TERMS OF REFERENCE

Project Title: Supply, Installation, Operation and Maintenance of an Intelligent Supply and Pressure Management System for Calamba Water District's Supply Service Operation

Item	Specifications
Item 1	1. Supply and Installation of all necessary hardware components for automation: 1.1. Supply and installation of Six (6) Logic Controllers at the Pumping Station/s; Integration of the Logic Controller to the existing VFD (with existing pressure transmitter) 1.1.1. Logic controller shall be capable of remote manual and intelligent automated control using artificial intelligence. ▪ Supply Voltage rated value: 24 V DC ▪ Digital Inputs: 14; ▪ Digital Outputs: 10 Relay Outputs ▪ Analog Inputs: 2 ▪ OPCUA capable ▪ EMC: interference immunity against discharge of static electricity ▪ Standards, approvals, certificates: o CE Mark o UL Approval o cULus o RCM (formerly C-TICK) o KC Approval o Marine Approval 1.1.2. Human-Machine-Interface (HMI) at the site for operator control on-site. Panel display size: 10.0" Display with PCB-coating for outdoor and corrosive environment • 10.0" Display • NEMA4 / IP65 Front Panel • OPCUA/ / IIoT capable • 1 ethernet port 1.1.3. Supplier shall use mobile data, including the supply and installation of all necessary hardware, maintenance, and monthly communication costs for the duration of the subscription to ensure reliable communication. 1.1.4. Power Metering with Revenue Grade Current Transformers (Applicable only when this add-on is availed). ▪ Three Phase/Single Phase ▪ 690V L-L / 400V L-N ▪ 1A / 5A Standard Current Transformers 1.1.5. UPS and UPS Battery ▪ 24V 10 Amax ▪ 1.5 hours buffer time 1.1.6. Supply and Installation of Surge Protection Device 1.2. Supply and installation of six (6) datalogging devices at pertinent points 1.2.1. Mobile Data

	1.2.2. Battery Powered, Solar Rechargeable, Outlet Rechargeable 1.2.3. ASCII, MODBUS 1.2.4. Analog and Digital Signal Capable 1.2.5. ESD protected IP67 1.3. Supply and Installation of Monitor/ Screen for remote monitoring and control 1.3.1. Screen size: 65 inches 1.3.2. Backlight Type: LED 1.3.3. Resolution: 3840 x 2160 (4K UHD) 1.3.4. Display Color: 1.08 Billion (8bit+FRC or 10bit) 1.3.5. Aspect Ratio: 16:9 1.3.6. Viewing Angle: 178 Degree 1.3.7. Surface: Anti-glare tempered glass + Anti-fingerprint 1.3.8. Touch Type: IR 1.3.9. Touch points: Up to 20 points 1.3.10. Front Ports: HDMI 1.4 x 1, USB-A 2.0 x 2 1.3.11. Read Input Ports: HDMI 2.0 x 2, VGA x 1, LAN in RJ45 x 1 1.3.12. OPS Slot: Yes 1.3.13. CPU: A73 x 2 + A53 x 2 1.3.14. GPU: Mali-G51 x 4 1.3.15. RAM: 4GB 1.3.16. ROM: 64GB 1.3.17. Android Version: 8
Item 2	2. Supply and Installation of all necessary hardware to accommodate the standard automation installation setup detailed in Item 1: 2.1. Crossing Pumping Station: Interlocks 2.1.1. MCCB 2.1.2. Surge Protection Device 2.1.3. Control Transformer (Step down) 2.1.4. Timer Relay 2.1.5. MCB, Control Relays and Contactor 2.1.6. Voltage Monitor 2.1.7. Level Switch 2.1.8. Switch/Push Buttons 2.1.9. Pilot Lights 2.1.10. Panel Enclosure 2.2. Bucal Pumping Station Integration 2.2.1. Industrial Computer for SCADA-cloud integration ▪ Panel Enclosure ▪ UPS and Battery (24 V, 1.5 Hours Standby Time) 2.2.2. Desktop Computer Set – 1pc ▪ Intel Core i5 12th Generation ▪ 8GB DDR4 RAM, 256 GB M.2 SSD, 1TB HDD ▪ Intel UHD Graphics ▪ LAN, WIFI, Bluetooth ▪ Two display output (at least 1 HDMI) ▪ Office Home License ▪ At least Windows 10 OS ▪ 24 inches Monitor ▪ USB Keyboard and Mouse

	▪ UPS 1500 VA 2.2.3. Ruggedized Firewall Appliance ▪ 4 x GE RJ45 Switch Ports ▪ 2 x Shared Media Pairs including 2 x GE RJ45 ports, 2 x SFP slots ▪ RJ45 bypass between WAN and LAN ▪ DB9 Serial ▪ Embedded 3G/4G/LTE Wireless LAN module ▪ 2 external SMA WWAN antennas ▪ SIM card slot 2.2.4. Protection Software Bundle ▪ IPS, Advanced Malware Protection Service, Application Control ▪ 3-year security bundle
Item 3	3. Setup and Maintenance for three years of an intelligent operation using artificial intelligence to optimize the areas covered by the Pumping Station/s. Optimization shall follow the following targets: 3.1. Optimization of available supply (billed volume increase, reduction of incidence of intermittent supply); 3.2. NRW Reduction; 3.3. Power Consumption Reduction; 3.4. Ensured Pressure Level at the Customer Side (subject to pump capacity) 3.5. System shall adapt to both short term variations and long-term development in the area
Item 4	4. Centralized Web-based Monitoring and Control, and Alarm System: 4.1. User friendly web-based dashboard for monitoring and downloading of data, and remote control of pump station, up to ten (10) user accounts, 4.2. Mobile app for immediate access to the R-TAP dashboard for up to ten (10) user accounts 4.3. Alarm system for detecting anomalous events and sending of alarms to relevant personnel through mobile access. Alarm system shall be designed with fixed and dynamic alarms. 4.4. Scheduled regular report generation customized to water utility's preference 4.5. Available data shall consist where applicable: 4.5.1. Hydraulic Data ▪ Discharge Pressure ▪ Critical Point Pressure ▪ Flow ▪ Tank Level ▪ Valve Status or Opening 4.5.2. Pump Electrical Data (for VFD-controlled pumps) ▪ Current ▪ Frequency ▪ Voltage ▪ Power ▪ Energy 4.5.3. Fault Statuses ▪ Hydraulic Faults • Tank Level Faults (overflow/low-level) • Deepwell Level Faults (low, low-low level)

	• Valve Faults (if present) • Overpressure or low-pressure • Flow Limit Fault (Low/High) ▪ General Electrical Faults • Voltage Monitor (i.e. No power) • VFD or DOL Feedback Fault • VFD or DOL Thermal Fault ▪ VFD Faults (for VFD-controlled pumps) • Overvoltage • Undervoltage • Overcurrent • Overtemperature • Phase-Loss • Serial-line 4.6. Remote on-off control and setting of pressure set-points of pumps at pump station through Web-based Dashboard 4.7. System shall include a fail-safe mode 4.8. Continuous software upgrades for three (3) years on relevant features
Item 5	5. Project Commissioning and Testing 5.1. Duration of installation and setup: ▪ 274 calendar days 5.2. Commissioning and on-site testing: following the completion of installation and setup, supplier shall conduct on-site relevant tests on key functionalities of the system.
Item 6	6. Data Analytics Report 6.1. Data Analytics 6.1.1. Analysis of historical data 6.1.2. Dynamic alerts that adjust to changing network behavior 6.1.3. Recommendation on operation optimization schemes
Item 7	7. Training for operators and relevant personnel (to be selected by the water utility), to maximize the value of the system 7.1. Supplier shall provide training on the use of the software and field operations of the R-TAP system. 7.2. Supplier shall also brief Customer on the capabilities of the field devices and software of the R-TAP system.
Item 8	8. Warranty and After Sales 8.1. Standard manufacturers' warranty on parts. 1 year installation service warranty. 8.2. Operation and maintenance of the software system. This includes ensuring the proper operation of web dashboard and software components, and the addition software updates within the engagement period. 8.3. Warranty shall cover manufacturer's defect, and normal wear and tear unless used in inappropriately by the operator. 8.4. Warranty shall not cover water damages brought about by flooding or excessive exposure to moisture or water. 8.5. Warranty shall not include loss of any hardware component. 8.6. Warranty shall commence upon acceptance of all hardware components (after a Run-in or Endurance testing of two weeks without any failure). 8.7. Continuous software upgrades on relevant features (at least one (1) software

		upgrade per calendar year).
	8.8.	Customization requests (subject to the compatibility with the system architecture) within the sixty (60) calendar days from acceptance