SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING 4" (2 units) and 6" (1 unit) IN-LINE ULTRA VIOLET HYDRO-OPTIC DISINFECTION SYSTEM	
TECHNICAL SPECIFICATIONS	
GENERAL SPECIFICATION OF UV-HOD SYSTEM	**REMARKS**
4" UVHOD SYSTEM	
Discharge Pipe Size: 4" diameter	
Max. Flow Capacity: 70m3/hr.	
Type of Lamp: 1.0Kw UV Medium Pressure High Intensity	
No. Of Lamps: 1 x 1.0Kw MPHI Lamp	
Max. Operating Pressure: 10 bar	
Water Operating Temperature: Up to 60°C	
Electric Requirements: 3 Phase x 400/480VAC for the Ballast Module (Lamp) and 1-Phase x 120/240VAC for the Controller	
6" UVHOD SYSTEM	
Discharge Pipe Size: 6" diameter	
Max. Flow Capacity: 150m3/hr.	
Type of Lamp: 1.7Kw UV Medium Pressure High Intensity	
No. Of Lamps: 1 x 1.7Kw MPHI Lamp	
Max. Operating Pressure: 10 bar	
Water Operating Temperature: Up to 60°C	
Electric Requirements: 3 Phase x 400/480VAC for the Ballast Module (Lamp) and 1-Phase x 120/240VAC for the Controller	
Construction Materials:	
Housing: Stainless Steel 316	
Internals: High grade fused silica quartz	
Real Time Tracking & Monitoring	
Real Time Control:	
> Two (2) sensors per lamp to continuously measure 3 parameters that affect UV dosage in real time (UV Transmittance, Lamp Power/Status and Flow rate)	
> Control system which automatically adjust lamp power	
> The unit should provide the minimum dose required.	

> Full exception reporting, alarm and alerts, security suite.	
> Real Time monitoring.	
> Real-time status display of critical parameters	

ULTRA VIOLET DISINFECTION (Chamber & UV Lamps)	**REMARKS**
1. Internal Quartz disinfection chamber to be used as the main disinfection chamber. All the influent water must flow through the quartz disinfection chamber from one side of the reactor to the next. Water and light shall be mixed in this disinfection chamber. Quartz chamber shall be capable of reflecting light within the disinfection zone. Any reflective coating used inside the disinfection chamber shall not be in direct contact with the water flow path. A 316 stainless steel casing is only used as a protective casing around the main quartz chamber.	
2. The UV system shall be equipped with Medium Pressure, High Intensity Lamps and shall be enclosed within a quartz sleeve that is no less than 5 mm thick. Each lamp shall guarantee 100 percent treatment of the water flow traveling through each UV System.	
3. The UV system shall be able to automatically adjust the power consumption between 40%-100% depending on demand and still give 100 percent disinfection.	
4. The system shall have a UV intensity sensor per lamp. The UV intensity sensor views and monitors the UV intensity directly with no other medium in between. Each UV intensity sensor shall be connected to the master control of the UV system.	
5. The system should have a UV Transmittance (UVT) Sensor per 2 lamps that is integrated within the UV chamber. The UVT sensor should be connected to the system controller inline and provide the UVT for the validated dose pacing algorithm.	

POWER / CONTROL MODULE / MONITORING	**REMARKS**
1. Each power supply (ballast) shall independently operate one lamp that is capable of 40-100 percent adjustability.	
2. All power supply, UV intensity, UVT analyzer and flow meters will be controlled by a single controller with a touch screen which will capable of display and control of the following parameters:	
a. Flowrate	
b. UV Dose (in mJ/cm2)	

c. Lamp life and efficiency for each individual lamp.	
d. Power output of the Power Supply (ballast)	
e. Specific screens for calibrating UVT and UV intensity sensors.	
3. Each controller shall contain alarm capabilities, both display and remote. Alarms will report on low dose, lamp efficiency, temperature, UVT and flow conditions.	
DOSAGE	**REMARKS**
1. The UV system shall provide the minimum Validated dose needed for 3 log inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism log removal required for inactivation) according to LT2ESWATR under peak flow conditions. The basis for evaluating the UV dose and system design criteria for the UV system shall be in accordance to the manufacturer's third party validation base on USEPA UVDGM validation protocol, Nov. 2006.	
2. The validation process of the UV system must be done in the USA using the dose pacing validation, as specified in the USEPA UVDGM validation protocol, Nov. 2006.	
3. The UV Dose will be adjusted using an end of lamp life factor of a minimum of 0.8.	
4. The UV dose shall be capable of adjustment by a medium pressure lamp and ballast integrated system that is capable of adjusting the lamp intensity from 40-100 percent.	
5. Should N+1 be required for system redundancy, manufacturer shall use the USEPA UVDGM validation received for the particular UV system as the design criteria for ensuring N+1 compliance.	

The manufacturer will provide the following information as part of its proposal:	
1. Calculations of UV Dose used for system sizing and guarantees, System sizing to be solely based on EPA UVDGM validation protocol Nov. 2006 and validated RED values.	
2. The UV system shall provide the minimum Validated dose needed for 3 log inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism log removal required for inactivation) according to LT2ESWTR under peak flow conditions with one reactor lamp output at end lamp life and under fouled conditions.	
3. Sleeve manufacturer certification approving that the absorption of the protecting quartz sleeve at 253.7 nanometers shall not exceed 2% per 1 mm. thickness.	

4. Minimum of Five (5) years' experience in the manufacture of closed piped ultraviolet Disinfection systems of similar design to that proposed for this project.	
5. Manufacturer to provide Certificate on Exclusivity Distributorship Agreement	
PIPELINE, VALVE & FITTINGS:	
100mm & 150mm seamless BI Pipe	
8 pcs 100mm Butterfly Valves	
4 pcs 150mm Butterfly Valves	
2 pcs 100mm Mechanical Coupling	
1 pc 150mm Mechanical Coupling	
2 pcs 100mm Electromagnetic Flowmeter	
1 pc 150mm Electromagnetic Flowmeter	
2 pcs 100mm Automatic In-Line Screen Filter	
1 pc 150mm Automatic In-Line Screen Filter	
3 lot - UV System Shed • The supplier must provide shed for protection / safeguard the unit suitable to the field condition.	
ELECTRO- MAGNETIC FULLBORE FLOWMETER SUPPLY: 220 Volts ENCLOSURE: IP 68 FULLY SUBMERSIBLE SENSOR AND TRANSMITTER ACCURACY: ± 0.5% , TRANSMITTER DISPLAY: 2 LINE REMOTE DIGITAL OUTPUT: PULSE FOR DATA LOGGER CABLE LENGTH: 25 Meters with Military Specs CONNECTION: FLANGE TYPE PN 16 • The flow meter shall have stainless sensors. • The transmitter shall be made of die cast aluminum. • The transmitter shall be designed to have military connection for sensor port, programming port and output pulse port. • The sensor shall be designed with no moving parts. • Product that has widest flow velocity range and highest accuracy level shall be given. Preference over the other brands. • The magnetic flow meter including transmitter/electronic display shall have a protection of IP 68 submersible type. • The magnetic flow meter shall be buriable type to minimized the cost of chamber. The magnetic flow meter shall be bi-directional measured as standard.	

• The magnetic flow meter shall be battery operated with minimum life of two years and site replaceable. • The magnetic flow meter shall have accuracy 0f +/-0.5% or better. • The magnetic flow meter shall have at least indicating transmitters for total flow. Forward, Reverse and Net Totals, Date, Time, Flow rate, Velocity and Status Indicators. • The magnetic flow meter shall be designed to function with External Data Logger for recording pressure and flow of the pipe section being investigated. • The magnetic flow meter shall be designed to be adaptable to your existing data logger using a digital cable with military connector for capturing pulse output from the flow meter. • The magnetic flow meter shall be at least have been used in the Philippine environment for at least 5 years.	
SCOPE OF WORKS	
Inclusions: 1) Supply, Delivery, and Installation of 4" (2 units) and 6" (1 unit) UV HOD 2) Clean-in-Place Unit (3 units) 3) Provision of drawing for the suggested UV Installation 4) 2 units 4" & 1 unit 6" Digital Electromagnetic Flow Meter 5) Construction of 3 (lots) UV System Shed 6) The contractor shall finish the work contract within forty-five (45) calendar days.	

TERMS AND WARRANTY	
1. One (1) Year warranty on spare parts and workmanship 2. After sales service shall include the O & M Training and free periodic maintenance schedule for One (1) year. 3. The spare parts availability shall be available locally within the period of the Contract to continue the proper function of the equipment. 4. The contractor shall provide all the labor, materials and equipment to be used.	