		
5.4.11.	IWSD Portal must be able to create a CSV file with all data to be exported to the Water Utility's billing software. CONTRACTOR shall work with the Water Utility billing software company to ensure the format of the export file from IWSD Portal is compatible with the billing software. This shall allow for the electronic transfer of all		

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	new meter data, collected in the field, and uploaded to IWSD Portal, to the billing software.		
5.4.12.	Utility Portal must provide a view to the Water Utility of the product inventory throughout the project. Water meter and endpoint quantities shall be monitored by the Water Utility in real-time through IWSD Portal.		
5.4.13.	IWSD Portal must provide a location for, and Water Utility access to project documents such as contracts, Invoices, prevailing wage payroll, and any other documents required by the Water Utility.		
5.5.1.	Installation CONTRACTOR shall provide inventory management through the Field Service Software in conjunction with IWSD Portal.		
5.5.2.	Field Technicians shall use bar code scanning technology to enter meter and radio endpoint data into the Field Service Software. As meters and endpoints are marked installed through the field technician's mobile app, they shall be deducted from the inventory levels.		
5.5.3.	Installation CONTRACTOR shall be responsible for receiving material deliveries from AMR/AMI and Meter Manufacturer.		
5.5.4.	Routing of product installation shall be coordinated with Water Utility to avoid interruption of billing schedules.		

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5.5.5.	Video conferencing on tablets/mobile device shall be available to field technicians for onsite communication and troubleshooting to ensure quality.		
5.5.6.	CONTRACTOR must have dedicated call center (not outsourced) to be able to schedule appointments daily. Call center shall be responsible for contacting customers that Water Utility is able to provide phone numbers for.		
5.5.7.	Regular project progress meetings shall be conducted by the CONTRACTOR with all project constituents to update everyone on project status.		
5.6.1.	The CONTRACTOR is responsible for uploading existing customer information file into the Field Service Software.		
5.6.2.	The CONTRACTOR is responsible for providing a file to transfer all field data captured by the technicians, electronically to the Water Utility billing software. No manual data entry by Utility personnel shall be acceptable.		
5.6.3.	The CONTRACTOR Utility Portal shall provide email notifications to the Water Utility indicating when the billing file is ready for upload to the billing system. All billing file data must be validated by the CONTRACTOR team and confirmed to be correct before notification is sent to Water Utility.		
5.6.4.	Digital work orders shall be generated by IWSD Portal, based on information provided from the Field Service Software. All work orders shall contain existing account information from the Water Utility data base, new meter, and		

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	endpoint data, before and after pictures, and any other pertinent account data. Work orders shall be stored on the Installation Contractor's servers for an agreed upon period after project completion.		
5.7.1.	CONTRACTOR must provide a data validation team responsible for confirming information from the Water Utility data base matches the information field technician finds on location. This is accomplished by data validation team comparing data in field pictures to the data entered by the field technician.		
5.7.2.	Field data shall also be validated by uploading a file from the head end system of the Advanced Metering Infrastructure to the Field Service Management software. The Field Service Management software shall then compare field data collected to the data captured by the AMI system ensuring they match.		
5.7.3.	CONTRACTOR shall be responsible for confirming AMI endpoints successfully communicate back to the head end of the AMI system.		
5.7.4.	CONTRACTOR must conduct mandatory monthly workshops incorporating revised safety procedures, municipality updates, reinforcing Occupational Safety Health Administrative (OSHA) standards in the field and confined space rules and regulations.		
5.7.5.	Field Technician must spend 40 hours in the field and home office including the call center to be cross trained in all functional areas of the business.		

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5.7.6.	Field Supervisors must have 30 hours of Occupational Safety Health Administration (OSHA) training and 8 hours specifically in confined space entry training.		
5.7.7.	Field technicians must have minimally 10 hours of Occupational Safety Health Administration (OSHA) training and 8 hours specifically in confined space entry training		
5.7.8.	To assure quality, CONTRACTOR must randomly call customers and conduct field inspections on completed installations.		
5.8.1.	The CONTRACTOR shall employ competent, efficient employees skilled in the work assigned to them.		
5.8.2.	The CONTRACTOR will provide a list to Water Utility of names, photo identification, background checks, vehicle information and other required information for the employees performing work.		
5.8.3.	All service staff, technicians, drivers, and field supervisors will be equipped with smart phones and/or tablets and will be using the CONTRACTOR's proprietary software.		
5.8.4.	All CONTRACTOR technicians shall have the same color uniforms including shirts, pants, and jackets. The CONTRACTOR logo shall be permanently attached to shirts and jackets.		

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5.8.5.	Vehicles used shall have company logos prominently displayed and shall have license plates registered with IWSD.		
5.8.6.	The CONTRACTOR technicians shall be skilled in handling both small and large water meters, both indoors and outdoors, including confined space meter vaults, ranging in size from 5/8" to 12"		
5.9.1.	Field Service Software shall provide the Water Utility with the ability to email, text, or send a voice message to a single customer or a group of customers.		
5.9.2.	A History of all notifications sent to customers through the Field Service Software via email, text, or voice message shall be stored. The Water Utility shall have the ability to access notification history by customer account. That history shall store the date and time of the communication, the subject matter, the content of the notification, and the contact information the notification was sent to.		
5.9.3.	The Field Service Software shall also provide the ability for Water Utility customers to update their contact information electronically. A secure URL shall be provided to the Water Utility's Customers through a method of communication suitable to the Water Utility. That secure URL shall capture at a minimum, the customer's email, phone, cellular phone, mailing address, and the customer's preferred method of communication.		
5.10.2.	CONTRACTOR shall employ competent, efficient employees skilled in the work assigned to them. The CONTRACTOR shall provide the Water Utility with a list of names, photo identification, background checks, vehicle		

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	information and other required information for the employees performing work.		
5.10.3.	CONTRACTOR employees shall, always display in a clear manner, photo identifications. Each photo identification shall have the CONTRACTOR name, employee's name, title, and signature.		
5.10.4.	All service staff, technicians, drivers, and field supervisors will be equipped with smart phones and/or tablets. Electronic and Wireless Communication, through a cellular network, must be available to the installation team.		
5.10.5.	All the CONTRACTOR employees shall be neat and presentable always to present a professional appearance. All Employees shall have the same color uniforms including shirts, pants, and jackets. The CONTRACTOR logo shall be permanently attached to shirts and jackets.		
5.10.6.	The CONTRACTOR vehicles used for work shall have company logos prominently displayed and shall be registered with the Water Utility.		
5.10.7.	All work shall be performed by competent, skilled personnel, to be conducted in accordance with good trade practices and all applicable codes.		
5.10.8.	CONTRACTOR must be skilled in handling both small and large water meters, both indoors and outdoors, including confined space meter vaults, ranging in size from 5/8" to 12"		

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5.10.9.	The CONTRACTOR shall be responsible for the proper care and protection of the work site, for all materials and articles delivered to the site where the CONTRACTOR will perform the work, until completion and final acceptance of the work. The CONTRACTOR shall exercise proper precautions and safety measures in performing the work, which shall be in accordance with all applicable laws, rules, and regulations. The CONTRACTOR shall be responsible for the protection of all persons and/or property at the location in which the work will take place.		
5.10.10.	The CONTRACTOR shall keep the work site free from unnecessary accumulations of waste materials. Upon the completion of all the work, the CONTRACTOR installers will be instructed to remove all tools, equipment, and surplus materials, as well as all rubbish and waste resulting from the work. Upon the completion of the work, the work area shall be left "broom clean" or its equivalent, to the reasonable satisfaction of the Water Utility.		
5.10.11	Method of endpoint installation in meter box or lid		
5.10.12.	CONTRACTOR explanation on the implementation of a dual port if the meter boxes are in proximity and the meters are not in the same box.		

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6.1.1.	GIS Solution must be capable of integrating a District Metering Solution		
6.1.2.	GIS Solution must be capable of integrating with a Wastewater AMI Solution		
6.1.3.	GIS Solution must be capable of creating boundaries for both Water and Wastewater designated areas		
6.1.4.	GIS Solution must be hosted in Microsoft Azure.		
6.1.5.	GIS Solution must function in a Real-Time environment in the Office or Field.		
6.1.6.	GIS Solution must be optimized for touch-screen computers on Android, iOS and Windows Tablets.		
6.1.7.	GIS Solution must work with Google Street View and built in Routing.		
6.1.8.	GIS Solution must be a fully functioning GPS navigation system.		
6.1.9.	GIS Solution must feature easy to use forms to display and input maintenance data (Tasks can be pre-assigned out to staff, and supports re-occurring tasks for ease of scheduling maintenance tasks).		

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6.1.10.	GIS Solution must display facility attributes and customer information.		
6.1.11.	GIS Solution must support QR and Barcode scanning to find facilities easily on the map as well as scanning barcodes on Meters for improved data input.		
6.1.12.	GIS Solution must display maintenance history from the office or out in the field.		
6.1.13.	GIS Solution must feature field specific quality assurance / quality control (Supports validation for required fields, Input forms can guarantee numeric values and consistent data, automatically calculate Flushing, Water Loss, Fire Flow rates and volume).		
6.1.14.	GIS Solution must track Equipment, Materials, Parts, Tools, and Work along with compounding costs.		
6.1.15.	GIS Solution must include intuitive Redline functionality.		

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6.1.16.	GIS Solution must Centralized Administration (Customize forms in the Form Designer for any asset, Configure Users, Roles, and Software Functions, Connect to Esri Feature Services and Map Services).		
6.1.17.	GIS Solution must feature advanced Document Storage (As-builts and other documents can be pulled up quickly and easily, Intuitive document navigation allows for quick zooming and panning, Ability to attach Photos and Videos to assets and viewable by all users).		
6.1.18.	GIS Solution must handle One-Call tickets from Sunshine 811 (Tickets can be visually displayed and organized for the field crew, supports optimization and routing of tickets, supports attaching images, videos, and documents to a specific ticket, Provide Positive Response in Real-Time from the Field or Office)		
6.1.19.	GIS Solution must contain extensive reports for instant answers (Customizable queries allow for simple display of critical information, Reports can be generated on the fly in Word and Excel).		
6.1.20.a.	GIS Solution must supports locked down functionality for field users through a Centralized Administration Application (Administrator can define departments, roles, and groups, GIS Solution must support configurable database and application through the Administration Application, Flexible configuration tools to update all users, Supports Azure Active Directory Services, GIS Solution must support extending the application without the need for custom programming, Queries, reports, and forms can be configured quickly and easily, GIS Solution must Form Designer		

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	allows the creation of custom inspection forms with unlimited possibilities)		
6.1.20.b.	GIS Solution must be GIS-Centric, 10.6.1 and higher (must be compatible with Esri ArcGIS Server, Portal and ArcGIS Online, must support Feature Services for Feature Classes and Tables, must feature two-way communication for Real-Time Operations with ArcGIS, must support ArcGIS Dashboards with ArcGIS Server, Portal and ArcGIS Online)		
6.1.21.	GIS Solution must support import and export functionality with other business system when APIs are not readily available.		