

Technical Specifications

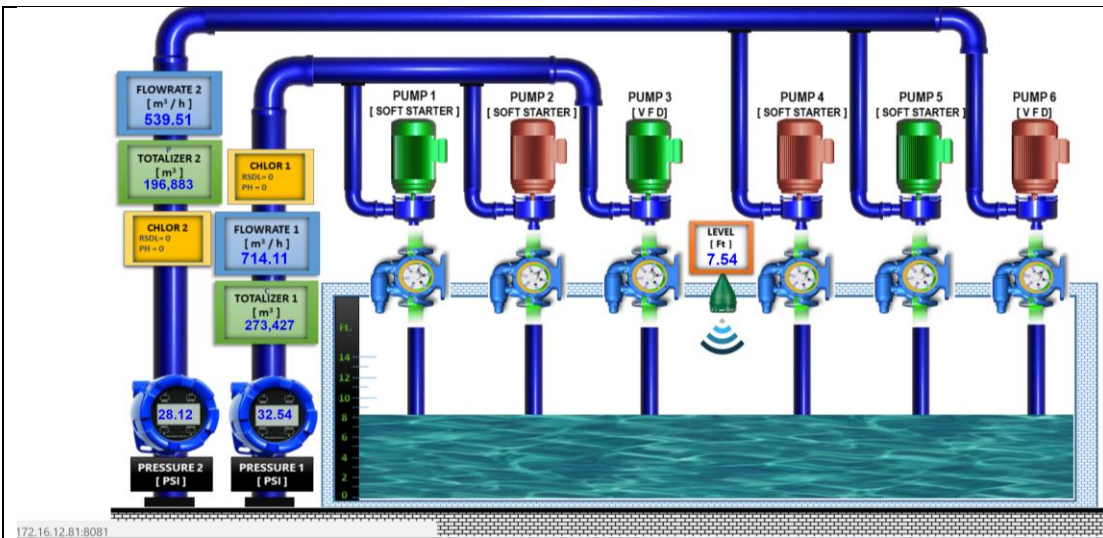
DESCRIPTIONS/SPECIFICATIONS	<u>STATEMENT OF COMPLIANCE</u> (State "Comply or not Comply" for each item description and specifications and attach your company shop/drawing and or brochures / and or Literatures)
PR No. 17-12-08-0181 – SUPPLY, DELIVERY AND COMMISSIONING OF 1 LOT AUTOMATION OF BALULANG BOOSTER OPERATION	
1. Proposed IP-Based Automation Design and Scope of Works detail The minimum requirements or specification for the Internet Protocol (IP) Based Automation Infrastructure are detailed in the following sub-sections. While it is mandatory for the supplier to meet these minimum requirements, if the estimates of a particular requirement would need a higher category of product, the supplier should provide as such. The supplier should however provide basis for arriving at the solution being proposed as part of his offer. The supplier should design the solution to provide scalability to Cagayan de Oro Water District (COWD).	
Basic Requirement: Cagayan de Oro Water District (COWD) wants to ensure that the contractor or supplier is able to provide an IP-Based Automation design in compliance to the standards and best practices, hence requires the following:	
1. Real-time Data Capture of the following:	
a. 2 equipment Pressure Values;	
b. 2 equipment Flow Meter Values (Flow rate, Totalizer);	
c. 6 equipment Variable Frequency Drive (VFD) Controller Values;	
d. 1 equipment Water Level Values;	
e. 1 equipment Chlorine Analyzer Values;	
2. Real-time Control and Monitor of 6 Booster Pump Motors:	
a. 6 units Booster Pump Motors under VFD Controller	
i. Control of Rotational Speed of the Booster Pump Motor	
ii. Control for On/Off	
iii. Monitor of Voltage & Current	
3. Unlimited Customized Human Machine Interface (HMI) set according to client requirements	
4. Web-based Reporting and Monitoring	
5. Unlimited user accounts with role base access control	
The overall Scope of Work (SOW) includes the following:	
(a) Provide all materials, labor, interconnection cabling, software and supplemental equipment, middleware and software modules as required to provide a fully operational system for booster pump station.	
(b) Shall furnish workstation, Internet of Things (IOT) controller with automation software. Purpose of which is to provide remote monitoring, control, reporting and Human Machine Interface (HMI). The performance, functionality and configuration should be as per requirement specified by the client. The system should also utilize available data from the existing Remote Terminal Unit (RTU) and sensors for reporting and monitoring.	

(c) Provide means and technology to interface existing devices and equipment (including legacy equipment) to be utilized for the IP-Based Automation, as follows:			
<ul style="list-style-type: none"> • 2 units Module w/ Communication Port for Pressure Value 			
<ul style="list-style-type: none"> • 2 units Module w/ Communication Port for Flow Meter Value 			
<ul style="list-style-type: none"> • 6 units Module w/ Communication Port Variable Frequency Drive 			
<ul style="list-style-type: none"> • (VFD) Frequency Valve and Operation Status 			
<ul style="list-style-type: none"> • 1 unit Module w/ Communication Port for Water Level Value 			
<ul style="list-style-type: none"> • 1 unit Module w/ Communication Port for Chlorine Analyzer Data Capture 			
<ul style="list-style-type: none"> • 1 unit Internet-of-Things (IOT) Controller 			
<ul style="list-style-type: none"> • 1 unit Workstation with Monitors 			
<ul style="list-style-type: none"> • 1 set Automation Software 			
(d) Conversion of the following:			
<ul style="list-style-type: none"> • Ultrasonic Water Level Output from 4 to 20 mA to Ethernet 			
<ul style="list-style-type: none"> • Flow Meter pulse output to Ethernet 			
<ul style="list-style-type: none"> • Variable Frequency Drive Motor Control digital output to Ethernet 			
(e) Integrate with existing Variable Frequency Drive's (VFD) to communicate, modify parameters to control motor speed according to clients control logic.			
(f) Training			
<ul style="list-style-type: none"> • Basic system diagnostics for IP-Based Automation and Remote Terminal Unit (RTU) communications. 			
<ul style="list-style-type: none"> • Provide application training specific to the onsite configuration and operation of the IP-Based Automation, with the following training curriculum: <ul style="list-style-type: none"> ❖ Basic IP-Based Automation HMI configuration and navigation ❖ Basic IP-Based Automation HMI operation ❖ Report Generation ❖ System Back-up and Restoration ❖ Database archiving and restoration ❖ C# Programming, Database Administration, IOT-Based Instrumentation, Basic Electronics 			
<p>Note: The above scope of work is indicative and may not be exhaustive in any manner. The supplier shall be assumed to have accounted for best practices, all services and equipment necessary for the establishment of an IP-Based Automation.</p>			
2. Bill of Materials			
ITEM	DESCRIPTION	QTY	UOM
1	ANALOG INPUT MODULE WITH EHERNET PORT	1	UNIT
2	PULSE COUNTER INPUT MODULE WITH EHERNET PORT COMMUNICATION PORT	2	UNITS
3	RS232 TO TCP/IP PORT	10	UNITS
5	IOT CONTROLLER WITH RS485 AND TCP/IP PORT	1	UNIT
6	MINI PC, 4GB RAM, 500GB SATA 2.5"	6	UNITS
7	40" LED TV FOR MONITORING	6	UNITS
8	WORKSTATION WITH ACCESSORIES AND TWO (2) x 19.5" MONITOR	1	UNIT
9	SOFTWARE FOR CUSTOMIZED HUMAN MACHINE INTERFACE (HMI); DATABASE CREATION; WEB APPLICATION FOR REPORTING AND MONITORING	1	LOT
10	IN-HOUSE TRAINING	1	LOT
3. Technical Requirements			
i. ANALOG INPUT MODULE WITH TCP/IP COMMUNICATION PORT <ul style="list-style-type: none"> • Channels : 6 Differential & 2 Single-ended 			

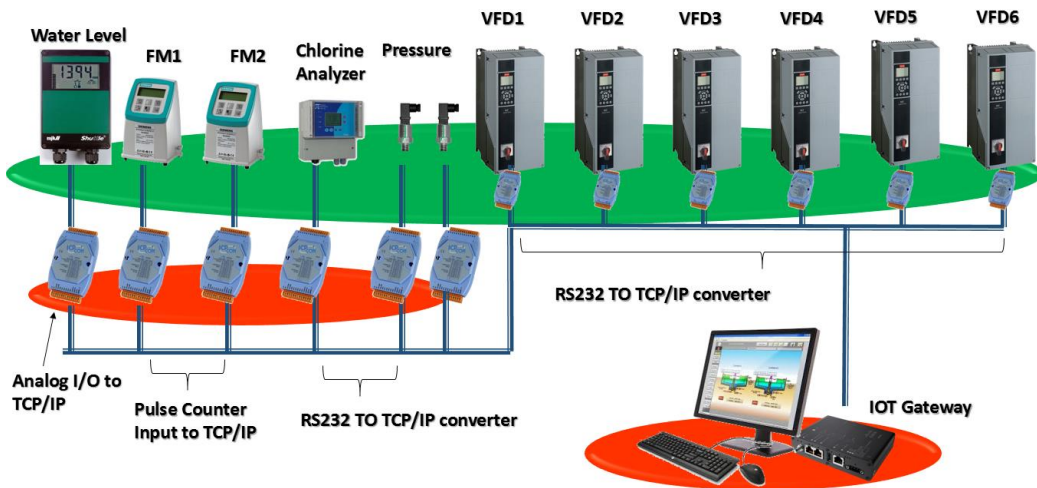
	<ul style="list-style-type: none"> • Input Type : mV, V and mA 	
	<ul style="list-style-type: none"> • Input Range : ± 150 mV, ± 500 mV, ± 1 V, ± 5 V, ± 10 V 	
	<ul style="list-style-type: none"> • Current Range : ± 20 mA 	
	<ul style="list-style-type: none"> • Isolation Voltage : 2500 VRMS 	
ii.	PULSE COUNTER INPUT MODULE WITH TCP/IP COMMUNICATION PORT	
	<ul style="list-style-type: none"> • Channels : 2 independent 32-bit counter 	
	<ul style="list-style-type: none"> • Input Frequency : 100 kHz max. 	
	<ul style="list-style-type: none"> • Isolation Voltage : 5000 VRMS 	
	<ul style="list-style-type: none"> • Input Pulse Width : > 10 μs 	
	<ul style="list-style-type: none"> • Max. Count : 4294967295 (32-bit) 	
	<ul style="list-style-type: none"> • Programmable Digital Noise Filter: 4 μs to 1.02 ms 	
	<ul style="list-style-type: none"> • Alarm : alarm comparator on each counter 	
iii.	RS232 TO TCP/IP CONVERTER	
	<ul style="list-style-type: none"> • RS-422 (4-wire, full-duplex) 	
	<ul style="list-style-type: none"> • RS-485 (2-wire, half-duplex) protocol 	
	<ul style="list-style-type: none"> • Speeds : 115.2 k, 38.4 k, 19.2 k, 9600, 4800, 2400, 1200 	
	<ul style="list-style-type: none"> • Isolation Side : RS-232 signal (TXD, RXD, GND) 	
	<ul style="list-style-type: none"> • Isolation Voltage : 2500 Vrms 	
	<ul style="list-style-type: none"> • Connector : Female DB-9 and plug-in screw terminal block 	
	<ul style="list-style-type: none"> • Power Consumption : 0.912 W typical 	
	<ul style="list-style-type: none"> • Auto baud rate and data format adjustment 	
	<ul style="list-style-type: none"> • Surge protector on RS-422/RS-485 communications signals 	
iv.	INTERNET OF THINGS (IOT) CONTROLLER WITH RS485 AND TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL (TCP/IP) PORT	
	<ul style="list-style-type: none"> • Device Category IOT Gateway 	
	<ul style="list-style-type: none"> • Processor Type Intel Atom E3826 	
	<ul style="list-style-type: none"> • Frequency 1.46 GHz 	
	<ul style="list-style-type: none"> • Memory Size 2 GB 	
	<ul style="list-style-type: none"> • Memory Type DDR3L-1066 	
	<ul style="list-style-type: none"> • Interface Type HDMI, LAN, PCIe, RS-232, RS-232/422/485, SDIO, USB, USIM 	
	<ul style="list-style-type: none"> • Operating Supply Voltage 6 V to 36 V 	
	<ul style="list-style-type: none"> • Maximum Operating Temperature + 50 C 	
	<ul style="list-style-type: none"> • Dimensions 120 mm x 100 mm x 55 mm 	
	<ul style="list-style-type: none"> • Description/Function Duo-Core Intel Atom E3826 embedded IoT gateway platform 	
	<ul style="list-style-type: none"> • Minimum Operating Temperature 0 C 	
v.	MINI PC	
	<ul style="list-style-type: none"> • Processor : Intel Celeron, 2.3Ghz, Dual Core, 3MB Cache, 15W 	
	<ul style="list-style-type: none"> • Graphics : Intel HD Graphics 	
	<ul style="list-style-type: none"> • Memory : 4GB DDR4 SO-DIMM 	
	<ul style="list-style-type: none"> • Storage : 500GB, 2.5" SATA Drive 	
	<ul style="list-style-type: none"> • Audio : Up to 7.1 surround audio via HDMI 	
	<ul style="list-style-type: none"> • Connectivity : 2x USB 3.0 ports on the back panel, 2x USB 3.0 ports on the front panel (1x charging capable), 2x internal USB 2.0 via header, Consumer infrared on the front panel 	
	<ul style="list-style-type: none"> • Networking : 10/100/1000Mbps Network Connection, Intel Wireless-AC 3165 M.2 2230, wireless antennas (IEEE 802.ac, Bluetooth* 4, Intel Wireless Display) 	
	<ul style="list-style-type: none"> • Power Adapter : 19V, 65W wall-mount AC-DC Power Adapter, Multi-country plugs (IEC types A/C/G/I) 	

	<ul style="list-style-type: none"> Enclosure : Silver with Black Top, Plastic shell with metal inner structure, 	
	<ul style="list-style-type: none"> Dimensions : 115mm x 111mm x 52mm 	
	<ul style="list-style-type: none"> Installation : With Structured Cabling for Data and Power 	
vi.	40" LED TV	
	<ul style="list-style-type: none"> Display 	
	<ul style="list-style-type: none"> ❖ Inch : 40" 	
	<ul style="list-style-type: none"> ❖ Backlight : LED 	
	<ul style="list-style-type: none"> ❖ Ports : 2xHDMI, 1xVGA, 	
	<ul style="list-style-type: none"> ❖ Accessories : Mounting Bracket, HDMI Cable, VGA Cable 	
	<ul style="list-style-type: none"> ❖ Features : On/Off Scheduler 	
	<ul style="list-style-type: none"> ❖ Installation : With Structured Cabling for Data and Power 	
vii.	WORKSTATION	
	<ul style="list-style-type: none"> Form Factor: : Extra Small Form Factor (xSFF) 	
	<ul style="list-style-type: none"> Processor : Intel Core i3-4130 Processor (3M Cache, 3.40 GHz) 	
	<ul style="list-style-type: none"> Chipset : Intel H81 Express Chipset 	
	<ul style="list-style-type: none"> Display : 19.5-inch Monitor with DVI (2 monitors) 	
	<ul style="list-style-type: none"> Memory : 8GB DDR3 	
	<ul style="list-style-type: none"> Hard Drive : 1TB HDD 	
	<ul style="list-style-type: none"> Optical Drive : 16X Super-Multi drive 	
	<ul style="list-style-type: none"> Graphics : 1GB NVIDIA GeForce GT 705 (supporting: DVI, HDMI®) 	
	<ul style="list-style-type: none"> Audio : Integrated high-definition, 5.1-channel surround sound 	
	<ul style="list-style-type: none"> Networking : 802.11b/g/n wireless LAN and Bluetooth® 4.0 LELAN: Gigabit Ethernet I/O Ports 	
	<ul style="list-style-type: none"> Front I/O Ports : SD Card reader, 2 Audio jack, 2 USB 3.0 	
	<ul style="list-style-type: none"> Rear : 1 LAN port, 1 USB 2.0 port, 3 Audio jack, 4 USB 2.0 port 	
	<ul style="list-style-type: none"> Input Device : Wired USB Keyboard and Mouse 	
	<ul style="list-style-type: none"> OS : Windows 10 Pro 	
	<ul style="list-style-type: none"> Dimension :367 (W) x 269.5 (D) x 100 (H) mm (14.45 x 10.61 x 3.94 inches)L 	
	<ul style="list-style-type: none"> Warranty : 1 year warranty on parts and labor 	
	<ul style="list-style-type: none"> UPS : With 1 Line Interactive UPS 	
	<ul style="list-style-type: none"> Installation : With Structured Cabling for Data and Power 	
viii.	SOFTWARE TOOLS FOR CUSTOMIZED HUMAN MACHINE INTERFACE (HMI); DATABASE CREATION ; WEB APPLICATION FOR REPORTING AND MONITORING	
	HMI	
	<ul style="list-style-type: none"> Microsoft Visual Studio 	
	<ul style="list-style-type: none"> OLE for Process Control (OPC) Systems.NET <ul style="list-style-type: none"> Enables the following products for 100 Tags with Networking and 2 Simultaneous Connections 	
	<ul style="list-style-type: none"> OLE for Process Control (OPC) Trend.NET <ul style="list-style-type: none"> Real-time 2D and 3D trending. 	
	<ul style="list-style-type: none"> Includes .NET component for WinForm and WPF applications. 	
	<ul style="list-style-type: none"> Combine with OPC Database.NET for historical replay. 	
	<ul style="list-style-type: none"> OPC Alarm.NET <ul style="list-style-type: none"> Real-time and historical alarming. 	
	<ul style="list-style-type: none"> Includes .NET component for WinForm and Windows Presentation Foundation (WPF) applications. 	
	<ul style="list-style-type: none"> Log alarms to SQL Server, Oracle, Access, and MySQL. <ul style="list-style-type: none"> Send alarm notifications via E-Mail. 	
	<ul style="list-style-type: none"> OPC WPF HMI.NET 	
	<ul style="list-style-type: none"> Create WPF HMI applications using Visual Studio. 	

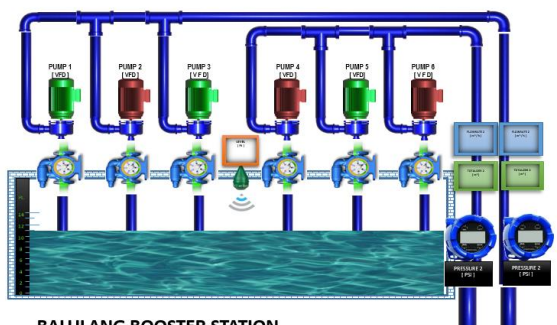
<ul style="list-style-type: none"> • OPC Database.NET 	
<ul style="list-style-type: none"> • Log data to SQL Server, Oracle, Access, MySQL, and Comma Separated Values (CSV) files. 	
<p>DATABASE</p> <ul style="list-style-type: none"> • MYSQL/MSSQL 	
<p>WEB APPLICATION FOR REPORTING AND MONITORING</p> <ul style="list-style-type: none"> • IIS for Web Server • SSRS • HTML 	
<p>ix. TRAINING</p>	
<p>Contractor should provide Training for the following topics:</p>	
<ul style="list-style-type: none"> ○ Basic IP-Based HMI configuration and navigation 	
<ul style="list-style-type: none"> ○ Basic IP-Based HMI operation 	
<ul style="list-style-type: none"> ○ Report Generation 	
<ul style="list-style-type: none"> ○ System Back-up and Restoration 	
<ul style="list-style-type: none"> ○ Database archiving and restoration 	
<ul style="list-style-type: none"> ○ Basic system diagnostics for IP-Based and RTU communications 	
<ul style="list-style-type: none"> ○ Basic system diagnostics for IP-Based Automation and Remote Terminal Unit (RTU) communications 	
<ul style="list-style-type: none"> ○ 5-day Programming Training (4 persons) for C#/ASP.net MVC using Microsoft Visual Studio and to be conducted by the developer of the IOT Automation System 	
<ul style="list-style-type: none"> ○ 3-day Training (4 persons) for Advance MS SQL Database Administration, Programming and Scripting to be conducted by the developer of the IOT Automation System 	
<ul style="list-style-type: none"> ○ 3-day Training (4 persons) for IOT-based Instrumentation like RTUs, IOT controller, PLC and Gateways 	
<ul style="list-style-type: none"> ○ 1-day Training for Basic electronics 	
<p style="text-align: center;">ANNEX 1</p> <p>Contractor Qualifications and Training</p>	
<ol style="list-style-type: none"> 1. The supplier should provide Certificate of Authorization from the Distributor that the system will run and ensure that equipment proposed will run smoothly and is under the best practices. 	
<ol style="list-style-type: none"> 2. The supplier should provide Certification that the new proposed system will be compatible with the existing Macasandig Booster Station IOT-Based Automation System. 	
<ol style="list-style-type: none"> 3. The supplier shall ensure that configuration and implementation should be as per the requirement of the end-user. <ul style="list-style-type: none"> ○ Proper Documentation and over-all design transfer is part of the submittals before final acceptance of the project. 	
<p style="text-align: center;">ANNEX 2</p> <p>WARRANTY</p> <ul style="list-style-type: none"> ▪ The supplier shall submit a warranty certificate for 1 year on IP-Based Automation System. 	
<p>DESIGN & LAYOUT</p> <ul style="list-style-type: none"> ▪ The supplier should confirm to meet and implement the desired design and layout. <ol style="list-style-type: none"> a. SAMPLE CUSTOM (HMI) 	



b. IP-BASED AUTOMATION



BALULANG BOOSTER STATION



6 VFD CONTROLLER



Ultrasonic Water Level Transmitter



2 Flow Meter



Analog Pressure Gauge

c. CUSTOM REPORT GENERATION

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