

**SCOPE OF SUPPLY FOR GREENVILLE WASTEWATER TREATMENT PLANT
ULTRAVIOLET DISINFECTION EQUIPMENT – TROJANUVSigna™**

Prepared for: The City of Greenville, OH Wastewater Treatment Plant

Request Document: UV Disinfection Equipment Request for Proposals – August 28, 2020

Submitted by: Trojan Technologies

Trojan Quote: 226542 (September 18, 2020)

Design Criteria:

Current Peak Design Flow:	13.0 MGD
Future Peak Design Flow:	17.3 MGD
Average Flow:	2.1 MGD
UV Transmission:	50% (minimum)
Total Suspended Solids:	12 mg/L (30 Day Average, grab sample)
Minimum Dose:	>15 mJ/cm ² T1 (bioassay-validated) & 30 mJ/cm ² MS2 (bioassay-validated)
Discharge Limit:	126 cfu/100 mL E.Coli (30 Day Geometric Mean) & 284 cfu/100 mL E.Coli (7 Day Geometric Mean)

We are pleased to submit the following scope of equipment based on the above criteria.

The purchaser is responsible for reading all information contained in this Supply Contract. Trojan will not be held accountable for the supply of equipment not specifically detailed in this document. Detailed installation instructions are provided with the shop drawings and are available earlier upon request. Changes to this Scope of Supply that affect selling price will be handled through a change order.

Please refer inquiries to Trojan Manufacturer's Representative:

Representative: Tim Shaw
Firm: The Henry P. Thompson Company
Phone: 513-248-3200
Email: tshaw@hpthompson.com

This proposal has been respectfully submitted by,
Trojan Technologies



John Faber
Regional Manager

GENERAL CONFIGURATION

The TrojanUVSigna equipment described in this Scope of Supply consists of one (1) channel with three (3) UV banks with future expansion capability to four (4) UV banks to treat 33.3% additional flow capacity.

Channel Dimensions Requirements: Length: 35 ft
 Width: 4.4 ft
 Depth: 7.8 ft

Unless otherwise indicated in this proposal all anchor bolts, conduit, conductors, local disconnects and transformers (if required) are the responsibility of the Installation Contractor and are not included in Trojan's Scope of Supply. Specific cable types listed below are for reference only. Selecting cables that are appropriate for the installation environmental conditions and in compliance with local code is the responsibility of the Installation Contractor.

Site to provide approved (engineered) anchor points for personnel to use as part of their fall restraint system around open channels. The anchor points must be positioned so that the preferred retractable lifeline of 8 ft (2.4 m) is of sufficient length to access the work at the channel. Refer to local safety regulation.

UV BANKS

Trojan's Responsibility:

Each bank supplied will consist of TrojanUV Solo Lamps™, quartz sleeves, supporting structures, ActiClean™ chemical/mechanical cleaning system and an automatic bank lifting mechanism. UV lamps are powered from an individual electric feed from a lamp driver located in a Power Distribution Center (PDC).

Model: TrojanUVSigna™
Quantity: Three (3) UV Banks, expandable to four (4) future UV Banks
Each bank will be supplied with eighteen (18) UV lamps, eighteen (18) quartz sleeves, one (1) UV intensity sensor, one (1) ActiClean chemical-mechanical wiping system and one (1) automatic bank lifting mechanism
Rating: Type 6P / IP68 submergence-rated
Approximate Weight: 570 lbs

Installation Contractor's Responsibility:

The Installation Contractor shall install, align, secure, and seal (grout) each UV bank and lifting system in the channel per the instructions provided. The Installation Contractor shall provide solid grating downstream of the UV bank to block out UV light. Please refer to the supplied Trojan-supplied drawings for details.

SYSTEM CONTROL CENTER

Trojan's Responsibility:

A System Control Center (SCC) shall be supplied to monitor and control the UV disinfection System. Trojan will provide a PLC I/O and soft address map to aid the Installation Contractor with integration of the UV PLC and SCADA system. The UV SCC shall consist of the following:

Quantity Supplied: One (1) SCC
Location: Wall-Mounted
Controller Type: AB CompactLogix
Operator Interface: Beijer 7" HMI X2 Extreme (Outdoor-Rated)
Material / Rating: 304 Stainless Steel (Type 4X, IP 66)
SCADA: EtherNet/IP
Approximate Weight: 200 lbs

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for mounting the SCC as indicated on the drawings. Unless otherwise indicated, the Installation Contractor to be responsible for the supply, installation and connection of the following at the SCC:

1. One (1) 120V, 60 Hz, 1 Phase, 2 Wire + GND, 1.8 kVA power feed
2. One (1) bond link to plant ground, in accordance with applicable codes and standards
3. One (1) Modbus communication link, Belden 3106A (or equivalent), to PDC
4. One (1) Modbus communication link, Belden 3106A (or equivalent), to HSC
5. One (1) Cat 5e Ethernet communication link to SCADA
6. One (1) 4-20 mA analog shielded twisted pair from plant flow meter
7. One (1) 4-20 mA analog shielded twisted pair from online UV Transmittance monitor
8. One (1) 24V DC, 2 conductors + GND, power to the Level Sensor Monitor
9. One (1) 4-20 mA analog shielded twisted pair from the Level Sensor Monitor

POWER DISTRIBUTION CENTERS

Trojan's Responsibility:

The Power Distribution Center (PDC) distributes power to the UV lamps and shall consist of the following:

Quantity Supplied:	One (1) PDC
Method of Cooling:	Air-conditioning
Material / Rating:	304 Stainless Steel (Type 4X, IP 66)
Approximate Weight:	1984 lbs

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for setting in place and bolting the PDC in location. The Installation Contractor to be responsible for the supply, installation and connection of the following at the PDC:

1. One (1) 480Y/277V, 60 Hz, 3 phase, 4 wire + GND, 58.4 kVA power feed with local disconnect
2. One (1) bond link to plant ground, in accordance with applicable codes and standards (to underside of panel)
3. One (1) bond link from each UV bank to the PDC in accordance with the applicable drawings, specifications, codes, and standards
4. One (1) bank-in-place sensor cable (by Trojan) from each UV bank to the PDC
5. One (1) UV intensity sensor cable (by Trojan) from each UV bank to the PDC
6. One (1) Modbus communication link, Belden 3106A (or equivalent), from the SCC
7. One (1) discrete, 2-conductor, cable from level sensor control box for low water level signal
8. Installation and termination of lamp cables from the UV banks to PDC. (Qty: 18 per UV Bank – supplied by Trojan)

HYDRAULIC SYSTEM CENTER

Trojan's Responsibility:

The Hydraulic System Center (HSC) houses the ancillary equipment required to operate the quartz sleeve cleaning system and automatic bank lifting mechanism.

Quantity Supplied:	One (1) HSC
Materials / Rating:	304 Stainless Steel (Type 4X, IP 66)
Hydraulic Fluid:	Mineral Oil
Approximate Weight:	500 lbs

Installation Contractor's Responsibility:

The Installation Contractor shall be responsible for setting in place and bolting the HSC as shown on the Trojan drawings. The HSC must be located within 50 ft of the PDC. The Installation Contractor shall be responsible for the supply, connection and installation of the following at the HSC:

1. One (1) 480V, 60 Hz, 3 phase, 3 wire + GND, 2.5 kVA power feed with local disconnect
2. One (1) bond link to plant ground, in accordance with applicable codes and standards
3. One (1) Modbus communication link, Belden 3106A (or equivalent), from the SCC
4. Cut and crimp hydraulic hoses (coordination with Parker Store) (hoses and connections supplied by Trojan)
5. Connection of the hydraulic hoses, total of four (4) per UV bank

WATER LEVEL CONTROLLER

Trojan's Responsibility

A level control device is required to maintain and control the effluent level in the channel regardless of flow rate.

Quantity Supplied: One (1) Fixed Serpentine Weir
Material of Construction: 304 Stainless Steel

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for setting in place, bolting, grouting and sealing each level control weir trough as per Trojan's and Engineer's drawings.

LOW WATER LEVEL SENSOR

Trojan's Responsibility:

A Low Water Level Sensor is required downstream of the UV System to generate a low water level signal that will shut down and protect the UV System if the water level in the channel drops too low.

Quantity Supplied: One (1)
Description: Electrode type water level sensor
Approximate Weight: 10 lbs (panel)

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for setting in place and bolting the water level sensor panel to the effluent channel wall as per Trojan's and Engineer's drawings.

LEVEL SENSOR CONTROL BOX

Trojan's Responsibility:

Trojan will provide a wall mounted Level Sensor Control Box 24 x 14 x 6 in to provide power and relays for low level sensors.

Quantity Supplied: One (1)
Description: Level Sensor Control Box
Materials / Rating: 304 Stainless Steel (Type 4X)
Approximate Weight: 40 lbs

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for mounting the Level Sensor Control Box as indicated on the drawings. The Installation Contractor shall also be responsible for supplying mounting hardware, watertight conduit and for the supply, installation and connection of the following at the Control Box:

1. One (1) 120 Volt, 1 phase, 2 wire + GND 0.12 kVA power supply
2. One (1) discrete, 2 conductor cable from the level sensor to the level sensor control box
3. One (1) discrete, 2 conductor cable from the level sensor control box to the PDC

UV TRANSMISSION MONITOR

Trojan's Responsibility:

An on-line UV Transmission Monitor will be supplied to provide a UVT measurement of the source water.

- Description:** One (1) Hach UVASsc UVT monitor including:
- One (1) submersible probe with mounting kit
 - One (1) sc200 Controller
 - 25 ft cable between the probe and the controller
- Enclosure Rating:** Type 4X
- Controller Dimensions:** 12 x 12 x 4 in
- Approximate Weight:** 30 lbs (includes probe and Controller)
- Probe Immersion Depth:** up to 6 ft

Installation Contractor's Responsibility:

The Installation Contractor to be responsible for setting in place and mounting the Controller panel and the probe. The Installation Contractor shall also be responsible for the supply, installation and connection of the following at the Controller:

1. One (1) 120 Volt, 1 phase, 2 wire + GND, 50 VA power supply
2. One (1) 4-20mA analog shielded twisted pair to the SCC
3. Installation of sensor communication cable (by Trojan) between the probe and Controller
4. Anchor bolts as required for mounting Controller and probe to the channel edge

SPARE PARTS AND ADDITIONAL EQUIPMENT

Trojan's Responsibility:

The following equipment will be supplied with the UV system:

Description	Quantity
1 Additional complete set of UV Lamps	Fifty-four (54)
1 kW UV Lamp	Six (6)
2 kW Lamp Driver	Three (3)
Wiper Seal Kit Assembly (2 seals, springs, cage, spacers)	Six (6)
Quartz Sleeve	Six (6)
UVI Sensor	One (1)

DOCUMENTATION (SHOP DRAWINGS AND O&M MANUALS)

The following documentation will be supplied by Trojan per the following schedule:

- One (1) electronic copy of Trojan Shop Drawing Submittals 4 – 6 weeks after receipt of written purchase order (hardcopies available upon request)

- One (1) electronic copy of Trojan Standard O&M manuals at time of equipment delivery (hardcopies available upon request)

DELIVERY, START-UP AND TRAINING

Equipment shipped 16 – 18 weeks after approval of Shop Drawings.

Installation Contractor's Responsibility:

The Contractor is responsible for:

- Unloading of the components supplied by Trojan, storage of all components, if required in a clean dry environment
- Installing the equipment outlined in the scope of Supply in accordance with contract drawings, Trojan's shop drawings, instructions and installation checklist.
- Supplying all conduits and conductors and components per the sites state regulations and components indicated as supplied by others,
- Completing the Checklist and returned at least two (2) weeks prior to date requested for commissioning.

Trojan's Responsibility:

The following start-up services will be provided by Trojan-certified technicians:

- Installation assistance as required by phone or fax. Technical Assistance Center 1-866-388-0488 or tac@trojanuv.com
- Start-up and testing of the installed UV equipment.
 - If the Trojan's Certified Service Technician determines the Contractor work is not complete and the start-up cannot be completed in the allotted time a return visit will be scheduled at the Contractors expense.
- Classroom and/or jobsite training for operations staff
 - If trainees are not available a return visit will be scheduled at the Contractors expense.

WARRANTY

Trojan will warrant the equipment and parts for 12 months after start-up or 18 months after shipment, whichever comes first. Warranty does not cover labor. Refer to attached Terms and Conditions for additional details.

- UV lamps shall be warranted for 15,000 hours prorated after 9,000 hours.
- Lamp drivers shall be warranted for 10 years, prorated after 1 year.

SELLING PRICE

\$ 315,885 USD

- Selling price does not include any duties or taxes that may be applicable.
- Freight included if destination is within North America.
- Incoterms 2002: Ex Works (EXW) or Cost, Insurance and Freight (CIF) to destination or port will apply for all other destinations.

PAYMENT TERMS

- 25% Upon approval of Shop Drawings
- 70% Upon delivery of equipment to job site
- 5% Equipment Acceptance
- Net 30 Days

- If UV System Start-up is required within 30 days of shipment, Trojan requires 95% payment unless agreed upon in writing before authorizing system Start-up.

TERMS & CONDITIONS

See Trojan's Terms and Conditions attached.

Trojan appreciates the opportunity to submit this proposal. Our proposal is submitted subject to and based on Trojan's standard terms and conditions, which we have attached as part of our proposal. We believe these terms and conditions are customary in the trade and respectfully reserve the opportunity to negotiate, fair and reasonable contract terms acceptable to both parties, if Trojan is selected for this project.