REQUEST FOR PROPOSALS

ENGINEERING AND RELATED SERVICES

WWTP Backup UV System Replacement

Project #2109

AUGUST 26, 2024

Address Proposals to:

City of Wilsonville
Attn: Mike Nacrelli, PE
29799 SW Town Center Loop East
Wilsonville, OR 97070
mnacrelli@ci.wilsonville.or.us

Proposals due: Thursday, September 19, 2024, at 2:00 PM, Pacific Time

Proposals must be sealed in an opaque envelope, plainly marked as follows: "Request for Proposals – WWTP Backup UV System Replacement," and sent to the attention of Mike Nacrelli, PE. Include the name and address of the Proposer. Proposers must submit four (4) printed sets and one (1) electronic copy of the Proposal. The City of Wilsonville reserves the right to reject any or all Proposals.

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Request for Proposals

Request for Proposals

The City of Wilsonville, Oregon (the "City") is requesting Proposals in order to select a qualified consultant to provide professional services for the WWTP Backup UV System Replacement ("Project"). Consultants are invited to demonstrate their experience and qualifications in performing work directly related to the services required by responding to this **Request for Proposals (RFP)**. The anticipated negotiated fee for this Project is expected to exceed $100,000; therefore, Proposals will be evaluated in accordance with the qualifications based selection procedures of OAR 137-048-0220. This Project ☐does ☒ does not involve federal funds.

I. Project Description

This project implements the replacement of the backup UV disinfection system at the Wastewater Treatment Plant (WWTP) identified in the 2023 Wastewater Treatment Plant Master Plan, available at https://www.ci.wilsonville.or.us/comm-dev/page/wastewater-treatment-plant-master-plan. The backup UV system (installed in 1993) has failed and is no longer supported by the vendor and therefore needs to be replaced.

Attachment B to this RFP includes a recently completed preliminary design report, which will be the basis for the final design.

II. Scope of Work

The following is a general scope of work for the design of the WWTP Backup UV System Replacement. Proposers will provide a proposed scope of work that will encompass the general tasks provided below, but with more detail and explanation of how each task will be performed. The City reserves the right to negotiate the final scope of work that will be attached to the Professional Services Agreement.

Term of Service

The contract resulting from this RFP shall have an anticipated date of final completion on June 30, 2027.

Pre-Contract Activity

The successful Proposer shall work with the City's Project Manager to refine and clarify the scope of services prior to preparing its cost proposal. A pre-contract meeting(s) may be required, and shall not be billable to the City.

Task 1 – Project Management

Consultant shall provide overall management of the project work and oversight and coordination of the consultant team, including staff and sub-consultants. Coordinate project work with the City Project Manager and communicate work status on a regular basis and as project issues or concerns arise. Maintain an electronic project file for all project documents. Provide quality assurance such that all deliverables have been peer reviewed prior to submittal to the City.

Consultant shall prepare monthly progress reports accompanied by progress billings, as well as monitor work tasks, budgets and schedule. Monthly progress billings are subject to City review and approval.

Consultant shall prepare a detailed Project schedule that includes each task and subtask and key project milestones. Update the Project schedule as changes to task timeframes occur.

Consultant shall attend and prepare materials for project meetings that will include at a minimum, kickoff, design review of key project deliverables, pre-bid, and pre-construction.

Task 2 – Design Documents

Consultant shall prepare a complete set of preliminary (30%), advance (60%), and final (90%) design documents, including engineered plans, updated schedule, and cost estimates for the project for review and comment by the City. Consultant shall review the conclusions and recommendations from the 2024 Preliminary Design Report for confirmation or any suggested modifications. Consultant shall evaluate procurement options for the selected UV equipment and assist the City in pursuing the chosen procurement method. In addition, the consultant shall assist the City in pursuing available incentives from Energy Trust of Oregon. Final design documents shall include construction specifications for review and comment. Submitted comments and responses will be tracked in a comment log for the duration of the project.

Task 3 – Final Construction Documents

Consultant shall prepare a complete set of final construction documents, including construction drawings, specifications, cost estimates, bid schedule and bid item descriptions. Final construction documents shall incorporate any final City and DEQ comments.

Task 4 – Bidding Assistance

Consultant shall coordinate with City in the preparation of construction bid documents. The City will prepare, print, and distribute construction bid documents and be the main point of contact for all bidders during the bidding process. Consultant shall prepare response to potential construction contractor and supplier technical questions about the plans and specifications at the request of the City. Consultant shall review all addenda necessary to clarify the construction bid documents.

Task 5 – Construction Engineering Services

Construction engineering services include, but are not limited to administration, management, reviewing submittals, responding to requests for information, and periodic inspection during construction of the Project. Additional services include assistance with construction contract change orders, equipment startup and testing, punchlist preparation, project closeout, and providing record drawings in PDF and CAD format.

III. Minimum Qualifications

To be considered for award of the contract for this Project, each Proposer shall demonstrate the following minimum criteria as part of their Proposal.

1. Proposer's project team shall include a State of Oregon Registered Professional Engineer.
2. Proposer shall demonstrate a minimum of five (5) years' experience providing the types of services described within the Scope of Work of this Request for Proposals for public agencies.
3. Proposer shall not have a record of substandard workmanship, as verified by the City by communication with licensing authorities, former clients and references, and other means as the City deems appropriate.

IV. Proposal Requirements

Proposers shall prepare and submit Proposals in accordance with the requirements stated within this RFP. Adherence to these requirements will ensure a fair and objective analysis of submitted Proposals. Proposals should provide a clear, concise description of the Proposer's capabilities to satisfy the requirements of this RFP. Emphasis should be placed on completeness, brevity, and clarity of content. Failure to comply with or complete any part of the RFP may result in rejection of the Proposal. The ability to follow these instructions demonstrates attention to detail.

Proposal Format

Proposals shall be typewritten with a standard body text font (e.g. Calibri, Times New Roman, Garamond) of at least 12-point. Proposals shall be preferably double-sided and stapled once or bound in the upper left-hand corner. The City requests that submittal materials contain post-consumer recycled content and are readily recyclable. The City discourages the use of materials that cannot be readily recycled, such as PVC binders, spiral bindings, and plastic or glossy covers or dividers. One page is considered to be one side of a single 8½" x 11" sheet.

Proposals shall be organized in accordance with the listed Proposal contents and shall not exceed 20 total pages. Supporting Information, as defined below, shall be provided in a separate section at the end of the Proposal, and not counted in the page limit requirements. A front cover sheet and one-page table of contents are not counted in the page limit requirements.

Proposals exceeding the specified number of pages or text font size may be considered non-responsive and the Proposal may be rejected. Pages exceeding the maximum page limit may not be reviewed.

Introductory Letter

The introductory letter should address the consultant's willingness and commitment, if selected, to provide the services offered and a description of why the Proposer believes it should be selected.

The letter shall be addressed to the City's Project Manager and include the name of the firm, as well as the printed name, title, telephone number, and email address of the officer authorized to represent the consultant in any correspondence, negotiations, and signing of any contract that may result. Include the address of the office that will be providing the service and the project manager's name, title, telephone number, and e-mail address. The Proposer's federal and state

tax ID numbers and the state of incorporation, if applicable, shall also be included. The letter must be signed by the Proposer, if an individual, or by a legal representative of the Proposer's entity, authorized to bind the entity in contractual matters.

The letter of interest shall specifically stipulate the following statements:

> *"Proposer has received and examined, as part of the Proposal, Addenda No. __ through __. Proposer accepts all terms and conditions contained in the Request for Proposal and the Professional Services Agreement, except as otherwise specifically noted as an Exception in the Proposal."*
>
> *"The submitted Proposal is valid for a period of ninety (90) days from the time and date Proposals are due."*
>
> *"All materials and documents acquired or produced by the consultant in conjunction with the resulting contract shall be delivered to and become property of the City of Wilsonville, without restriction or limitation of future use."*

Project Understanding

Proposals shall demonstrate the consultant's understanding of the Project by providing a clear and concise description of the Project, discussion of the anticipated primary issues and milestones, and identification of key stakeholders, based on the information provided in the RFP.

Project Approach

Proposals shall clearly define the tasks and activities necessary to meet the objectives outlined in the Scope of Work of the RFP. Each Proposer should demonstrate knowledge of the type of work requested, ability to solve the anticipated Project issues, and ability to offer innovative ideas. Proposer's ability to expeditiously complete the work should be made evident. The Proposal should include the following:

1. Describe overall approach to project management.
2. Describe Proposer's approach and methodology for preparing project cost estimates, including the services being solicited by the RFP, as well as the cost of permits, acquisitions, and construction.
3. Describe approach to organize and accomplish each of the tasks and activities of this RFP, including addressing the anticipated primary issues and milestones.
4. Identify Proposer's specific team members, including key sub-consultants, and resources assigned to each task and activity of the RFP.
5. Describe Proposer's approach to complete the tasks and activities of this RFP in a timely manner and control costs.
6. Describe Proposer's approach to unanticipated issues that may arise during the Project.
7. Describe Proposer's quality assurance and quality control procedures to be implemented on this Project.
8. Describe Proposer's approach and abilities to interact and engage stakeholders.

9. Identify and describe the deliverables that will result from each task and activity.
10. Identify key points of input and review with City staff.

Proposer's Experience

Proposals shall provide a brief work history of consultant's and any key sub-consultant's projects entailing the same type of work being requested. Emphasis should be placed on local projects for public agencies where possible. The Proposal should include the following:

1. Describe the consultant's and key sub-consultant's firm size, office locations, and relevant capabilities and resources to be utilized on this Project.
2. Describe consultant and key sub-consultants' work experience that correspond with the Project needs, as identified in this RFP.
3. Provide at least three (3) examples of projects completed by Proposer for public agencies within the last five (5) years that best characterize Proposer's experience with the work being requested, work quality, and cost control, describing each by project name, type, location, and date.
    - Include the public agency name and the name, address, telephone number, and email of the current contact person for each project, where possible.
    - Identify what role, if any, each team member who is proposed for this City Project (see Project Team Experience, below) played in each listed project.
    - Identify original and final contract costs for each listed project. Explain any cost overruns and corrective actions taken.

Project Team Experience

Proposals shall identify the team to be assigned to the Project by name, describing each member's qualifications and experience with completed projects relative to the requested services, including expertise regarding all tasks associated with the Scope of Work. Each Proposal should include the following:

1. Identify by name and title the project principal, project manager, key staff, and any sub-consultants or subcontractors to be assigned to this Project.
2. Describe education, training, qualifications, registrations, certification, and relevant individual work experience of all key personnel, including sub-consultants, to be assigned to this Project.
3. Identify the Project roles and responsibilities of all key personnel.
4. Describe any attributes or expertise of key personnel uniquely situated for the requested services.
5. Describe the extent of principal and project manager involvement.
6. Describe current and anticipated assignments and location of key personnel, including percentage of time devoted to other projects during performance of this Project.

7. Estimate the percentage of time key personnel will be devoted to this Project for the duration of the Project, based on a 40-hour work week.

Project Schedule

Proposals shall include a proposed Project schedule identifying the duration and completion date of all tasks and milestones. The schedule should reflect the anticipated final completion date stated in the Scope of Work. If the schedule extends beyond the final completion date, the Proposal should include an explanation as to why the work cannot be completed within the proposed timeframe stated in the Scope of Work.

Supporting Information

Supporting materials may include graphs, full resumes, other references, charts, sample documents, and photos. However, pertinent information should be covered in the body of the Proposal. Supporting Information will not count toward the page limit, but brevity is encouraged. If there is no additional information to present in the Supporting Information, then state: *"There is no additional information we wish to present."*

V. Proposal Submission

Proposers shall submit four (4) printed copies of their written Proposals, sealed in an opaque envelope, plainly marked "Request for Proposals – WWTP Back UV System Replacement," and include the name and address of the Proposer. Proposals shall be addressed and submitted to the following location by **2:00 p.m., Pacific Time, on Thursday, September 19, 2024**.

City of Wilsonville
Attn: Mike Nacrelli, PE
29799 SW Town Center Loop East
Wilsonville, OR 97070
mnacrelli@ci.wilsonville.or.us

Proposals must arrive at the issuing office on or before the listed time and date due. Late Proposals will be returned unopened and without review. Submit one (1) electronic copy by e-mail.

VI. Proposal Evaluation and Selection

A Selection Review Committee of at least three members will be appointed to evaluate the Proposals received. Each committee member will independently evaluate each Proposal in accordance with the criteria stated in the Proposal Requirements section of this RFP.

The City may also seek expert advice to help review Proposals. Advisors to the Selection Review Committee may attend evaluation meetings and consultant presentations, evaluate the Proposals, and lend any such expertise to the process as requested by the City. However, any such person that is contacted by the City for their expert advice shall not, from first being contacted until the RFP process is completed or otherwise brought to an end, have communications with any Proposers regarding their Proposals or the RFP process.

At any point during the evaluation process, the City is permitted to seek clarification of any Proposal.

Written Evaluation

Based on their evaluation, each member of the Selection Review Committee will score each Proposal according to the following scoring criteria. Each member will rank, in descending order, each Proposal by total score.

EVALUATION CRITERIA

Criteria	Maximum Score
Introductory Letter	Required
Project Understanding	10
Project Approach	30
Proposer's Experience	20
Project Team Experience	40
Project Schedule	Required
Total	100 Points

In addition to the above weighted scoring criteria, feedback from provided references will also be considered and may be determinative in the selection process. References will not be scored but will be considered and may be a deciding factor.

Interview Evaluation

If determined to be necessary or desirable by the City, finalists from the written evaluation may be invited to participate in an additional interview evaluation process. The number of finalists will be determined by the Selection Review Committee. The interview evaluation process will provide an opportunity for Proposers to make a presentation to clarify their Proposal and for the Selection Review Committee to ask additional questions related to the Proposal and Scope of Work. The City will notify finalists of the interview evaluation time and location and allow for a reasonable period of time for finalists to prepare presentations.

After the interviews, each member of the Selection Review Committee will re-evaluate and re-score each finalist interviewed according to the Evaluation Criteria. Each member will rank, in descending order, each interview by total score.

Successful Proposer Determination

The Proposer with the highest overall ranking, as determined by the Selection Review Committee, shall be identified as the Successful Proposer. Depending on the number of Proposers and the point spread among Proposals, the Selection Review Committee may determine that an interview evaluation is needed to determine the Successful Proposer. Those Proposers selected for interviews will be based on the Proposals with the highest overall ranking.

If interviews are conducted, the Successful Proposer will be determined based on the adjusted post- interview score and ranking in accordance with the Evaluation Criteria. The Proposer with the highest overall adjusted ranking, as determined by the Selection Review Committee, shall be identified as the Successful Proposer.

The City reserves the right to perform additional investigations of any Proposer, including communication with licensing authorities, former clients and references, and other means as the City deems appropriate, and may reject any Proposal upon finding a record of Proposer's substandard workmanship.

The Selection Review Committee shall determine the final ranking of Proposers, and the Committee's decision is final. Upon determination of the Successful Proposer and performance of additional investigations, the City will issue a Notice of Intent to Award letter notifying all Proposers of the City's selection of a Successful Proposer and protest procedures.

The City reserves the right to negotiate a final contract that is in the best interest of the City. With regards to the Professional Services Agreement, the City will only negotiate those provisions that were noted as Exceptions in the Proposal. The City will attempt to reach a final agreement with the Successful Proposer. The City may, in its sole discretion, terminate negotiations and reject the Proposal in the event agreement cannot be reached. The City may then attempt to reach final agreement with the next highest ranked Proposer, and so on with the remaining Proposers, until an agreement is reached. In the alternative, the City may at any time elect to reject all Proposals and begin the RFP process over.

After the City has reached final agreement with the Proposer, the Selection Review Committee will make a recommendation to the Wilsonville City Council, for contracts over $100,000. The Wilsonville City Council will then make the final contract award decision.

Award Protest

A Proposer believing to have been adversely affected or aggrieved by the selection of the Successful Proposer may submit a protest to the City in accordance with OAR 137-048-0240. The protest must be in writing and submitted to:

City of Wilsonville
Attn: Mike Nacrelli, PE
29799 SW Town Center Loop East
Wilsonville, OR 97070

OR

mnacrelli@ci.wilsonville.or.us

Award protests shall include "WWTP Backup UV System Replacement – Award Protest" in the subject line or written on the front of the envelope. The written protest must be received by the City no later than seven (7) calendar days after the date the Notice of Intent to Award letter was issued. The protest should demonstrate that all higher ranked Proposers failed to meet the requirements of the RFP or are not qualified to perform the services described in the RFP. Protests received after the submittal deadline will not be considered.

No contract associated with the RFP will be awarded until any protests have been resolved. The City will evaluate and resolve all award protests submitted before the deadline within a reasonable time following receipt of the protest. The City will promptly issue a written decision on the protest to the Proposer who submitted the protest. If the City's written decision on the protest results in a change to the RFP, the City shall cancel the Notice of Intent to Award, revise the RFP documents accordingly, and solicit for new Proposals. The City's decision regarding the protest is final and concludes the administrative appeals process.

VII. Schedule

The following is the anticipated timeline for receiving and evaluating Proposals and awarding a contract to the most qualified firm or individual. This schedule is subject to change as additional time is needed.

Advertise Request for Proposals	August 26, 2024
Pre-Proposal Meeting *(optional)*	September 4, 2024, 11:00 a.m.
RFP Change Request Deadline	September 13, 2024, 5:00 p.m.
RFP Question Submission Deadline	September 13, 2024, 5:00 p.m.
Addenda Issuance Deadline	September 16, 2024
Proposals Due	September 19, 2024, 2:00 p.m.
Evaluation of Proposals Complete	September 25, 2024
Interviews Scheduled *(if required)*	September 30, 2024
Notice of Intent to Award	October 1, 2024
Award Protest Deadline	October 8, 2024, 5:00 p.m.
City Council Award	October 21, 2024, 7:00 p.m.
Notice of Award	October 22, 2024

VIII. Pre-Proposal Meeting

An optional pre-Proposal meeting for all Proposers will be held at **11:00 a.m., Pacific Time, on Wednesday, September 4, 2024**. The pre-Proposal meeting will be held at:

Wilsonville WWTP
9275 SW Tauchman St.
Wilsonville, OR 97070

Consultants will be provided the opportunity to discuss with City project management staff the Project and services described in the RFP.

IX. RFP Documents

Request for Proposal (RFP) documents may be obtained at Wilsonville City Hall, located at 29799 SW Town Center Loop East, Wilsonville, Oregon 97070. Upon request, RFP documents may be

obtained by standard mail for a fee of $35.00. The City of Wilsonville shall not be held responsible for the delivery of the documents. Contact Candi Garrett at (503) 683-4960 to obtain RFP documents by mail.

RFP documents can also be downloaded at www.questcdn.com, Project **#9286177**, for a $10.00 download fee. For any assistance with free registration or downloading, contact QuestCDN customer service at (925) 233-1632.

X. Project Manager

The City's Project Manager shall be the sole point of contact for all questions, concerns, and protests. The Project Manager for this Project is:

Mike Nacrelli, PE	Contact at:
Senior Civil Engineer	503-570-1540
Wilsonville Engineering Division	mnacrelli@ci.wilsonville.or.us

XI. RFP Questions

Proposers shall direct all questions regarding RFP documents in writing or by email to:

City of Wilsonville
Attn: Mike Nacrelli, PE
29799 SW Town Center Loop East
Wilsonville, OR 97070

OR

mnacrelli@ci.wilsonville.or.us

All questions shall include "WWTP Backup UV System Replacement – RFP Questions" in the subject line or written on the front of the envelope and be submitted in writing by **5:00 p.m., Pacific Time, on Friday, September 13, 2024**. Questions and answers will be provided by email to all firms on the RFP holders list.

Access to the City's Project Manager for telephone calls, emails, or other communication will be unrestricted during the RFP preparation period up until **5:00 p.m., Pacific Time, on Friday, September 13, 2024**. During this time, Proposers are encouraged to ask as many questions as needed to prepare a viable Proposal. Questions submitted after **5:00 p.m., Pacific Time, on Friday, September 13, 2024** will not be addressed.

For the sake of fairness, Proposers are not to contact any City staff or official other than the Project Manager concerning this RFP. Contact with any other City staff or official concerning this RFP will be grounds for disqualification.

Proposers are hereby notified that verbal communication may not be relied upon as official communication concerning this RFP. Only answers to those questions responded to by the Project Manager via email or by written addendum may be relied upon.

XII. General RFP Information

Changes to the RFP Solicitation by Addenda

The City reserves the right to make changes to the RFP by written addendum, which shall be issued by email format only to all those who have obtained the RFP documents by pick-up, standard mail, or download at www.questcdn.com.

All addenda shall have the same binding effect as though contained in the main body of the RFP and Scope of Work.

No addenda will be issued later than **Monday, September 16, 2024**, except by an addendum, if necessary, postponing the date for receipt of Proposals or withdrawing the RFP altogether.

Each Proposer is responsible for obtaining all addenda prior to submitting a Proposal and shall acknowledge in the Proposal receipt of each addendum as part of the Proposal. Failure to acknowledge receipt of all addenda as part of the Proposal may result in rejection of the Proposal.

Confidentiality

All information submitted by Proposers shall become and remain the property of the City and, as such, is considered public information and subject to disclosure pursuant to the Oregon Public Records Act, except such portions of the Proposals for which the Proposer requests exception from disclosure as being proprietary information exempt from disclosure, consistent with Oregon law. If a Proposal contains any information that is considered a trade secret under ORS 192.501(2), each sheet of such information must be marked with the following legend:

> *"This data constitutes a trade secret and shall not be disclosed except in accordance with the Oregon Public Records Law, ORS Chapter 192."*

Identifying the Proposal in whole as a trade secret is not acceptable. Failure to identify a portion of the Proposal as a trade secret shall be deemed a waiver of any future claim of that information as a trade secret. Nondisclosure of documents or any portion of a document submitted as part of a Proposal may depend upon official or judicial determinations made pursuant to the Oregon Public Records Law.

The City will make available to any person requesting information through the City processes for disclosure of public records, any and all information submitted as a result of this RFP not exempted from disclosure without obtaining permission from any Proposer to do so after the Notice of Intent to Award has been released.

The City accepts no liability for the inadvertent or unavoidable release of any confidential information submitted. If a public record request is made for material marked as proprietary, the City will attempt to notify the impacted Proposer prior to the deadline for release of the material but will not defend against any legal challenge for release. Therefore, claims arising out of any public record request for such information shall be at the Proposer's sole expense, if the Proposer wishes to deny or withhold the information.

Cancellation

The City reserves the right to cancel this RFP or the contract award at any time before execution of the contract by both parties, if cancellation is deemed to be in the best interest of the City. In no event shall the City have any liability for the cancellation of a contract award.

Late Proposals

All Proposals that are not received by the Proposal Due Date and Time will not be considered and will be returned unopened to the Proposer. Electronically mailed or faxed Proposals will not be accepted. Delays due to mail and/or delivery handling, including but not limited to delays within the City's internal distribution systems, do not excuse the Proposer's responsibility for submitting the Proposal to the correct location by the Proposal Due Date.

Disputes

In case of any doubt or differences of opinion as to the items or services to be furnished hereunder, or the interpretation of the provisions of the RFP, the decision of the City shall be final and binding upon all parties.

Proposer Certifications

By the act of submitting a Proposal in response to this RFP, the Proposer certifies that:

1. Proposer has carefully examined all RFP documents, including the draft Professional Services Agreement (attached as Attachment A), all addenda, and all other attachments, fully understands the RFP intent, is able to perform all tasks as described in the Scope of Work of this RFP, and the Proposal is made in accordance therewith. Except as otherwise noted as part of the Proposal, Proposer certifies that Proposer is ready, willing, and able to comply with all terms of the attached Professional Services Agreement.
2. Proposer is familiar with the local conditions under which the work will be performed.
3. The Proposal is based upon the requirements described in the RFP, without exception, unless clearly stated in the response.
4. Proposer accepts all of the terms of the City's Professional Services Agreement and warrants that Proposer will fully meet all of the insurance requirements contained therein. If Proposer wishes to amend or modify any terms of the Professional Services Agreement, such amendment or modification must be stated in particularity in the Proposal. Proposed changes to the draft Professional Services Agreement not stated at the time of Proposal submission will not be considered. Changes stated will be considered but may not be agreed upon by the City for contract award. If the City does not agree with such noted changes, Proposer may withdraw the proposed change or the entire Proposal and the City may elect to award to the next highest ranked Proposer.
5. Proposer certifies, and in the case of sole proprietorship, partnership, or corporation, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of Proposer's knowledge and belief, no elected official, employee, or person whose salary is payable in whole or part by the City has a direct or indirect financial interest in the Proposal, or in the services to which it relates, or in any of the profits thereof, other than as fully described in the Proposer's response to this solicitation.

6. Proposer has examined all parts of the RFP, including all requirements and contract terms and conditions thereof, and if its Proposal is accepted, the Proposer shall accept the contract documents thereto, unless substantive changes are made in same without the approval of the Proposer.
7. Proposer, if an individual, is of lawful age; is the only one interested in this Proposal; and no person, firm, or corporation, other than that named, has any interest in the Proposal, or in the proposed contract.
8. Proposer has quality experience providing the types of services and duties as described within the Scope of Work of this RFP.

Proposer shall also certify Proposer's state of residence.

Nondiscrimination

By the act of submitting a Proposal in response to this RFP, the Proposer certifies, under penalty of perjury, that ***the Proposer has not discriminated, and will not discriminate, against minorities, women, emerging small business enterprises, or business enterprises that are owned or controlled by or that employ a disabled veteran in obtaining any required subcontracts***.

Competition

Prospective Proposers are encouraged to comment, either with their Proposals or at any other time, in writing, on any specification or requirement within this RFP which the Proposer believes will inordinately limit competition.

RFP Protests and Change Requests

A prospective Proposer may protest anything contained in the RFP documents and request a supporting change to any provision, specification, or contract term contained in the RFP documents by submitting a written request to:

City of Wilsonville
Attn: Mike Nacrelli, PE
29799 SW Town Center Loop East
Wilsonville, OR 97070

OR

mnacrelli@ci.wilsonville.or.us

All change requests shall include "WWTP Backup UV System Replacement – RFP Protest" in the subject line or written on the front of the envelope and be submitted, in writing, by **5:00 p.m., Pacific Time, on Friday, September 13, 2024**. Each protest and request for change must specify the provisions, specifications, or contract terms of the RFP in question and contain reasons for the requested change and any proposed changes.

The City will evaluate and resolve all protests and related change requests submitted before the listed time and date due within a reasonable time following receipt of the protest. The City will

issue a written decision on the protest to the Proposer who submitted the protest. Changes that are accepted by the City shall be issued in the form of an addendum to the RFP.

Proposal Liability

Proposers responding to this RFP do so solely at their expense, and the City is not responsible for any Proposer expenses associated with the RFP. By proposing, Proposers agree that doing so is at their own risk and the City shall have no liability related thereto. Finalists invited to participate in interview evaluations are responsible for scheduling and paying for their own travel arrangements. The City is not liable for any cost incurred by a Proposer in protesting any portion of the RFP documents or the City's selection decision.

City Requests for Clarification, Additional Research, and Revisions

The City reserves the right to obtain clarification of any portion of a Proposal or to obtain additional information necessary to properly evaluate a particular Proposal. Failure of a Proposer to timely respond to such a request for additional information or clarification may result in a finding that the Proposer is non-responsive and consequent rejection of the Proposal.

The City may obtain information from any legal source for clarification of any Proposal. The City need not inform the Proposer of any intent to perform additional research in this respect or of any information thereby received.

The City may perform, at its sole option, investigations of any Proposer. Information may include, but shall not necessarily be limited to, current litigation and contracting references. All such documents, if requested by the City, become part of the public record and may be disclosed accordingly.

The City reserves the right to request revisions of any Proposal after the date and time due and before award for the purpose of obtaining best and final offers.

Rejection of Proposals

The City reserves the right to reject any or all irregularities or omissions in Proposals submitted in response to this RFP to the extent it is determined to be in the best interest of the City to do so. Furthermore, the City reserves the right to reject any or all Proposals or portions thereof submitted in response to this RFP. Proposals may be rejected for one or more of the following reasons, including but not limited to:

1. Failure of the Proposer to adhere to one or more of the provisions established in the RFP.
2. Failure of the Proposer to submit a Proposal in the format specified herein.
3. Failure of the Proposer to submit a Proposal within the time requirements established herein.
4. Failure of the Proposer to adhere to ethical and professional standards before, during, or following the Proposal process.
5. Failure to provide information that is specifically requested in this RFP.

The City may reject any Proposal not in compliance with all prescribed public procurement procedures and requirements, and may reject for good cause any or all Proposals upon a finding by the City that it is in the public interest to do so.

Modification or Withdrawal of Proposal by Proposer

A Proposal may not be modified, withdrawn, or canceled by the Proposer following the time and date the Proposals are due. Proposals submitted early may be modified or withdrawn only by notice to the City, at the Proposal submittal location, prior to the time and date the Proposals are due. Such notice shall be submitted to the Project Manager, in writing, executed and signed by a duly authorized representative of the firm/individual submitting the Proposal. All such communication shall be so worded as not to reveal the contents of the original Proposal.

Withdrawn Proposals may be resubmitted prior to the time and date the Proposals are due, provided that they are then fully in conformance with the RFP.

Duration of Proposal

Proposal prices, terms, and conditions shall be firm for a period of at least ninety (90) days from the time and date Proposals are due. Proposals shall not be subject to future price escalation or changes of terms during the ninety (90) day period.

Local and Federal Requirements

The City of Wilsonville intends to select a consultant in accordance with OAR 137-048-0220 and the City's municipal code. Selection of a consultant under this process is not a guarantee of a contract award, nor is the award of a contract for any portion of the Work a guarantee of award of a contract for any subsequent work. All work is subject to budgetary and funding constraints of the City of Wilsonville.

The selected consultant shall comply with all federal, state, and local laws, regulations, executive orders, and ordinances applicable to the work under this contract, including, without limitation, the provisions of: (i) Title VI of the Civil Rights Act of 1964; (ii) Section V of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1990 and ORS 659.425; (iv) all regulations and administrative rules established pursuant to the foregoing laws; and (v) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules, and regulations.

The selected consultant is subject to the Oregon Workers Compensation Law and shall comply with ORS 656.017, which requires the provision of Workers Compensation coverage for all employees working under this contract. The City of Wilsonville's programs, services, employment opportunities, and volunteer positions are open to all persons without regard to race, religion, color, national origin, sex, sexual orientation, gender identity, age, marital status, disability, or political affiliation.

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Attachment A

Sample Professional Services Agreement

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Contract No. 252880
CIP No. 2109

CITY OF WILSONVILLE
PROFESSIONAL SERVICES AGREEMENT

This Professional Services Agreement ("Agreement") for the WWTP Backup UV System Replacement Project ("Project") is made and entered into on this _____ day of _____ 2024 ("Effective Date") by and between the **City of Wilsonville**, a municipal corporation of the State of Oregon (hereinafter referred to as the "City"), and _____, a(n) _____ *[corporation/LLC]* (hereinafter referred to as "Consultant").

RECITALS

WHEREAS, the City requires services which Consultant is capable of providing, under terms and conditions hereinafter described; and

WHEREAS, Consultant represents that Consultant is qualified to perform the services described herein on the basis of specialized experience and technical expertise; and

WHEREAS, Consultant is prepared to provide such services as the City does hereinafter require.

NOW, THEREFORE, in consideration of these mutual promises and the terms and conditions set forth herein, the parties agree as follows:

AGREEMENT

Section 1. Scope of Work

Consultant shall diligently perform the design services according to the requirements and deliverable dates identified in the Scope of Work for the Project, attached hereto as **Exhibit A** and incorporated by reference herein (the "Services").

Section 2. Term

The term of this Agreement shall be from the Effective Date until all Services required to be performed hereunder are completed and accepted, or no later than June 30, 2027, whichever occurs first, unless earlier terminated in accordance herewith or an extension of time is agreed to, in writing, by the City.

Section 3. Consultant's Services

3.1. All written documents, drawings, and plans submitted by Consultant in conjunction with the Services shall bear the signature, stamp, or initials of Consultant's authorized Project Manager. Any documents submitted by Consultant that do not bear the signature, stamp, or initials of Consultant's authorized Project Manager, will not be relied upon by the City. Interpretation of plans and answers to questions regarding the Services or Scope of Work given by Consultant's Project Manager may be verbal

or in writing, and may be relied upon by the City, whether given verbally or in writing. If requested by the City to be in writing, Consultant's Project Manager will provide such written documentation.

3.2. Consultant will not be deemed to be in default by reason of delays in performance due to circumstances beyond Consultant's reasonable control, including but not limited to strikes, lockouts, severe acts of nature, or other unavoidable delays or acts of third parties not under Consultant's direction and control ("Force Majeure"). In the case of the happening of any Force Majeure event, the time for completion of the Services will be extended accordingly and proportionately by the City, in writing, but the City will not be responsible for any additional costs as a result of the Force Majeure event. Lack of labor, supplies, materials, or the cost of any of the foregoing shall not be deemed a Force Majeure event.

3.3. The existence of this Agreement between the City and Consultant shall not be construed as the City's promise or assurance that Consultant will be retained for future services beyond the Scope of Work described herein.

3.4. Consultant shall maintain the confidentiality of any confidential information that is exempt from disclosure under state or federal law to which Consultant may have access by reason of this Agreement. Consultant warrants that Consultant's employees assigned to the Services provided in this Agreement shall be clearly instructed to maintain this confidentiality. All agreements with respect to confidentiality shall survive the termination or expiration of this Agreement.

Section 4. Compensation

4.1. Except as otherwise set forth in this **Section 4**, the City agrees to pay Consultant on a time and materials basis, guaranteed not to exceed _____ DOLLARS for performance of the Services ("Compensation Amount"). Any compensation in excess of the Compensation Amount will require an express written Addendum to be executed between the City and Consultant. Consultant's Rate Schedule is set forth in **Exhibit B**, attached hereto and incorporated by reference herein.

4.2. During the course of Consultant's performance, if the City, through its Project Manager, specifically requests Consultant to provide additional services that are beyond the Scope of Work described on **Exhibit A**, Consultant shall provide such additional services and bill the City at the hourly rates outlined on Consultant's Rate Schedule, as set forth in **Exhibit B**. Any additional services beyond the Scope of Work, or any compensation above the amount shown in **Subsection 4.1**, requires a written Addendum executed in compliance with the provisions of **Section 17**.

4.3. Except for amounts withheld by the City pursuant to this Agreement, Consultant will be paid for Services for which an itemized invoice is received by the City within thirty (30) days of receipt, unless the City disputes such invoice. In that instance, the undisputed portion of the invoice will be paid by the City within the above timeframe. The City will set forth its reasons for the disputed claim amount and make good faith efforts to resolve the invoice dispute with Consultant as promptly as is reasonably possible.

4.4. The City will be responsible for the direct payment of required fees payable to governmental agencies, including but not limited to plan checking, land use, zoning, permitting, and all other similar fees resulting from this Project, that are not specifically covered by **Exhibit A**.

4.5. Consultant's Compensation Amount and Rate Schedule are all-inclusive and include, but are not limited to, all work-related costs, expenses, salaries or wages, plus fringe benefits and contributions, including payroll taxes, workers compensation insurance, liability insurance, profit, pension benefits and similar contributions and benefits, technology and/or software charges, licensing, trademark, and/or copyright costs, office expenses, travel expenses, mileage, and all other indirect and overhead charges, including, but not limited to, the Oregon Corporate Activity Tax (CAT).

Section 5. City's Rights and Responsibilities

5.1. The City will designate a Project Manager to facilitate day-to-day communication between Consultant and the City, including timely receipt and processing of invoices, requests for information, and general coordination of City staff to support the Project.

5.2. Award of this contract is subject to budget appropriation. Funds are approved for Fiscal Year 2024-25. If not completed within this fiscal year, funds may not be appropriated for the next fiscal year. The City also reserves the right to terminate this contract early, as described in **Section 15**.

Section 6. City's Project Manager

The City's Project Manager is Mike Nacrelli. The City shall give Consultant prompt written notice of any re-designation of its Project Manager.

Section 7. Consultant's Project Manager

Consultant's Project Manager is _____. In the event that Consultant's designated Project Manager is changed, Consultant shall give the City prompt written notification of such re-designation. Recognizing the need for consistency and knowledge in the administration of the Project, Consultant's Project Manager will not be changed without the written consent of the City, which consent shall not be unreasonably withheld. In the event the City receives any communication from Consultant that is not from Consultant's designated Project Manager, the City may request verification by Consultant's Project Manager, which verification must be promptly furnished.

Section 8. Project Information

Except for confidential information designated by the City as information not to be shared, Consultant agrees to share Project information with, and to fully cooperate with, those corporations, firms, contractors, public utilities, governmental entities, and persons involved in or associated with the Project. No information, news, or press releases related to the Project, whether made to representatives of newspapers, magazines, or television and radio stations, shall be made without the written authorization of the City's Project Manager.

Section 9. Duty to Inform

If at any time during the performance of this Agreement or any future phase of this Agreement for which Consultant has been retained, Consultant becomes aware of actual or potential problems, faults, or defects in the Project or Scope of Work, or any portion thereof; or of any nonconformance with federal, state, or local laws, rules, or regulations; or if Consultant has any objection to any decision or order made by the City with respect to such laws, rules, or regulations, Consultant shall give prompt written notice thereof to the City's Project Manager. Any delay or failure on the part of the City to provide a written

response to Consultant shall neither constitute agreement with nor acquiescence to Consultant's statement or claim, nor constitute a waiver of any of the City's rights.

Section 10. Subcontractors and Assignments

10.1. Unless expressly authorized in **Exhibit A** or **Section 11** of this Agreement, Consultant shall not subcontract with others for any of the Services prescribed herein. Consultant shall not assign any of Consultant's rights acquired hereunder without obtaining prior written approval from the City, which approval may be granted or denied in the City's sole discretion. Some Services may be performed by persons other than Consultant, provided Consultant advises the City of the names of such subcontractors and the work which they intend to perform, and the City specifically agrees in writing to such subcontracting. Consultant acknowledges such work will be provided to the City pursuant to a subcontract(s) between Consultant and subcontractor(s) and no privity of contract exists between the City and the subcontractor(s). Unless otherwise specifically provided by this Agreement, the City incurs no liability to third persons for payment of any compensation provided herein to Consultant. Any attempted assignment of this Agreement without the written consent of the City shall be void. Except as otherwise specifically agreed, all costs for work performed by others on behalf of Consultant shall not be subject to additional reimbursement by the City.

10.2. The City shall have the right to enter into other agreements for the Project, to be coordinated with this Agreement. Consultant shall cooperate with the City and other firms, engineers or subcontractors on the Project so that all portions of the Project may be completed in the least possible time and within normal working hours. Consultant shall furnish other engineers, subcontractors and affected public utilities, whose designs are fitted into Consultant's design, detail drawings giving full information so that conflicts can be avoided.

10.3. Consultant shall include this Agreement by reference in any subcontract and require subcontractors to perform in strict compliance with this Agreement.

Section 11. Consultant Is Independent Contractor

11.1. Consultant is an independent contractor for all purposes and shall be entitled to no compensation other than the Compensation Amount provided for under **Section 4** of this Agreement. Consultant will be solely responsible for determining the manner and means of accomplishing the end result of Consultant's Services. The City does not have the right to control or interfere with the manner or method of accomplishing said Services. The City, however, will have the right to specify and control the results of Consultant's Services so such Services meet the requirements of the Project.

11.2. Consultant may request that some consulting services be performed on the Project by persons or firms other than Consultant, through a subcontract with Consultant. Consultant acknowledges that if such services are provided to the City pursuant to a subcontract(s) between Consultant and those who provide such services, Consultant may not utilize any subcontractor(s), or in any way assign its responsibility under this Agreement, without first obtaining the express written consent of the City, which consent may be given or denied in the City's sole discretion. For all Services performed under subcontract to Consultant, as approved by the City, Consultant shall only charge the compensation rates shown on the approved Rate Schedule (**Exhibit B**). Rate schedules for named or unnamed subcontractors, and Consultant markups of subcontractor billings, will only be recognized by the City as set forth in Consultant's Rate Schedule, unless documented and approved, in writing, by the City

pursuant to a modification to Consultant's Rate Schedule, per **Section 17** of this Agreement. In all cases, processing and payment of billings from subcontractors is solely the responsibility of Consultant.

11.3. Consultant shall be responsible for, and defend, indemnify, and hold the City harmless against, any liability, cost, or damage arising out of Consultant's use of such subcontractor(s) and subcontractor's negligent acts, errors, or omissions. Unless otherwise agreed to, in writing, by the City, Consultant shall require that all of Consultant's subcontractors also comply with and be subject to the provisions of this **Section 11** and meet the same insurance requirements of Consultant under this Agreement.

Section 12. Consultant Responsibilities

12.1. Consultant must make prompt payment for any claims for labor, materials, or services furnished to Consultant by any person in connection with this Agreement as such claims become due. Consultant shall not permit any liens or claims to be filed or prosecuted against the City on account of any labor or material furnished to or on behalf of Consultant. If Consultant fails, neglects, or refuses to make prompt payment of any such claim, the City may, but shall not be obligated to, pay such claim to the person furnishing the labor, materials, or services and offset the amount of the payment against funds due or to become due to Consultant under this Agreement. The City may also recover any such amounts directly from Consultant.

12.2. Consultant must comply with all applicable Oregon and federal wage and hour laws, including BOLI wage requirements, if applicable. Consultant shall make all required workers compensation and medical care payments on time. Consultant shall be fully responsible for payment of all employee withholdings required by law, including but not limited to taxes, including payroll, income, Social Security (FICA), and Medicaid. Consultant shall also be fully responsible for payment of salaries, benefits, taxes, Industrial Accident Fund contributions, and all other charges on account of any employees. Consultant shall pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167. All costs incident to the hiring of assistants or employees shall be Consultant's responsibility. Consultant shall defend, indemnify, and hold the City harmless from claims for payment of all such expenses.

12.3. No person shall be discriminated against by Consultant or any subcontractor in the performance of this Agreement on the basis of sex, gender, race, color, creed, religion, marital status, age, disability, sexual orientation, gender identity, or national origin. Any violation of this provision shall be grounds for cancellation, termination, or suspension of the Agreement, in whole or in part, by the City. References to "subcontractor" mean a subcontractor at any tier.

Section 13. Indemnity

13.1. Indemnification. Consultant acknowledges responsibility for liability arising out of the performance of this Agreement, and shall defend, indemnify, and hold the City harmless from any and all liability, settlements, loss, costs, and expenses in connection with any action, suit, or claim resulting or allegedly resulting from Consultant's negligent acts, omissions, errors, or willful or reckless misconduct pursuant to this Agreement, or from Consultant's failure to perform its responsibilities as set forth in this Agreement. The review, approval, or acceptance by the City, its Project Manager, or any City employee of documents or other work performed, prepared, or submitted by Consultant shall not be considered a negligent act, error, omission, or willful misconduct on the part of the City, and none of the foregoing shall relieve Consultant of its responsibility to perform in full conformity with the City's

requirements, as set forth in this Agreement, and to indemnify the City as provided above and to reimburse the City for any and all costs and damages suffered by the City as a result of Consultant's negligent performance of this Agreement, failure of performance hereunder, violation of state or federal laws, or failure to adhere to the standards of performance and care described in **Subsection 13.2**. For those claims based on professional liability (as opposed to general liability or automobile liability), Consultant shall not be required to provide the City's defense but will be required to reimburse the City for the City's defense costs incurred in any litigation resulting from the negligent acts, omissions, errors, or willful or reckless misconduct by Consultant.

13.2. Standard of Care. In the performance of the Services, Consultant agrees to use at least that degree of care and skill exercised under similar circumstances by reputable members of Consultant's profession practicing in the Portland metropolitan area. Consultant will re-perform any Services not meeting this standard without additional compensation. Consultant's re-performance of any Services, even if done at the City's request, shall not be considered as a limitation or waiver by the City of any other remedies or claims it may have arising out of Consultant's failure to perform in accordance with the applicable standard of care of this Agreement and within the prescribed timeframe.

Section 14. Insurance

14.1. Insurance Requirements. Consultant must maintain insurance coverage acceptable to the City in full force and effect throughout the term of this Agreement. Such insurance shall cover all risks arising directly or indirectly out of Consultant's activities or work hereunder. Any and all agents or subcontractors with which Consultant contracts for any portion of the Services must have insurance that conforms to the insurance requirements in this Agreement. Additionally, if a subcontractor is an engineer, architect, or other professional, Consultant must require the subcontractor to carry Professional Errors and Omissions insurance and must provide to the City proof of such coverage. The amount of insurance carried is in no way a limitation on Consultant's liability hereunder. The policy or policies maintained by Consultant shall provide at least the following minimum limits and coverages at all times during performance of this Agreement:

14.1.1. Commercial General Liability Insurance. Consultant and all subcontractors shall obtain, at each of their own expense, and keep in effect during the term of this Agreement, comprehensive Commercial General Liability Insurance covering Bodily Injury and Property Damage, written on an "occurrence" form policy. This coverage shall include broad form Contractual Liability insurance for the indemnities provided under this Agreement and shall be for the following minimum insurance coverage amounts: The coverage shall be in the amount of **$2,000,000** for each occurrence and **$3,000,000** general aggregate and shall include Products-Completed Operations Aggregate in the minimum amount of **$2,000,000** per occurrence, Fire Damage (any one fire) in the minimum amount of **$50,000**, and Medical Expense (any one person) in the minimum amount of **$10,000**. All of the foregoing coverages must be carried and maintained at all times during this Agreement.

14.1.2. Professional Errors and Omissions Coverage. Consultant agrees to carry Professional Errors and Omissions Liability insurance on a policy form appropriate to the professionals providing the work hereunder with a limit of no less than **$2,000,000** per claim. Consultant shall maintain this insurance for damages alleged to be as a result of errors, omissions, or negligent acts of Consultant. Such policy shall have a retroactive date effective before the commencement of any work by Consultant on the Services covered by this Agreement, and

coverage will remain in force for a period of at least three (3) years after termination of this Agreement.

14.1.3. Business Automobile Liability Insurance. If Consultant or any subcontractors will be using a motor vehicle in the performance of the Services herein, Consultant shall provide the City a certificate indicating that Consultant and its subcontractors have business automobile liability coverage for all owned, hired, and non-owned vehicles. The Combined Single Limit per occurrence shall not be less than **$2,000,000**.

14.1.4. Workers Compensation Insurance. Consultant, its subcontractors, and all employers providing work, labor, or materials under this Agreement that are subject employers under the Oregon Workers Compensation Law shall comply with ORS 656.017, which requires them to provide workers compensation coverage that satisfies Oregon law for all their subject workers under ORS 656.126. Out-of-state employers must provide Oregon workers compensation coverage for their workers who work at a single location within Oregon for more than thirty (30) days in a calendar year. Consultants who perform work without the assistance or labor of any employee need not obtain such coverage. This shall include Employer's Liability Insurance with coverage limits of not less than **$500,000** each accident.

14.1.5. Insurance Carrier Rating. Coverages provided by Consultant and its subcontractors must be underwritten by an insurance company deemed acceptable by the City, with an AM Best Rating of A or better. The City reserves the right to reject all or any insurance carrier(s) with a financial rating that is unacceptable to the City.

14.1.6. Additional Insured and Termination Endorsements. The City will be named as an additional insured with respect to Consultant's liabilities hereunder in insurance coverages. Additional Insured coverage under Consultant's Commercial General Liability, Automobile Liability, and Excess Liability Policies, as applicable, will be provided by endorsement. Additional insured coverage shall be for both ongoing operations via ISO Form CG 2010 or its equivalent, and products and completed operations via ISO Form CG 2037 or its equivalent. Coverage shall be Primary and Non-Contributory. Waiver of Subrogation endorsement via ISO Form CG 2404 or its equivalent shall be provided. The following is included as additional insured: "The City of Wilsonville, its elected and appointed officials, officers, agents, employees, and volunteers." An endorsement shall also be provided requiring the insurance carrier to give the City at least thirty (30) days' written notification of any termination or major modification of the insurance policies required hereunder. Consultant must be an additional insured on the insurance policies obtained by its subcontractors performing any of the Services contemplated under this Agreement.

14.1.7. Certificates of Insurance. As evidence of the insurance coverage required by this Agreement, Consultant shall furnish a Certificate of Insurance to the City. This Agreement shall not be effective until the required certificates and the Additional Insured Endorsements have been received and approved by the City. Consultant agrees that it will not terminate or change its coverage during the term of this Agreement without giving the City at least thirty (30) days' prior advance notice and Consultant will obtain an endorsement from its insurance carrier, in favor of the City, requiring the carrier to notify the City of any termination or change in insurance coverage, as provided above.

14.2. Primary Coverage. The coverage provided by these policies shall be primary, and any other insurance carried by the City is excess. Consultant shall be responsible for any deductible amounts payable under all policies of insurance. If insurance policies are "Claims Made" policies, Consultant will be required to maintain such policies in full force and effect throughout any warranty period.

Section 15. Early Termination; Default

15.1. This Agreement may be terminated prior to the expiration of the agreed upon terms:

15.1.1. By mutual written consent of the parties;

15.1.2. By the City, for any reason, and within its sole discretion, effective upon delivery of written notice to Consultant by mail or in person; or

15.1.3. By Consultant, effective upon seven (7) days' prior written notice in the event of substantial failure by the City to perform in accordance with the terms through no fault of Consultant, where such default is not cured within the seven (7) day period by the City. Withholding of disputed payment is not a default by the City.

15.2. If the City terminates this Agreement, in whole or in part, due to default or failure of Consultant to perform Services in accordance with the Agreement, the City may procure, upon reasonable terms and in a reasonable manner, services similar to those so terminated. In addition to any other remedies the City may have, both at law and in equity, for breach of contract, Consultant shall be liable for all costs and damages incurred by the City as a result of the default by Consultant, including, but not limited to all costs incurred by the City in procuring services from others as needed to complete this Agreement. This Agreement shall be in full force to the extent not terminated by written notice from the City to Consultant. In the event of a default, the City will provide Consultant with written notice of the default and a period of ten (10) days to cure the default. If Consultant notifies the City that it wishes to cure the default but cannot, in good faith, do so within the ten (10) day cure period provided, then the City may elect, in its sole discretion, to extend the cure period to an agreed upon time period, which agreed upon extension must be in writing and signed by the parties prior to the expiration of the cure period. Unless a written, signed extension has been fully executed by the parties, if Consultant fails to cure prior to expiration of the cure period, the Agreement is automatically terminated.

15.3. If the City terminates this Agreement for its own convenience not due to any default by Consultant, payment of Consultant shall be prorated to, and include the day of, termination and shall be in full satisfaction of all claims by Consultant against the City under this Agreement.

15.4. Termination under any provision of this Section shall not affect any right, obligation, or liability of Consultant or the City that accrued prior to such termination. Consultant shall surrender to the City items of work or portions thereof, referred to in **Section 19**, for which Consultant has received payment or the City has made payment.

Section 16. Suspension of Services

The City may suspend, delay, or interrupt all or any part of the Services for such time as the City deems appropriate for its own convenience by giving written notice thereof to Consultant. An adjustment in the time of performance or method of compensation shall be allowed as a result of such delay or suspension unless the reason for the delay is within Consultant's control. The City shall not be

responsible for Services performed by any subcontractors after notice of suspension is given by the City to Consultant. Should the City suspend, delay, or interrupt the Services and the suspension is not within Consultant's control, then the City shall extend the time of completion by the length of the delay.

Section 17. Modification/Addendum

Any modification of the provisions of this Agreement shall not be enforceable unless reduced to writing and signed by both the City and Consultant. A modification is a written document, contemporaneously executed by the City and Consultant, which increases or decreases the cost to the City over the agreed Compensation Amount in **Section 4** of this Agreement, or changes or modifies the Scope of Work or the time for performance. No modification shall be binding or effective until executed, in writing, by both Consultant and the City. In the event Consultant receives any communication of whatsoever nature from the City, which communication Consultant contends gives rise to any modification of this Agreement, Consultant shall, within five (5) days after receipt, make a written request for modification to the City's Project Manager in the form of an Addendum. Consultant's failure to submit such written request for modification in the form of an Addendum shall be the basis for refusal by the City to treat said communication as a basis for modification or to allow such modification. In connection with any modification to this Agreement affecting any change in price, Consultant shall submit a complete breakdown of labor, material, equipment, and other costs. If Consultant incurs additional costs or devotes additional time on Project tasks, the City shall be responsible for payment of only those additional costs for which it has agreed to pay under a signed Addendum. To be enforceable, the Addendum must describe with particularity the nature of the change, any delay in time the Addendum will cause, or any increase or decrease in the Compensation Amount. The Addendum must be signed and dated by both Consultant and the City before the Addendum may be implemented.

Section 18. Access to Records

The City shall have access, upon request, to such books, documents, receipts, papers, and records of Consultant as are directly pertinent to this Agreement for the purpose of making audit, examination, excerpts, and transcripts during the term of this Agreement and for a period of four (4) years after termination of the Agreement, unless the City specifically requests an extension. This clause shall survive the expiration, completion, or termination of this Agreement.

Section 19. As-Builts/Property of the City

Consultant must provide redlined as-builts prior to Final Acceptance. As-builts should be provided in electronic format. All documents, reports, and research gathered or prepared by Consultant under this Agreement, including but not limited to spreadsheets, charts, graphs, drawings, tracings, maps, surveying records, mylars, modeling, data generation, papers, diaries, inspection reports, photographs, and any originals or certified copies of the original work forms, if any, shall be the exclusive property of the City and shall be delivered to the City prior to final payment. Any statutory or common law rights to such property held by Consultant as creator of such work shall be conveyed to the City upon request without additional compensation.

Section 20. Notices

Any notice required or permitted under this Agreement shall be in writing and shall be given when actually delivered in person or forty-eight (48) hours after having been deposited in the United States

mail as certified or registered mail, addressed to the addresses set forth below, or to such other address as one party may indicate by written notice to the other party.

To City: City of Wilsonville
Attn: Mike Nacrelli, Senior Civil Engineer
29799 SW Town Center Loop East
Wilsonville, OR 97070

To Consultant: _____
Attn: _____
_____
_____

Section 21. Miscellaneous Provisions

21.1. Integration. This Agreement, including all exhibits attached hereto, contains the entire and integrated agreement between the parties and supersedes all prior written or oral discussions, representations, or agreements. In case of conflict among these or any other documents, the provisions of this Agreement shall control, and the terms most favorable to the City, within the City's sole discretion, will apply.

21.2. Legal Effect and Assignment. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, personal representatives, successors, and assigns. This Agreement may be enforced by an action at law or in equity.

21.3. No Assignment. Consultant may not assign this Agreement, nor delegate the performance of any obligations hereunder, unless agreed to in advance and in writing by the City.

21.4. Adherence to Law. In the performance of this Agreement, Consultant shall adhere to all applicable federal, state, and local laws (including the Wilsonville Code and Public Works Standards), including but not limited to laws, rules, regulations, and policies concerning employer and employee relationships, workers compensation, and minimum and prevailing wage requirements. Any certificates, licenses, or permits that Consultant is required by law to obtain or maintain in order to perform the Services described on **Exhibit A**, shall be obtained and maintained throughout the term of this Agreement.

21.5. Governing Law. This Agreement shall be construed in accordance with and governed by the laws of the State of Oregon, regardless of any conflicts of laws. All contractual provisions required by ORS Chapters 279A, 279B, 279C, and related Oregon Administrative Rules to be included in public agreements are hereby incorporated by reference and shall become a part of this Agreement as if fully set forth herein.

21.6. Jurisdiction. Jurisdiction and venue for any dispute will be in Clackamas County Circuit Court.

21.7. Legal Action/Attorney Fees. If a suit, action, or other proceeding of any nature whatsoever (including any proceeding under the U.S. Bankruptcy Code) is instituted in connection with any controversy arising out of this Agreement or to interpret or enforce any rights or obligations hereunder, the prevailing party shall be entitled to recover attorney, paralegal, accountant, and other

expert fees and all other fees, costs, and expenses actually incurred and reasonably necessary in connection therewith, as determined by the court or body at trial or on any appeal or review, in addition to all other amounts provided by law. If the City is required to seek legal assistance to enforce any term of this Agreement, such fees shall include all of the above fees, whether or not a proceeding is initiated. Payment of all such fees shall also apply to any administrative proceeding, trial, and/or any appeal or petition for review.

21.8. Nonwaiver. Failure by either party at any time to require performance by the other party of any of the provisions of this Agreement shall in no way affect the party's rights hereunder to enforce the same, nor shall any waiver by the party of the breach hereof be held to be a waiver of any succeeding breach or a waiver of this nonwaiver clause.

21.9. Severability. If any provision of this Agreement is found to be void or unenforceable to any extent, it is the intent of the parties that the rest of the Agreement shall remain in full force and effect, to the greatest extent allowed by law.

21.10. Modification. This Agreement may not be modified except by written instrument executed by Consultant and the City.

21.11. Time of the Essence. Time is expressly made of the essence in the performance of this Agreement.

21.12. Calculation of Time. Except where the reference is to business days, all periods of time referred to herein shall include Saturdays, Sundays, and legal holidays in the State of Oregon, except that if the last day of any period falls on any Saturday, Sunday, or legal holiday observed by the City, the period shall be extended to include the next day which is not a Saturday, Sunday, or legal holiday. Where the reference is to business days, periods of time referred to herein shall exclude Saturdays, Sundays, and legal holidays observed by the City. Whenever a time period is set forth in days in this Agreement, the first day from which the designated period of time begins to run shall not be included.

21.13. Headings. Any titles of the sections of this Agreement are inserted for convenience of reference only and shall be disregarded in construing or interpreting any of its provisions.

21.14. Number, Gender and Captions. In construing this Agreement, it is understood that, if the context so requires, the singular pronoun shall be taken to mean and include the plural, the masculine, the feminine and the neuter, and that, generally, all grammatical changes shall be made, assumed, and implied to individuals and/or corporations and partnerships. All captions and paragraph headings used herein are intended solely for convenience of reference and shall in no way limit any of the provisions of this Agreement.

21.15. Good Faith and Reasonableness. The parties intend that the obligations of good faith and fair dealing apply to this Agreement generally and that no negative inferences be drawn by the absence of an explicit obligation to be reasonable in any portion of this Agreement. The obligation to be reasonable shall only be negated if arbitrariness is clearly and explicitly permitted as to the specific item in question, such as in the case of where this Agreement gives the City "sole discretion," or the City is allowed to make a decision in its "sole judgment."

21.16. Other Necessary Acts. Each party shall execute and deliver to the other all such further instruments and documents as may be reasonably necessary to carry out this Agreement in order to

provide and secure to the other parties the full and complete enjoyment of rights and privileges hereunder.

21.17. Interpretation. As a further condition of this Agreement, the City and Consultant acknowledge that this Agreement shall be deemed and construed to have been prepared mutually by each party and it shall be expressly agreed that any uncertainty or ambiguity existing therein shall not be construed against any party. In the event that any party shall take an action, whether judicial or otherwise, to enforce or interpret any of the terms of the Agreement, the prevailing party shall be entitled to recover from the other party all expenses which it may reasonably incur in taking such action, including attorney fees and costs, whether incurred in a court of law or otherwise.

21.18. Entire Agreement. This Agreement and all documents attached to this Agreement represent the entire agreement between the parties.

21.19. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall constitute an original Agreement but all of which together shall constitute one and the same instrument.

21.20. Authority. Each party signing on behalf of Consultant and the City hereby warrants actual authority to bind their respective party.

The Consultant and the City hereby agree to all provisions of this Agreement.

CONSULTANT:

_____

By:_____

Print Name:_____

As Its:_____

EIN/Tax I.D. No. _____

CITY:

CITY OF WILSONVILLE

By:_____

Print Name:_____

As Its:_____

APPROVED AS TO FORM:

_____
Stephanie Davidson, Assistant City Attorney
City of Wilsonville, Oregon

#252880
k:\dir\wwtp\uv system\doc\psa wwtp backup uv system replacement-bid (ne3).docx

Attachment B

Preliminary Design Report

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Technical Memorandum

6500 SW Macadam Avenue, Suite 200
Portland, OR 97239

T: 503.244.7005

Prepared for: City of Wilsonville, Oregon

Project Title: WWTP Backup UV System Replacement Predesign

Project No.: 195468

Technical Memorandum

Subject: Preliminary Design Report

Date: August 23, 2024

To: Mike Nacrelli, Plant Manager, City of Wilsonville

Nathan Dryden, Operations Manager, City of Wilsonville

From: Tim Mills, Project Manager, Brown and Caldwell

REGISTERED PROFESSIONAL ENGINEER
25387
TMills@BrwnCald.com
Digitally signed by TMills@BrwnCald.com
DN: CN=TMills@BrwnCald.com
Date: 2024.08.23 16:21:21-07'00'
November 12, 2008
TIMOTHY A. MILLS
EXPIRES: 12/31/2024

Prepared by: Adam Festger, UV Process Specialist

Reviewed by: Erin Mackey, PhD*

**Professionally registered elsewhere.*

Limitations:

This document was prepared solely for the City of Wilsonville in accordance with professional standards at the time the services were performed and in accordance with the contract between the City and Brown and Caldwell dated January 29, 2024 This document is governed by the specific scope of work authorized by the City of Wilsonville; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by City of Wilsonville and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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Section 1: Project Background

The City of Wilsonville (City) Wastewater Treatment Plant (WWTP or plant) treats wastewater with a conventional process, disk filtration, and ultraviolet (UV) light disinfection. Treated water exits the plant and flows to the Willamette River.

As part of a secondary treatment process upgrade constructed in the early 1990s, a TrojanUV4000 disinfection system was installed. In 2014, a second UV channel was added. This new channel contains a Veolia (then Ozonia) Aquaray 3X HO vertical-lamp UV system (Aquaray system). This unit currently operates as the primary disinfection system.

In 2022, Trojan informed the City that the TrojanUV4000 system would no longer be supported. Further, plant staff reports that the system does not currently operate due to a malfunction associated with the human-machine interface (HMI). Given the lack of replacement parts and high costs associated with maintenance-related to the ending of support-the City has not attempted to repair the system. The City plans to replace the TrojanUV4000 with a new UV disinfection system, which is the subject of this preliminary design report.

The City has received a National Pollutant Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality dated August 2020, that includes limits for Escherichia coli (*E. coli*). NPDES permit limits are shown in Table 1-1.

Table 1-1. *E. coli* NPDES Permit Limits

Description	Value
E. coli–Monthly Geometric Mean	126 colony forming units per 100 milliliters (cfu/100 mL)
E. coli-Maximum Single Sample	406 cfu/100 mL

The City is required to sample effluent twice per week. These requirements are consistent for the discharge of Class D quality effluent to the Willamette River. No chlorine is permitted in discharged water, and disinfection is accomplished using UV light.

Section 2: Existing TrojanUV4000 System

The existing TrojanUV4000 UV disinfection system is located on the southeast corner of the Wilsonville WWTP. Immediately adjacent to the TrojanUV4000 channel is the Ozonia/Veolia Aquaray system. The UV systems are downstream of secondary clarification and filtration and immediately precede the outfall.

The TrojanUV4000 system, shown on Figure 2-1, was installed in 1993. The channel is designated as Channel 1 as it was the original UV system on site. The system consists of two banks in the same channel, in series, and it currently operates as the plant's standby UV system. The water level in channel 1 is controlled by a downstream, motorized weir gate. It is 48 inches wide upstream and downstream of the TrojanUV4000, and then narrows to 40 inches around the UV system itself, as shown in Table 2-1. The dimensions of the TrojanUV4000 design, and given that the reactor itself is grouted into the channel, means that extensive demolition will be required to remove the existing system and condition the channel to receive the replacement system. In other words, the existing UV channel was designed to the requirements of the TrojanUV4000, and modifications to the UV channel will be required to install a new UV disinfection system.

Figure 2-1. Existing TrojanUV4000 system

Table 2-1. Existing Channel 1 Dimensions	
Description	**Value**
Operating floor elevation [a]	96.36 feet (ft)
Available channel length	~56 ft (from inlet to effluent structures)
Channel width	48 inches upstream and downstream of the UV system, 40 inches at the UV system
Channel depth (channel floor to top of grating)	12 ft
Head loss across UV system at 8.0 mgd	25.7 inches

Abbreviation: mgd = million gallons per day

a. Note that in 2014, the plant datum was adjusted from National Geodetic Vertical Datum of 1929 (NGVD 29) datum to North American Vertical Datum of 1988 (NAVD 88) datum. These numbers reflect the elevation relative to the new datum.

The TrojanUV4000 system and the primary Aquaray system were designed according to the parameters listed in Table 2-2.

Table 2-2. Design Basis of Existing UV Systems

Description	TrojanUV4000 (1993)	Aquaray System (2012)
Design UV dose (mJ/cm^2)	25	30
UV transmittance (UVT)	55%	55%
Total suspended solids (TSS)	Unknown	5 to 30 mg/L (per the 2012 specifications)
Flow rate (mgd)	8.0 (per hydraulic profile on record drawings, 1995)	8.0 (per the 2012 specifications)

Abbreviations: mg/L = milligrams per liter, mJ/cm^2 = millijoules per square centimeter

Section 3: Existing UV System Design Parameters

This section details relevant water quality and design parameters to be considered in the design of the replacement UV system.

3.1 Design Basis for UV Transmittance

The WWTP does not use an online ultraviolet transmittance (UVT) monitor, nor does it currently have a protocol for monitoring UVT periodically with grab samples. For this reason, confirmation data related to ongoing UVT is not available. In situations such as this in plants using media filtration upstream, a common conservative design UVT is 55 percent. Given that this was used for previous designs as shown previously in Table 2-2, Brown and Caldwell (BC) recommends retaining 55 percent as the design UVT.

At the site visit in May 2024, BC brought a bench-top UVT monitor (a Real Tech RealUV254 portable unit) to the site to conduct a grab sample UVT check. BC and Jacobs staff collected a 250-mL sample from the effluent in Channel 2 in the overflowing weir trough. This sample was brought into the lab where the test cuvette was rinsed, calibrated, and the water tested for UVT. Milli-Q water was used as the calibration solution (100 percent UVT) and rinse agent. To perform the UVT measurement of the collected effluent, the cuvette was rinsed and filled three times with the sample, and UVT measured for each fill. UVT results of 68.4 percent, 68.3 percent, and 68.2 percent were obtained. The average was 68.3 percent. This UVT was well above the design level of 55 percent Although it represents a single sample and single snapshot of UVT, this water quality value and the fact that the system has remained in compliance with an operator-entered UVT of 65 percent (and subsequently used in the UV system's calculated dose algorithm) indicates that the upstream processes are producing relatively high UVT water and supports a 55 percent design UVT as appropriate conservatism.

3.2 Design Basis for UV Dose

The original design UV doses for the systems in Channels 1 and 2, listed previously in Table 2-2, note the different design doses. The Aquaray system installed in Channel 2, i.e., the unit treating effluent, operates at a relatively consistent reported UV dose of 33 mJ/cm^2 based on the monthly reports. BC presumes that this is the 30 mJ/cm^2 design dose plus an operational safety factor of 10 percent. However, without real-time UVT monitoring, which is not currently in place, the UV dose reported by the HMI is inaccurate. If the UVT is lower than the entered value of 65 percent, then the actual delivered dose is lower. If higher, then the delivered dose is higher.

To understand whether the combination of entered UVT, calculated UV dose, and flow rate consistently resulted in meeting permit limits, BC examined *E. coli* data in monthly reports. Figure 3-1 presents the results of weekly sampling from January 2023 through January 2024. The majority of effluent *E. coli* measurements were below 5 Most Probable Number (MPN)/100 mL. Note that the plant's requirement is not to exceed 126 MPN/100 mL monthly geometric mean, and no single sample is to exceed 406 MPN/100 mL.

There were two exceedances in the period examined, to 893 and 596 MPN/100 mL in April and November 2023, respectively. The first event was considered anomalous as subsequent samples returned to an acceptable level. The second event was correlated with an algae event that was subsequently corrected. Note that TSS was high at the same time as the November sample and may have been a contributing factor (see Section 3.4).

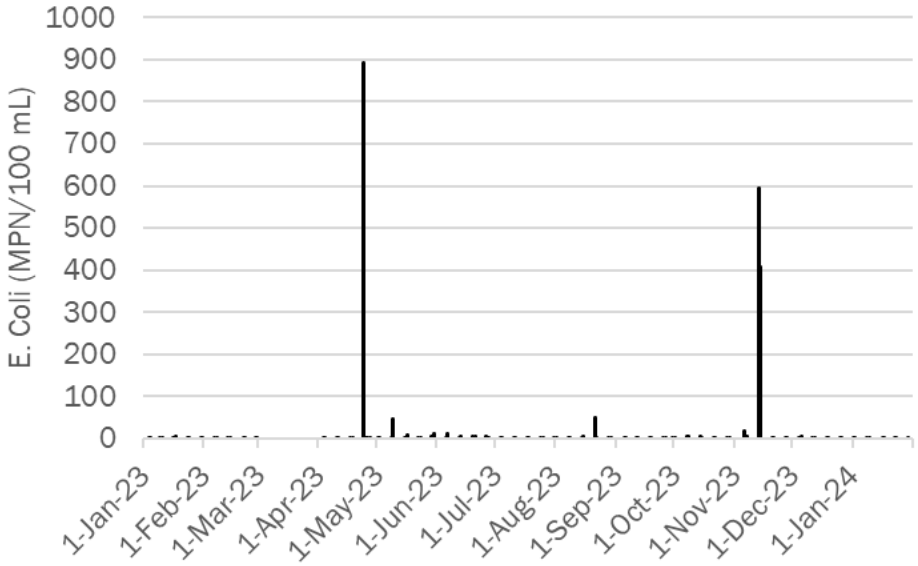

Figure 3-1. *E. coli* results, January 1, 2023, through January 31, 2024

Note that the literature values for the UV dose required to accomplish 1-log reduction of various species of *E. ˚coli* ranges between 2.5 and 4 mJ/cm^2. The literature values for UV dose required to accomplish 4-log reduction of similar strains of *E. coli* ranges between 8 and 15 mJ/cm^2 (Malayeri et. al., 2006). Therefore, a design dose of 30 mJ/cm^2 provides a safety factor relative to observed literature dose values for *E. coli.*

From the examination of the previous design and literature doses, the performance of the existing UV system at that design dose, and results of *E. coli* sampling in 2023-2024, BC concludes that a design dose of 30˚mJ/cm^2 is appropriate for the Channel 1 replacement UV system.

3.3 Design Basis for Flow Rate

Figure 3-2 presents recent flow data from the facility. This represents flow that would have passed through the Aquaray-system-equipped Channel 2. The average flow is 2.3 mgd based on the influent flow meter and 2.56 mgd based on the effluent flow meter. Peak flows within the available data set were 4.9 and 5.2 mgd based on the influent and effluent flow meters, respectively, and occurred in January 2024. The Aquaray system installation has a maximum flow rate of 8 mgd per the 2012 specifications. The channel, however, can accept a maximum flow rate of 8.8 mgd per the 2023 master plan. BC recommends that the design flow capacity of the Channel 1 replacement UV system match the flow rate that channel 1 is capable of accepting (i.e., 8.8 mgd).

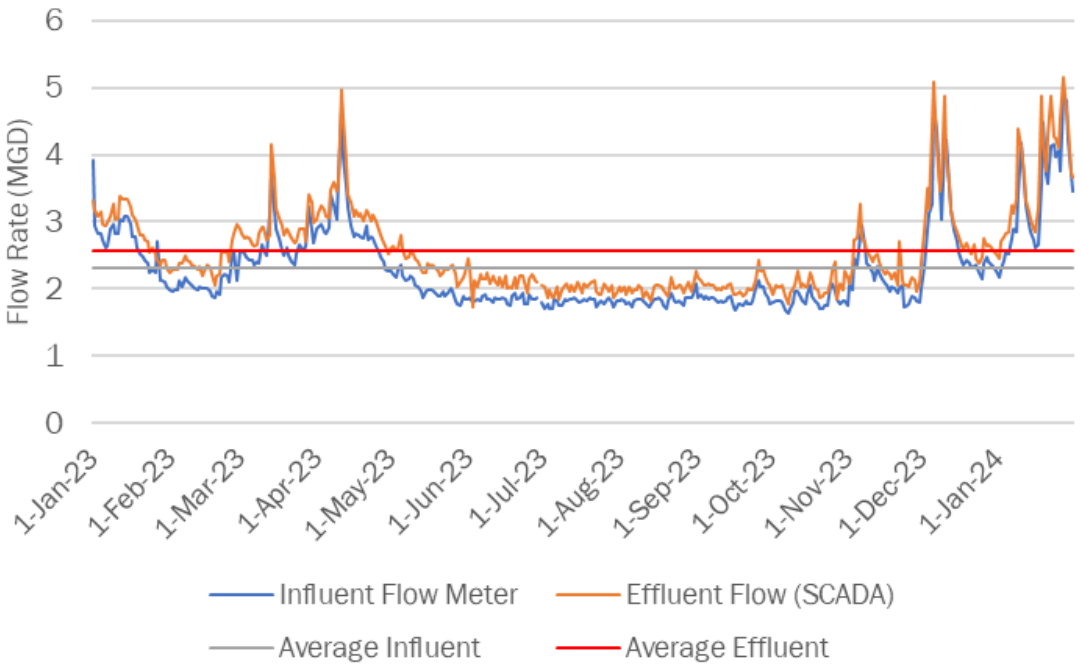

Figure 3-2. Flow rate, January 1, 2023, through January 31, 2024

3.4 Design Basis for Total Suspended Solids

Figure 3-3 presents available data for TSS. The average of all data is 4.9 mg/L, with a peak of 23 mg/L in June 2023. Based on the data, BC recommends a design maximum TSS of 25 mg/L.

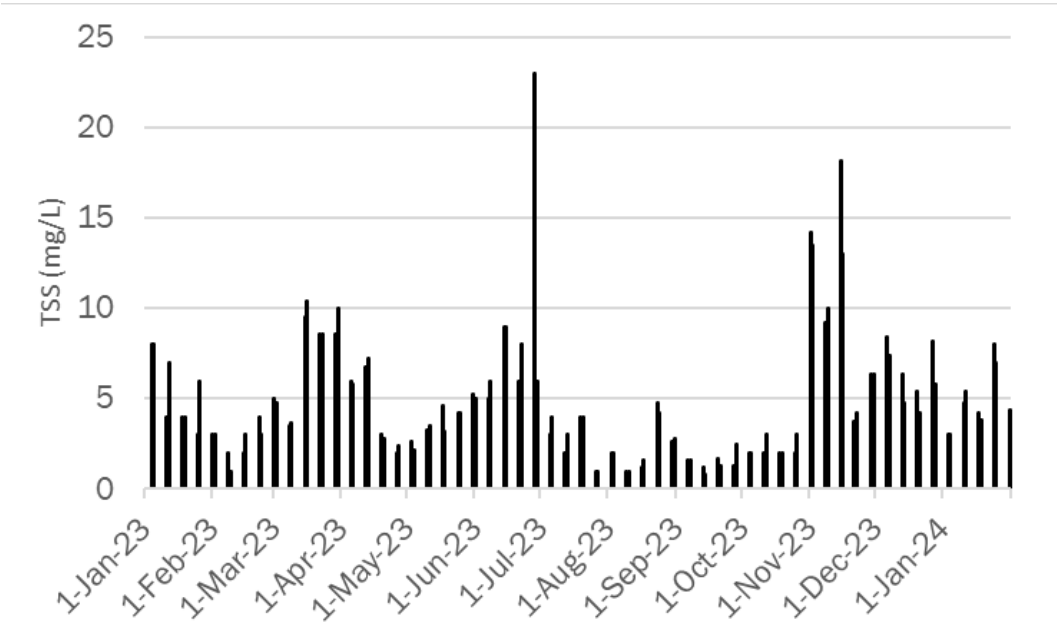

Figure 3-3. Total suspended solids, January 1, 2023, through January 31, 2024

3.5 Hydraulic Profile and Maximum Available Headloss

The hydraulic profile that was updated in 2019 is excerpted and included in Attachment A. This profile suggests that at 8.8 mgd, the existing TrojanUV4000 presents a headloss of 25.7 inches of water (inch H_2O).

The low pressure, high-output UV systems being considered for the retrofit are more sensitive to the water level change from the UV system influent to the effluent, and provide the ability to maintain required water layers and prevent submersion of key electrical components. The water level above the first bank of lamps, for example, must not be of a height (i.e., above the functional arc length of lamps) that creates a low UV dose pathway while, simultaneously, lamps must remain submerged at the downstream end of the UV banks to prevent overheating and operation in air. Therefore, the headloss across the UV system itself is balanced with the allowable water levels at influent and effluent. Designers consider this headloss together with the weir or gate headloss to design a system that works within the context of the UV system/weir and the overall system hydraulic profile. This scenario is different for each UV system configuration. Note that the headloss of the proposed UV systems is much lower than the headloss associated with the existing TrojanUV4000 (i.e., less than 3 inch H_2O). Each manufacturer has proposed a weir/gate/water level combination that will accommodate the flow rates for a replacement system in Channel 1.

3.6 Recommended Design Conditions

Table 3-1 summarizes the recommended design values of flow, UVT, and UV dose, as well as additional water quality parameters, including TSS. These design values provide appropriate conservatism and are supported by historical operational data.

Table 3-1. Recommended Design Conditions for UV System Retrofit

Description	Value	Units
Peak Design Flow	8.8	mgd
Average Flow	2.59	mgd
UVT	55	%
Turbidity	<3.5	Nephelometric turbidity units (NTU)
TSS	<25	mg/L
Fouling Factor and End-of-Lamp-Life Factor	per manufacturer	
Design Dose	≥30	mJ/cm^2 (MS2 reduction equivalent dose [RED] based on an MS2 bioassay validation)
System Configuration, redundancy	Single channel, N+1 bank configuration	
Rated headloss of existing TrojanUV4000 (including fixed weir level control)	25.7	inches (at 8.0 mgd)
Avg. Monthly *E. coli* based on geometric mean	<126	cfu/100 mL
Max Day *E. coli*	<406	cfu/100 mL

3.7 Observations of Mechanical, Structural, and Electrical Site Conditions

A three-person BC team visited the site on May 21, 2024. Flow was observed to be 2,053 gallons per minute (2.96 mgd) through Channel 2. The existing Aquaray system was operational and was disinfecting effluent. There was no flow in Channel 1. Water at a level of approximately 8 ft was stagnant in Channel 1. The TrojanUV4000 system was not operational, and no attempt was made to activate the system. An overall view of the UV area containing both UV systems is shown on Figure 3-4.

Figure 3-4. Existing Wilsonville WWTP UV disinfection area

3.7.1 Mechanical

As noted, the plant operates currently with all flow directed to Channel 2 for disinfection. Plant staff advised that there is a 7.0-mgd threshold value for activation of Channel 1. With recent peak flows significantly less than 7.0 mgd (and less than the 8.8-mgd design flow rate of the Veolia system in Channel 2), plant staff advises that there has been no recent reason to activate Channel 2. The 2023 master plan assumes a 2.9 percent annual population growth rate, resulting in an expected 2045 peak flow rate of 17.6 mgd.

To activate Channel 1, directing flow from Channel 2 to Channel 1 following a 15-minute lamp warm up period of the UV system in Channel 1 is accomplished by operators manually opening an isolation gate at the influent of Channel 1 and manually operating the valve at the inlet to channel 2. The motorized weir gate at the effluent end of Channel 1 is then adjusted incrementally to adjust water level to maintain submergence of lamps. Note that overdosing of UV light may occur under some flow and water quality conditions to maintain submergence of UV lamps.

Note also that the gates are not modulated automatically for flow pacing, and flow is measured in Channel 1 based on position setpoints of the weir gate and an equation in the operation and maintenance (O&M) manual. This manual process is suitable for temporary scenarios only. When flows return to below 7.0 mgd, or when Channel 2 is ready to be returned to service, operators manually actuate the respective isolation valves/gates to return flow to Channel 2. Note that the Channel 2 isolation valve is buried in the yard upstream of the channel and will be open during normal operation when flow is moving through Channel 2.

The Parshall flume shown in the 1993 record drawings was previously removed. The BC team was not able to verify the presence of the Parshall flume foundation shown on Figure 3-5 due to the presence of standing water in the channel. The record drawings are unclear. If this foundation is present, it will need to be removed by the contractor.

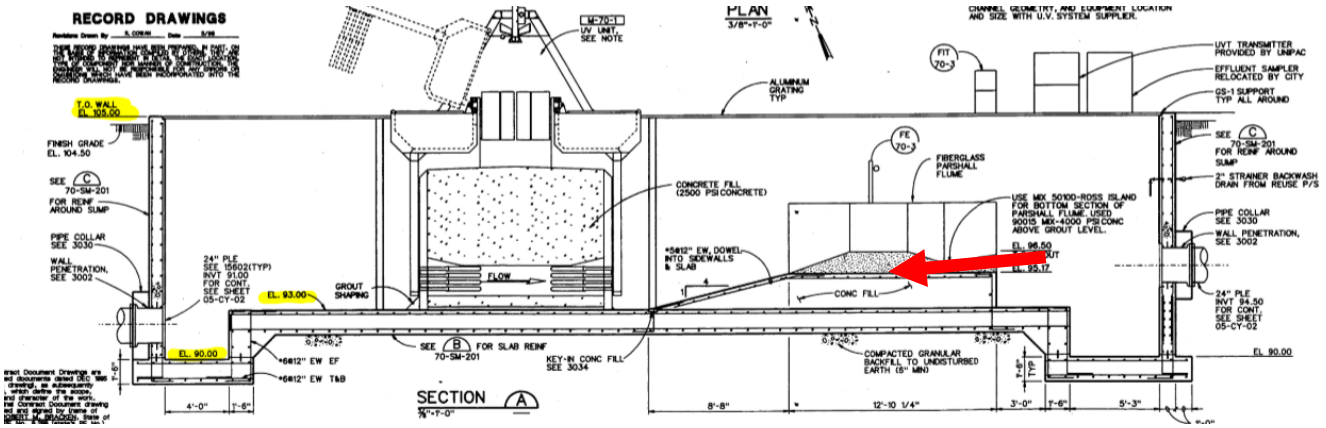

Figure 3-5. Concrete fill supporting the former installation of a Parshall flume

Manual operation of the jib crane during the site visit to evaluate the potential to reach Channel 1revealed that the crane does not have sufficient reach to lift modules out of Channel 1 (in addition to Channel 2, for which it was designed). For this reason, if the Channel 1 replacement UV system requires a crane to lift modules out of the channel, a new jib crane will be required.

While the Channel 2 system is not designed to include in-channel redundancy, the overall system operates with functional redundancy when Channel 1 is available for operation at flows up to 7.0 mgd. As Channel 1 is not operational currently, the only redundancy available is in the non-operating banks of the Channel 2 UV system. Given the relatively low design UVT and the lower average flow relative to design flow, the system typically operates with only one (or possibly two) of the three banks available, leaving at least one as functionally redundant. However, this applies in the scenario where UVT is higher and flow is lower than the design point and will not provide redundancy when flow increases in the future.

3.7.2 Structural

The BC team measured Channel 1 and dimensions were found to match the as-built drawings. The width of the channel in the area of the UV system is 40 inches (48 inches upstream and downstream of the UV system) and 12 ft in depth. A cursory inspection of the channel walls above the water line revealed no obvious deterioration. The contractor should field verify these values.

The existing TrojanUV4000 was grouted into the Channel 1. That is, a grout mixture encases the stainless-steel frame of the UV system as it sits in the channel. The grouting took place after the channel walls were formed and after the UV system itself was placed into the channel. For this reason, a seam exists between the concrete channel walls and the grouting that surrounds the UV system. This seam is shown on Figure 3-6. Removal of the existing TrojanUV4000 is described in a later section.

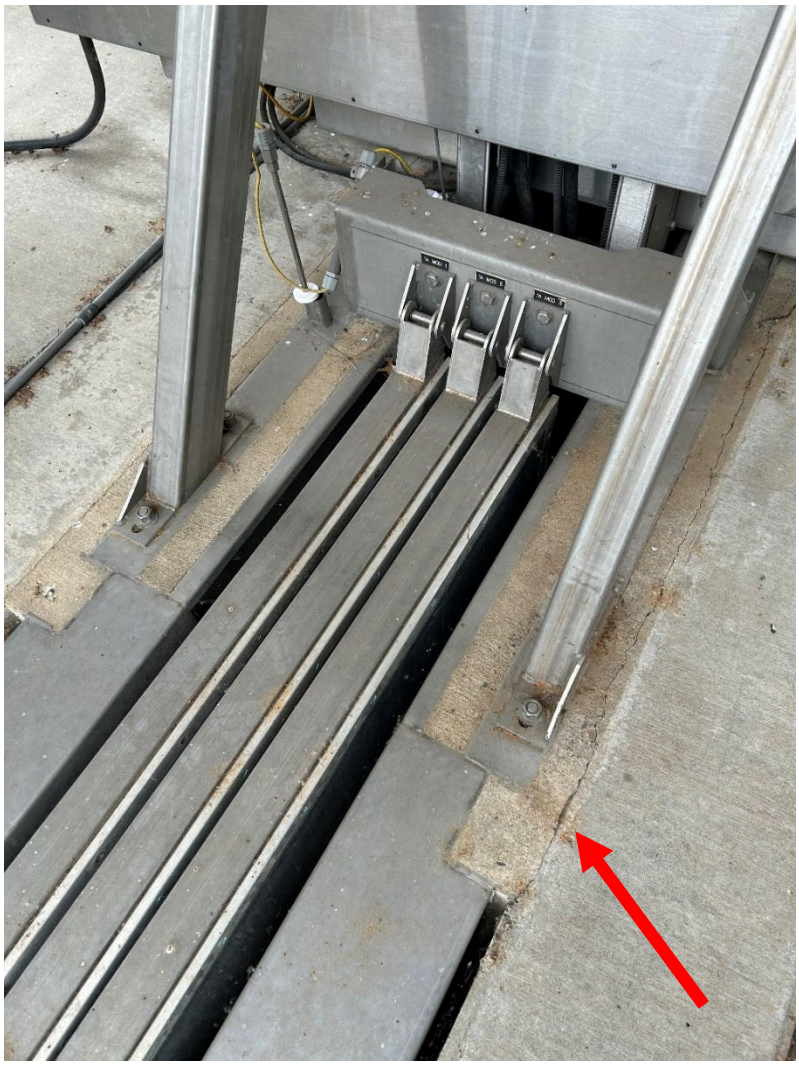

Figure 3-6. Grout-channel interface in the area of the TrojanUV4000

3.7.3 Electrical and Instrumentation

The total connected load of the proposed equipment is lower than the existing TrojanUV4000 equipment. For this reason, BC has made the preliminary conclusion that the existing electrical system is able to support the new equipment with the addition of appropriate transformers. Additional field work during detailed design is needed to confirm specific equipment that can be reused and to resolve record drawing discrepancies in the electrical room. Further, while foundational instrumentation will remain similar (e.g., a level sensor for water detection in channel 1), the updated UV system will use additional UV intensity sensors on each UV bank to monitor operation and control UV dose delivery. A local control panel for the UV equipment will accommodate the additional complexity and connect with the plant SCADA system in the electrical room. Specific electrical and instrumentation (E&I) improvements will, in part, be based on the selected UV manufacturer.

A magnetic flow meter installed upstream of Channel 2 reports flow through the UV channel. This flow rate is entered into the Channel 2 programmable logic controller (PLC) and is input into the UV system control for dose pacing. The flow rate is displayed on a user interface near the influent of Channel 2. The flow meter data display is shown in Figure 3-7.

Figure 3-7. Flow meter display

As discussed above, BC noted that the plant does not currently use a UVT monitor to provide real-time UVT measurement in water passing through the UV system. Rather, plant operators enter a UVT measurement manually. Staff did not indicate that they conducted periodic measurements to check that the UVT was above the entered value (of 65 percent), though on the day of the site visit, UVT was measured at 68.3 percent.

Section 4: UV Equipment Alternatives

4.1 UV Equipment Alternatives Investigated

BC obtained detailed and updated proposal information from Veolia, Trojan, and Wedeco for a replacement UV system for Channel 1. The UV manufacturers provided budget proposals and general arrangement drawings for review (Attachment A). Table 4-1 summarizes the proposed configurations and budget pricing.

Table 4-1. UV System Alternatives Information			
Item	Manufacturer		
	TrojanUVSigna	Veolia Aquaray 3X	Wedeco Duron 600
Number of Channels	1	1	1
Number of Banks/Modules per Channel	4	3	5
Number of Lamps per Bank/Module	8	36	12
Number of Redundant Banks	1	1	1
Total Number of Lamps	40	144	60
Watts per Lamp	1,000	400	600
Lamp Guarantee (hours)	15,000	16,000	14,000
Number of Intensity Sensors	4 (one per bank)	3 (one per bank)	5 (one per bank)
Sleeve Wiping	Yes, chemical/mechanical	Yes, mechanical	Yes, mechanical
Method for Removing Modules from Channel	Automatic Raising Mechanism (integral to system)	Jib crane (not included in budget price)	Automatic Raising Mechanism (integral to system)
System Rating	6P (modules), NEMA 4X (power distribution centers and system control center)	IP68 (modules), NEMA 4X (power supply units)	Quoted as Type 12
Number of Power Supply Units	1	1	1
PLC	Allan-Bradley Compact Logix	Allan-Bradley Compact Logix	Allan-Bradley Compact Logix
Maximum Power Draw (kW)	43.9	58.4	42.1
Power Requirement for Main Power Distribution	480/277V, 3 Phase, 60 Hz, 4 Wire + GND, 36.2 kVA	400V/3 Phase/60 Hz	480V, 3 Phase, 4 Wire + GND (WYE)
Quoted Maximum TSS (mg/L)	20	10	30
Headloss Across UV system including Weir (at 8.8 mgd, without redundancy | with redundancy)	5.0 | 6.3	5.3 | 6.4	19.8 | 20.4
Level Control Proposed	Fixed Weir (finger type, similar to the existing channel 2 weir)	Fixed Weir (finger type, similar to the existing channel 2 weir)	Downward opening gate
Flow Conditioners	2 (included)	1 (included)	None
Quoted Price Without Redundancy	$465,550	$385,000	$345,000 (Type 12)
Quoted Price With Redundancy	$548,500	$435,000	$380,000
Estimated Additional Capital Investment for Jib Crane	NA	$53,000	NA
Additional Capital Investment for UVT Monitor	Est $16,000	Est $16,000	Est $16,000

Abbreviations: GND = ground, Hz = hertz, kVA = kilovolt ampere, kW = kilowatt, NEMA = National Electrical Manufacturers Association, V = volt

Table 4-2 presents details of the required modifications to the existing Channel 1.

Table 4-2. UV System Channel Size and Modification Information		
UV Model	**Required Channel Dimensions**	**Modification/Impact to Existing Conditions**
TrojanUVSigna	Channel Length Required Without Redundancy: 31.6 feet	• Channel floor would need to be raised 1.9 ft • Channel would need to be narrowed 9.3 inches
	Channel Width: 30.72 inches	
	Channel Depth: 93.6 inches	
Veolia Aquaray 3X	Channel Length Required Without Redundancy: 24.5 feet	• Channel floor would need to be raised 3.38 ft • Channel would need to be narrowed 10.5 inches
	Channel Width: 29.5 inches	
	Channel Depth: 84 inches	
	Water Depth: 62 to 69 inches	
Wedeco Duron 600	Channel Length Required Without Redundancy: 40 feet	• Channel floor would need to be raised approximately 3 ft • Six total banks (including redundancy) leads to a length that is relatively long; the longer fixed weir will require widening of the channel
	Channel Width: 29.5 inches	
	Channel Depth: 74.8 inches	
	Water Depth: 42.1 inches (at gate)	

4.2 System Selection Considerations

All three systems presented will fit in the existing Channel 1, will operate within the plant's electrical system capacity, and, with different levels of channel modification, will meet the hydraulic requirements of peak flow conditions. A discussion of the installation requirements, advantages/disadvantages, and O&M requirements of each system is provided in this section.

4.2.1 TrojanUVSigna

Trojan manufactured the original TrojanUV4000 in Channel 1. The City is, therefore, familiar with Trojan as a manufacturer. The TrojanUVSigna is a system Trojan designed to replace the TrojanUV4000 units, and it fits well into the channel at Wilsonville. Required modifications were detailed previously in Table 4-2.

Trojan has recommended four duty banks with a total of 32 lamps. If a redundant bank is selected, an additional 8 lamps will be installed for a total of 40. The system requires a narrower channel than existing (by 9.3 inches). Concrete will be used to adjust the channel width. The length of the installed UV banks themselves require a channel length of approximately 40 ft (with redundancy). The length of the proposed TrojanUVSigna is well within the available length. Designed with fixed weir, the headloss of the UV system (3.2 inches with redundancy) is significantly lower than the existing TrojanUV4000 headloss (estimated at 25.7 inches at 8 mgd).

Trojan has recommended two, 50-percent porosity, flow conditioners at the entrance to the channel. Trojan included these flow conditioners in its proposal.

The Trojan system employs dose pacing control that makes use of sensor readings of UVI in the dose control algorithm. The online intensity measurement measures UVI in the water and accounts for lamp output and sleeve fouling. This is combined with real-time UVT data (measured by an online monitor) to accomplish dose pacing through a range of effluent conditions. The system proposed contains a mechanical-chemical wiping system to clean quartz sleeves. This system will likely reduce the manual cleaning requirements that are currently required by the existing Veolia duty system in Channel 2. In addition, the TrojanUVSigna system incorporates an integral module lifting system that provides module access without the need for a crane.

This provides a simpler footprint and enhanced operator safety while eliminating the requirement of an additional jib crane for Channel 1.

The TrojanUVSigna system uses a 1,000-watt (W) lamp. The relatively high wattage of the lamp leads to a relatively low total lamp count (compared to other low-pressure, high-output lamp-based systems). Trojan warranties the lamp for 15,000 hours.

The UV banks will need a 480-V, 3-phase, 4-wire power supply and will present a total connected load of 43.9 kW. The new TrojanUVSigna system will require a transformer.

All electrical cabinets will be rated NEMA 4X given the outdoor installation. Additionally, the TrojanUVSigna UV module is 6P rated and can withstand submergence for up to 24 hours. This offers system protection should a flooding event occur.

The Trojan system is manufactured in London, Ontario, Canada. Trojan warrants the equipment for 12 months following startup or 18 months after delivery, whichever occurs first.

The TrojanUVSigna meets the design basis treatment requirements. While the system will require some modifications to Channel 1, the lay length of the duty/redundant banks and the recommended fixed weir fits within the existing UV channel's available dimensions. The TrojanUVSigna will consume less energy than the existing TrojanUV4000, and therefore, the existing electrical system will power the new UV unit without substantial modification to the electrical system. Plant staff can expect that equipment maintenance for the TrojanUVSigna will be relatively lower than that required for the existing Veolia system owing to the chemical/mechanical cleaning, fewer lamps, and integral lifting system used to raise the lamps out of the channel. The final design will address additional considerations such as detailed analysis of the existing electrical and structural conditions and requirements for the UV system retrofit.

4.2.2 Veolia Aquaray 3X

Veolia (then Ozonia) manufactured the Aquaray system currently operating in Channel 2. This unit operates as the duty UV system. Installing a similar Veolia Aquaray 3X system in Channel 1 presents advantages, at least in the near term, including familiarity with operations procedures. However, the existing system is more than 10 years old and at the midpoint of its life cycle. The 2023 master plan projects replacement in 2040. Note however, that the proposed replacement system uses a newer-generation ballast and sensor technology. For this reason, the City would need to maintain two separate stores of ballasts and sensors between the two systems. Veolia has proposed an option to provide a new power supply unit and new UV modules for the existing Channel 2 system, which would upgrade the existing system to current technology. This would allow the City to unify parts storage for both systems, but would require an additional capital investment, quoted by Veolia at $100,000 for the new power supply only and $210,000 for new power supplies and new modules. The City would need to hire a contractor to install the new equipment at unknown cost.

A Veolia Aquaray 3X system would fit into the existing Channel 1 with minor modifications. The Aquaray requires a narrower channel than the existing TrojanUV4000 channel (29.5 inches versus 40 inches), and a 3.38-ft-shallower depth. Concrete will be used to adjust channel dimensions. Veolia has recommended three duty banks, each with 36 lamps. The addition of a redundant bank would add 36 lamps and bring the total to 144 lamps. The system uses a lower wattage lamp than TrojanUVSigna (400 W compared to 1,000 W) and for this reason requires more lamps to accomplish disinfection objectives. The length required for the installed UV banks is approximately 33 ft including redundant banks, plus length for the finger weir, which is within the available length. Headloss (6.4 inches) is also significantly lower than the existing TrojanUV4000 (which, as mentioned previously, is estimated at 25.7 inches at 8 mgd).

Veolia has proposed a fixed weir for level control with a length of 624 inches. A fixed weir, or weir trough, presents a robust, low-maintenance method of level control that matches the strategy used by the Aquaray

system in Channel 2. Matching the effluent structures would make it more likely that an acceptable passive flow split would be possible. Careful matching of headloss in final design will minimize headloss differences between the channels with the objective of eliminating the need for active flow control between the channels. Veolia has recommended a single flow conditioner at the entrance to the channel to facilitate well-distributed flow across the lamps in the channel.

Like Trojan, Veolia also incorporates features to reduce O&M costs by minimizing energy consumption and extending lamp life. For example, the Aquaray system employs dose pacing algorithms that account for changes in UVT, UVI, and flow rate. The online sensor intensity measurement measures UVI emitted from the lamps in the water and thereby accounts for lamp output and sleeve fouling. This would be combined with real-time UVT data measured by an online monitor to control the number of lamps and the power level of operating lamps with the target of optimizing dose delivery.

Veolia employs a mechanical wiping system to clean quartz sleeves. The existing Veolia Aquaray system in Channel 2 is also equipped with a mechanical wiping system, but operators report that weekly manual cleaning is required to maintain sleeve cleanliness. This procedure includes removal of UV banks, soaking in an acid bath, and reinstallation. It is anticipated that a new Veolia Aquaray in Channel 1 would require a similar cleaning regimen. The new Veolia Aquaray system would also require a new jib crane to remove the modules from the channel. As noted above, the existing crane will not work for both channels. Veolia has not included this crane in its quotation.

The Veolia Aquaray system uses a 400W lamp that is warranted for 16,000 hours. Veolia warrants the equipment for 12 months following startup or 18 months after delivery, whichever occurs first.

The UV banks would be supplied by a 400V, 3-phase, 60-Hz electrical supply and presents a total connected load of 58.4kW. This connected load is approximately 30 percent larger than the TrojanUVSigna. Like the Trojan option, the new UV system would also require a new transformer. All electrical cabinets, given the outdoor installation, will be rated NEMA 4X.

The Veolia Aquaray UV module is IP68 rated and can withstand submergence of 1 meter for up to 24 hours. This offers system protection should a flooding event occur.

The Veolia Aquaray also meets the design basis treatment requirements. While the system will also require some modifications to the channel, including a narrowing, a raising of the floor, and a modification of the effluent structure, the lay length of the duty/redundant banks fits within the Channel 1 available dimensions. The Veolia Aquaray will consume less energy than the existing TrojanUV4000, and therefore, the existing electrical system will power the new UV unit without substantial modification to the electrical system. Plant staff will be familiar with the operation of the Aquaray given their experience with the similar system in Channel 2. The final design will address additional considerations, such as detailed analysis of the existing electrical and structural conditions and requirements for the UV system retrofit.

4.2.3 Wedeco Duron 600

Wedeco has proposed the Duron 600 model for the replacement of the TrojanUV4000 in Channel 1. Required modifications were detailed previously in Table 4-2.

Wedeco has recommended five duty banks with a total of 60 duty lamps. If a redundant bank is selected, an additional 12 lamps will be installed for a total of 72. The system requires a narrower channel than existing (by 10.5 inches). Concrete will be used to adjust the channel width. The length of the installed UV banks themselves require a channel length of approximately 44 ft (with redundancy). The length of the proposed Wedeco Duron 600 is within the available length. However, Wedeco advises that their fixed weir design would require widening of the channel. The headloss of the UV system itself, without the effluent level control, is 3.8 inches with redundancy. Addition of a downward opening gate, as quoted, adds 16.6 inches for a total of 20.4 inches. While this is significantly lower than the existing TrojanUV4000 headloss

(estimated at 25.7 inches at 8 mgd), this headloss would be significantly higher than Channel 2 headloss. If Wedeco is selected, additional work to design and cost a low-headloss fixed weir, will be required. Wedeco has not proposed flow conditioners at the entrance to the channel in their initial quotation but would likely be required in final design.

The Wedeco system also employs dose pacing control that makes use of UVT and UVI in the dose control algorithm, with the objective of minimizing operational cost. The system proposed contains a mechanical wiping system to clean quartz sleeves. In addition, the Wedeco Duron system incorporates an integral module lifting system that provides module access without the need for a crane. Like Trojan, this provides a simpler footprint and enhanced operator safety while eliminating the requirement of an additional jib crane for Channel 1.

The Wedeco Duron system uses a 600 W lamp. Wedeco warrants the lamp for 14,000 hours. Wedeco warrants the equipment for 12 months following startup or 18 months after delivery, whichever occurs first.

The UV banks will need a 480-V, 3-phase, 4-wire power supply and will present a total connected load of 42.1 kW. The Wedeco Duron system will require a transformer.

The Wedeco Duron 600 meets the design basis treatment requirements. BC, however, has concerns related to the length of the system and the ability to accommodate a low-headloss fixed weir. The 6 banks (with redundancy) will limit the length of the fixed weir and likely lead to the requirement that the channel be widened in the area of the weir. Given this uncertainty and potential additional installation cost, BC did not proceed with a full Class 4 cost evaluation and NPV of the Wedeco Duron.

4.2.4 Water Analysis to Confirm Design Dose

BC recommends that the plant send water to at least one of the manufacturers to perform collimated beam analyses. This procedure will confirm that the recommended minimum UV dose of 30 mJ/cm^2 is sufficient to accomplish disinfection. UV manufacturers typically do not charge for this service. BC notes that the existing Aquaray system operates at this programmed UV dose, and that as shown on Figure 3-1, *E. coli* inactivation is generally successful. This leads to the observation that this UV dose is sufficient; however, further analysis would benefit the project and give the City added assurance that the design dose is sufficient.

4.2.5 Schedule

BC recommends and anticipates the following schedule for the retrofit. Given that the City currently does not have a functional backup UV system, BC believes that time is of the essence.

- **August 2024–February 2025:** Final design
- **March 2025–July 2025:** Procurement of contracting services
- **July 2025–May 2026:** Long-lead item purchase orders, submittals, and manufacturing/shipping
- **May 2026–August 2026:** Construction
- **August 2026–December 2026:** Commissioning and startup

With immediate start of final design, BC anticipates that the City could complete construction during the summer of 2026, and be operational for the winter treatment season of 2026. To install a new system earlier, the City could purchase the UV equipment in advance of selecting a contractor. This approach comes with risks associated with the contractor taking a minimalist role in the coordination of the assigned equipment contract.

4.2.6 Disinfection During Construction

To address the issue of providing disinfection during the anticipated 3-month construction period, BC recommends that the City continue to use the existing system in Channel 2 during construction. At the site visit in May 2024, BC and the City evaluated the potential for continuing Channel 2 operation during construction. Physically, the channels are separated by the channel's concrete wall. Electrically, each UV system uses different power feeds. If new duct banks are required for Channel 1, a new duct bank would be run in parallel, allowing for continued operation of Channel 2. If existing space/empty duct bank conduits can be used, new cables can be pulled while Channel 2 is operational. No new cables should be pulled in conduits with energized conductors. For these reasons, BC anticipates installation of the new system in Channel 1 could proceed without disruption to Channel 2 operation and that normal UV disinfection could continue during construction with care and protection of the operating Channel 2 (e.g., protecting construction debris from entering the channel). Should a reason arise that requires a contractor to deactivate the UV system in Channel 2 for a prolonged time during construction, the following three options exist:

- Pursue a waiver for disinfection during construction.
- Implement chemical disinfection (and associated quenching of the chemical disinfectant) prior to discharge.
- Implement a temporary UV disinfection system.

Note that Trojan has mobile UV disinfection units available for rent; however, given that piping in the area of the UV systems is underground, temporary above-ground piping between the disk filter effluent and the outfall would require excavation and present a significant cost.

BC observes a regulatory waiver is unlikely to be obtained and both chemical and UV temporary solutions present significant piping difficulties. For these reasons, use of an operating Channel 2 during construction is the best option. Performing construction during the lowest flow period, typically summer, would minimize the volume of water to be disinfected during construction.

Section 5: Mechanical, Structural, and Electrical Considerations

This section describes the mechanical, structural, and electrical considerations investigated during preliminary design.

5.1 Hydraulic Profile with Updated UV Disinfection Systems

The low-pressure, high-output UV systems being considered for the UV Channel 1 retrofit are more sensitive to water level than the existing TrojanUV4000. For this reason, BC performed a hydraulic check to verify that the installation of either candidate manufacturers' systems would maintain acceptable hydraulic conditions.

A parallel objective is to maintain an even flow split between the two channels with retrofitted UV Channel 1 acting as the primary UV system (for flows up to 7.0 mgd). UV Channel 2 will become the secondary UV system activated when flows exceed 7.0 mgd. Under situations where flow exceeds 7.0 mgd, flows will passively split between the two channels.

Using Visual Hydraulics software, BC investigated the hydraulic performance and passive flow splitting potential of the highest headloss replacement UV system. Manufacturers provided the projected maximum headloss presented by the UV system and the flow control weir of 6.3 inches at 8.8 mgd.

Modeling the retrofitted UV Channel 1 with a 43-foot-long fixed weir at 103.85 feet elevation, the model concludes the system maintains an even flow split of 8.8 mgd in each channel (for a total of 17.6 mgd). The existing concrete channel elevations are sufficient, and no upstream limits are exceeded. The long-fixed weir

for UV Channel 1 matches the type of weir in UV Channel 2 and therefore would serve as a simpler more reliable and repeatable flow splitting mechanism over a range of wet weather flows. Under lower dry weather flows only one channel (typically UV Channel 1) would be in operation.

The updated hydraulic profile is included in Attachment B.

5.2 Mechanical Considerations

In this section, BC considers several aspects of the mechanical design.

5.2.1 Flow Control

According to the plant's O&M manual, to control flow between Channel 1 and Channel 2, plant staff manually actuate control valves. Channel 2, currently operating as the duty channel, treats flows up to 8.8 mgd. The valve controlling flow to Channel 2 is normally open. If a maintenance scenario arose in Channel 2 and flow needed to be redirected to Channel 1, operators would open the weir gates in Channel 1 and close the valve in Channel 2. This process directs flow to either Channel 1 or Channel 2.

For future flow conditions that exceed 8.8 mgd, plant staff will need to operate both channels simultaneously. To accomplish the flow split with the existing configuration/design, similar manual valve actuation would be required; however, only Channel 1 has a flow meter. In a flow-split scenario, operators are required to calculate the flowrate through Channel 1 using the height of the weir gate and an empirical equation provided in the O&M manual. This scenario related to manual flow measurement in Channel 1 is undesirable for long-term operation. To correct, an additional flow meter is recommended for Channel 1. With flow meters in both channels, differences in flow rates between channels is unimportant if the real-time flow rate is provided to each UV system's respective PLC. Preliminary hydraulic design work by BC's hydraulic team suggests that, with careful selection of a new weir in Channel 1 and matching headloss as closely as possible between the two channels, the system can achieve an even, passive flow split.

Excavation upstream of Channel 1 and installation of a valve and flow meter manhole would accomplish flow split and measurement of flow rate in Channel 1. While automatic flow control/balancing could be postponed, a valve/flow meter manhole is required for this phase of construction. A possible solution is excavation and replacement of approximate 50 ft of piping upstream of Channel 1, as shown on Figure 5-1.

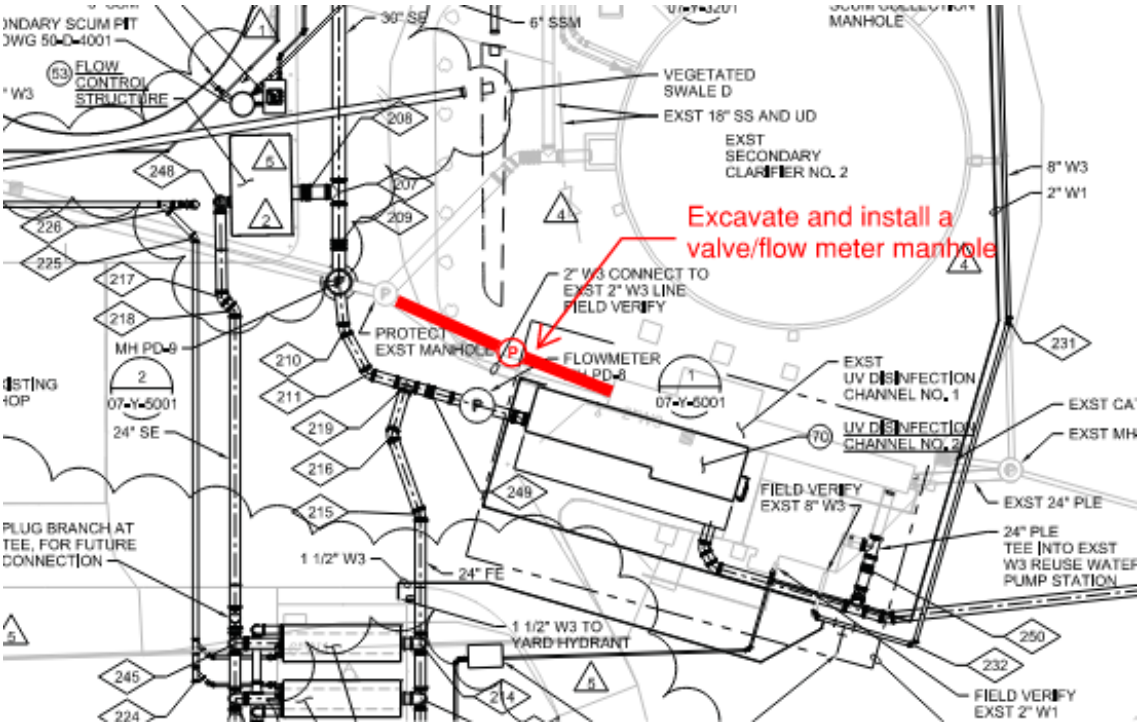

Figure 5-1. Location of proposed upstream valve/flow meter manhole vault

Source: 2012 record drawings pdf, page 63

Flow enters Channel 2 from a pipe near the bottom of the channel. To facilitate well-distributed and even flow across the lamps (eliminating short-circuiting of flow through any one portion of the channel). Flow conditioners will be required.

5.2.2 Redundancy

At full flow of 17.6 mgd (two channels operating at 8.8 mgd), the two UV systems will be required to operate all duty banks. Further, the *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse* published by the National Water Research Institute (NWRI) in 2012 state that "Standby UV equipment must be available by providing either a complete standby UV reactor train or an additional UV reactor in each reactor train." The City would fulfill these requirements, in Channel 1, with the addition of a redundant bank to the replacement unit. For this reason, BC recommends that the replacement UV system be sized and installed with a redundant bank. The regulator of record will have input in this decision, and this topic should be discussed as the design progresses. If redundancy is not required, this would be an opportunity for value engineering.

5.3 Structural Considerations

The basin will be modified to conform to the requirements of the selected system by adding fill concrete as required to the basin walls and base slab. Resulting dimensions of the channel would be per manufacturer's recommendations. Fill concrete will be reinforced to prevent cracking and will be anchored to the existing basin by drilling and epoxying reinforcing dowels.

The following project standards will be used for the modifications required for the structure during detailed design.

5.3.1 Codes and Standards

The following standards will be followed for the structural design:

- 2022 Oregon Structural Specialty Code with Amendments
- American Society of Civil Engineers (ASCE) 7-16 “Minimum Design Loads and Associate Criteria for Buildings and Other Structures”
- American Concrete Institute (ACI) 318-14 “Building Code Requirements for Structural Concrete” ACI 350-06 “Code Requirements for Environmental Engineering Concrete Structures”

5.3.2 Materials

The following materials will be used for the structural design:

- **Concrete:** 28-day compressive strength, 4,500 pounds per square inch (psi)
- **Reinforcing:** Fy = 60,000 psi

5.3.3 Design Loads

The following criteria will be used for the structural design:

- **Dead Load:** As calculated
- **Equipment Loads:** As provided by manufacturer

5.4 Removal of the Existing UV System

Trojan has provided a step-by-step procedure to remove the existing TrojanUV4000 system (Attachment B). System removal is a multi-day effort by a contractor as the existing stainless-steel reactor body is encased in grout/concrete. Per Trojan, the contractor will need to remove the existing grout/concrete using a jackhammer or saw to gain access to the reactor inserts. The approximate volume of concrete to remove is 15 to 20 cubic yards. Prior to beginning demolition, the contractor should take steps to carefully remove all hydraulic fluid in the TrojanUV4000 to prevent spills. Trojan estimates the time required is 15 to 24 hours (2 to 3 working days) per system.

5.5 Electrical and Instrumentation Considerations

In this section, BC considers several aspects of the electrical and instrumentation design.

5.5.1 Electrical System Modifications

The existing power system distribution was upgraded in 2014 with the addition of Channel 2 UV system. The UV Channel 1 and 2 power feeds originate from switchboard SWBD40, located in the Process Gallery building. Modifications to the switchboard include removal and replacement of existing thermal magnetic circuit breakers for Channel 1 UV system. Breaker ampacity would be determined based on the connected load ampacity.

Although modern UV lamp power supplies are designed to mitigate power system electrical harmonics, it is recommended that an isolation transformer be installed between the switchboard and UV system power supply. Electrical harmonics can cause abnormal operation of sensitive electrical equipment. Isolation transformers mitigate electrical harmonics generated by downstream loads from propagating to the upstream power system. Harmonic content can cause overheating of transformers and therefore the isolation transformer should be K-rated. Transformers that are K-rated are of a robust design to compensate for high load harmonic content without causing premature failure of the transformer itself. Additionally, if operating voltage required by the UV system power supply is less than 480V nominal, such as the Veolia Aquaray system at 400V, a step-down transformer is required.

All power, control, signal, and data cables will route back to the Process Gallery building to the associated electrical switchboard, panelboards, and CP40_2 (Area PLC). During detailed design, it is recommended to determine the available conduits, size, and routing within the existing duct bank is adequate to support the new UV system and associated instrumentation. An additional duct bank is required if additional conduits back to the Process Gallery are necessary. Ideally, it would be routed in parallel with the existing duct bank, as not to disturb operation of Channel 2 UV system, as mentioned in Section 4.2.5.

An alternate to hardwired cables back to CP40_2 is to install a remote input/output (I/O) module and control cabinet at Channel 1 and run RJ45/Ethernet back to CP40_2. All hardwire I/O from the UV system and associated instrumentation would be connected to the remote I/O module. This may eliminate the need to run a new duct bank if there is a spare conduit, sized appropriately, within the existing duct bank.

5.5.2 Instrumentation

An online UVT monitor could be placed upstream of the flow split to monitor UVT in real time. An online unit will allow the UV system to modulate power based on UVT and, assuming that the typical UVT is above 65 percent (the operator-entered UVT), the system will operate at a reduced power when water is of UVT greater than 65 percent and avoid underdosing if UVT drops below 65 percent. While for smaller systems this power savings is not large, it grows linearly with flow rate and also increases as UVT increases. Further, as flow rates to the Wilsonville WWTP increase, the UVT monitor will lead to increased O&M cost savings.

As discussed above, a flow meter upstream of Channel 1 would provide real-time flow data to the upgraded UV system.

Each UV system proposed includes UV intensity (UVI) sensor monitoring. The intensity sensors are part of the UV system. Each UVI sensor reports intensity to the UV system PLC, where the information is used to control operating energy levels of the UV system to accomplish the target UV dose.

Water level sensors will also be included in the upgraded Channel 1. Level control sensors are required to ensure that water is present in the channel at sufficient levels to cool the operating UV lamps. The level sensors also alarm when the water levels are too high (which can create a low-dose pathway above UV lamps and result in undertreatment).

The new UV control panel should include a sun shield and cover to protect the HMI, similar to the existing Aquaray system panel.

To maintain consistency across the plant, it is recommended that PLCs for any remote I/O and UV system controller should be Allen-Bradley CompactLogix or ControlLogix.

Section 6: Cost Estimate and Net Present Value Analysis

This section details BC's construction cost analysis efforts and findings.

6.1 Inputs and Assumptions for Capital Cost Opinion

BC's estimating team performed a Class 4 cost estimate for the Trojan and Veolia options. For the purposes of the evaluation, BC assumed that a redundant bank would be included in the installation.

6.2 Results of the Capital Cost Opinion

The results of the Class 4 cost opinion are presented in Table 6-1. Details and additional description can be found in Attachment E. Note that BC applied a 30 percent contingency.

Table 6-1. Cost Opinion of Two UV Disinfection Options

Description	Trojan	Veolia
Total Construction Cost Estimate	**$2,614,119**	**$2,414,943**
Class 4 Low (-30 percent)	$1,829,683	$1,690,460
Class 4 High (+50 percent)	$3,921,179	$3,622,415

6.3 Net Present Value Analysis Comparing Equipment Options

BC performed a full net present value (NPV) analysis to compare the Trojan and Veolia options, and an annual O&M cost review of Trojan, Veolia, and Wedeco options. While a full cost opinion and NPV analysis was not performed on the Wedeco system, it was included in the O&M cost review. BC believes that results of this analysis helps support the recommendations of the report. Financial inputs, including assumed cost of electricity, are presented in Table 6-2.

Table 6-2. Financial and Energy Cost Assumptions

Item	Value	Notes
Nominal Inflation Rate	6.0 percent	BC assumption
Nominal Discount Rate	8.0 percent	BC assumption
Real Discount Rate	1.89 percent	Calculation
Term	20 years	BC assumption
Cost of Electricity	0.06	$/kilowatt hour

While the electric utility charges different electricity costs at peak and off-peak hours, various surcharges and the weighted average of the different rates led BC to assume the rate presented in Table 6-2.

Replacement parts prices and warranty terms quoted by the manufacturers and used in the NPV calculations are presented in Table 6-3.

Table 6-3. Replacement Parts Warranty Terms and Pricing Used in Annual O&M Calculation				
Guarantees	Trojan	Veolia	Wedeco	Units
Lamp	15,000	16,000	14,000	Hours
Ballast	10	5	5	Years
Sensor	5	5	10	Years
Sleeve	5	10	20	Years
Wiper	1	2	1.5	Years
Prices				
Lamp	$850	$177	$473	
Ballast	$1,300	$840	$1,179	
Sensor	$2,100	$2,000	$1,197	
Sleeve	$350	$96	$641	
Wiper	$55	$8	$51	
Annual Cost for Sensor Calibration	$750	$1,500	$450	
Annual Cost for Cleaning System Consumables	$500	$1,000	$250	
Power Required at Average Flow	7.7	13.39	16.3	kW

The replacement parts pricing and annual costs lead to the calculated annual costs for each consumable/service. The annual costs for each manufacturer are presented in Table 6-4 and Figure 6-1.

Table 6-4. Annual Costs for Consumables and Total Annual Cost			
	Trojan	Veolia	Wedeco
Energy	$4,047	$7,038	$8,567
Lamps	$4,250	$3,546	$10,879
Ballasts	$1,300	$3,360	$4,716
Sensors	$420	$400	$359
Sleeves	$560	$345	$1,154
Wiper Rings	$440	$144	$1,224
Sensor Calibration	$750	$1,500	$450
Cleaning Consumables	$500	$1,000	$250
TOTAL	$12,267	$17,333	$27,599

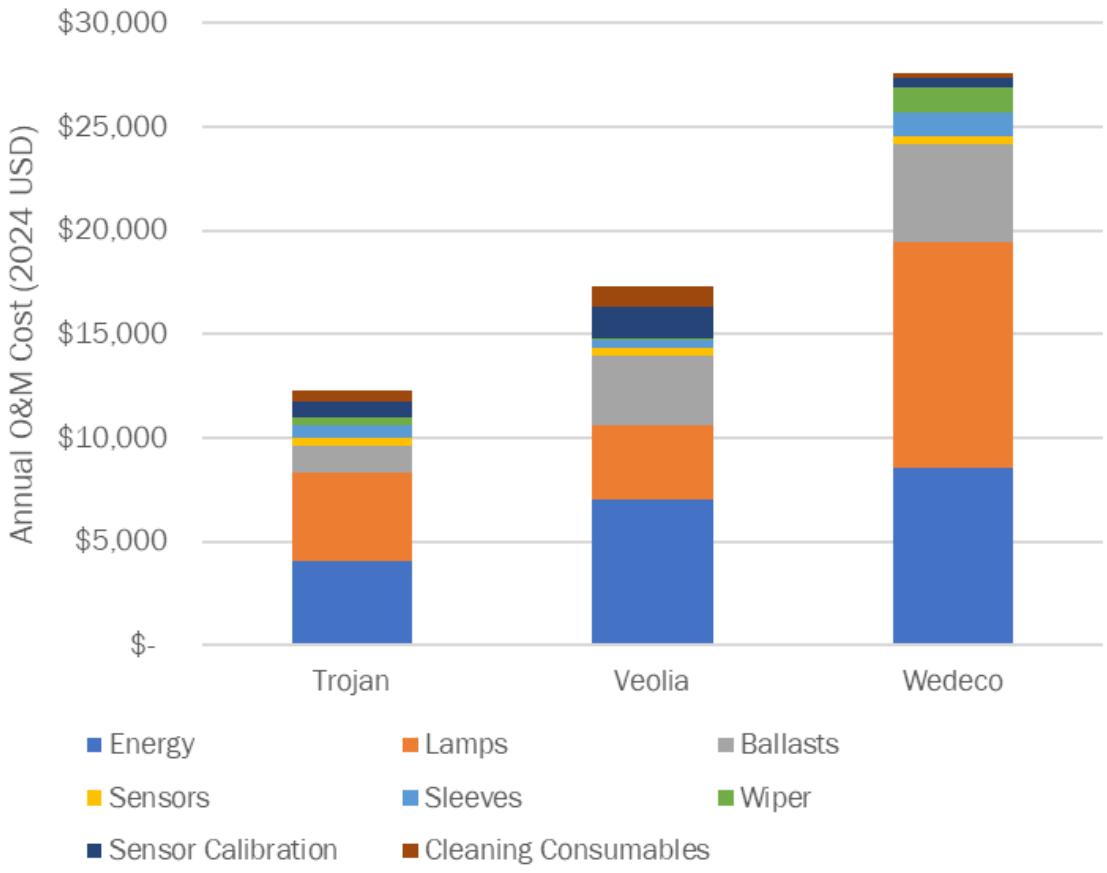

Figure 6-1. Annual O&M costs

Source: BC Calculation with manufacturer input

Using the financial assumptions listed above and the annual costs of each consumable/service, BC calculated a full NPV of the Veolia and Trojan options (Figure 6-2 and Table 6-5) and included the results of the Class 4 cost estimate described above. Results indicate that the total NPV of the Trojan system is higher than the Veolia system given a higher capital purchase price. However, the annual O&M, including electricity usage, is significantly lower. A primary difference in the overall O&M cost is the energy associated with operating the system: the TrojanUVSigna uses approximately 40 percent less energy than the Veolia system to perform the required disinfection.

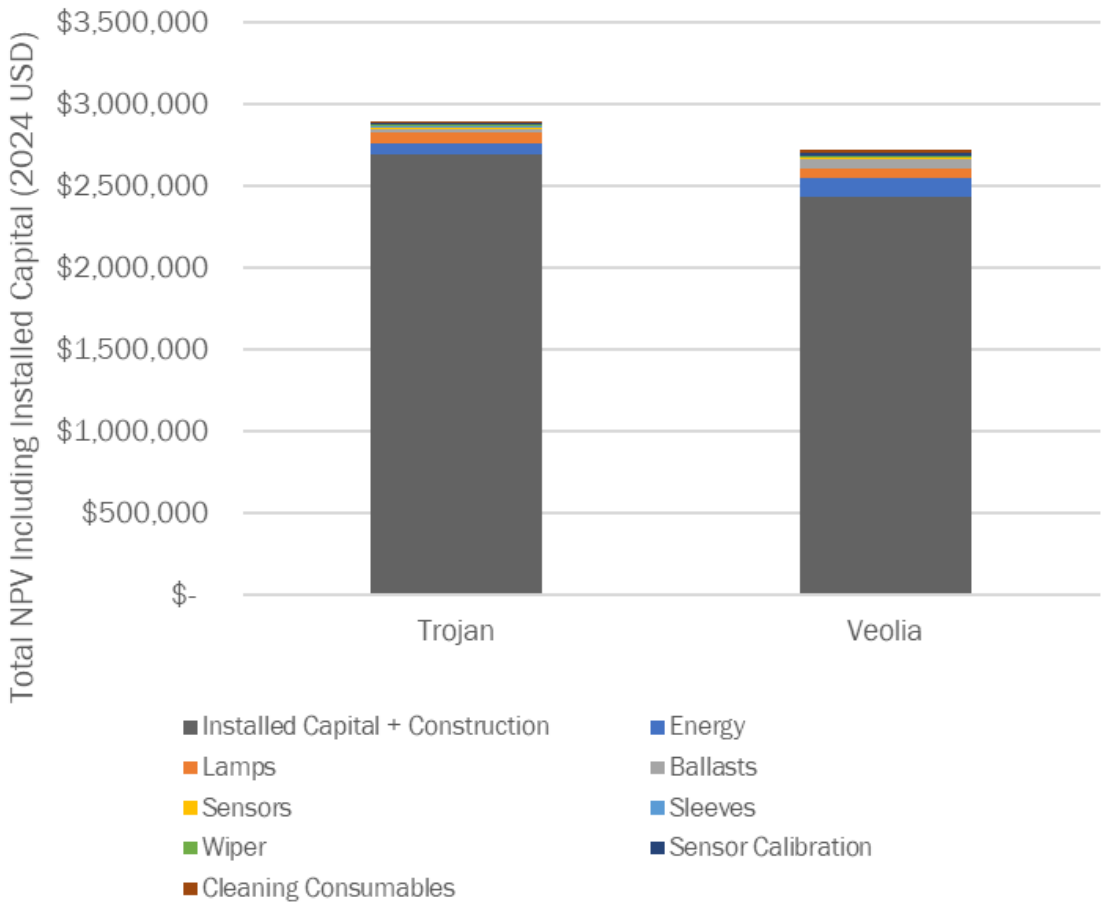

Figure 6-2. Total NPV including installed capital cost for Trojan and Veolia

Table 6-5. Results of NPV Calculations

Component of Present Value	Trojan	Veolia
Energy	$66,905	$116,345
Lamps	$70,259	$58,617
Ballasts	$21,491	$55,546
Sensors	$6,943	$6,613
Sleeves	$9,258	$5,707
Wiper	$7,274	$2,381
Sensor Calibration	$12,399	$24,797
Cleaning Consumables	$8,266	$16,531
Capital	$2,614,119	$2,414,945
TOTAL	$2,816,913	$2,701,482

Section 7: Recommendations, Future Capacity, and Schedule

This section presents BC's recommendations, summarizes future capacity needs, and presents a proposed project schedule.

7.1 Recommendations

BC recommends the TrojanUVSigna with a redundant bank as the basis of design for a replacement unit for Channel 1. The TrojanUVSigna:

- Is representative of latest-generation technology, has a longer future product lifetime, and is better suited for long-term operation at the plant.
- Has the lowest annual operating cost based on lower operating energy and maintenance costs.
- Expected lower maintenance burden on plant staff given the automatic removal system for lifting UV banks from the channel, fewer lamps to replace, and a more advanced wiper system.
- Has no requirement installation of an additional jib crane and is therefore safer for the plant staff (by eliminating the crane-based removal of UV banks).

Further, if the City were to select Veolia, given the recent change in power supply technology for the Veolia Aquaray, plant staff would need to maintain separate stores of ballasts and sensors which mitigates the system consistency advantage for Veolia.

BC does not recommend that the City carry forward the Wedeco Duron for consideration given uncertainty related to the length of the system, the requirement to widen the channel in the area of the weir, and its significantly higher annual O&M costs.

If the City prefers to avoid sole sourcing the Trojan system, a specification naming both Trojan and Veolia could be developed during detailed design. Encouraging competitive bidding is likely to reduce the system purchase prices listed in Table 5-1.

BC also recommends:

- Adding a UVT monitor to monitor UVT in real time during this upgrade.
- That the UV manufacturer provide flow conditioners at the inlet end of Channel 1 to facilitate well-distributed flow across the channel.
- A K-rated transformer for the UV system to mitigate electrical harmonics.
- A valve and flow meter manhole be installed, as part of this upgrade, upstream of Channel 1 to facilitate flow control and measurement.
- That the final design match the headloss of Channels 1 and 2 as closely as possible to facilitate even flow distribution when flows increase (requiring the use of both channels simultaneously).

7.2 Meeting Disinfection Needs in the Future

The 2023 master plan identifies a 2045 peak flow of 17.6 mgd. The recommended replacement unit adds 8.8 mgd of UV disinfection capacity, to the 8.8 mgd of capacity already in place (in Channel 2). This leads to a combined total disinfection capacity of 17.6 mgd, which meets future requirements.

7.3 Anticipated Schedule for UV System Upgrade

Figure 7-1 presents a potential schedule for the UV system upgrade that includes a 30-week delivery time for the UV system and typical durations for other activities. Note that this schedule is subject to change. BC estimates that under these conditions the City will complete the UV upgrade in mid-2027. The City could accelerate this schedule with pre-procurement of long lead items such as the UV system.

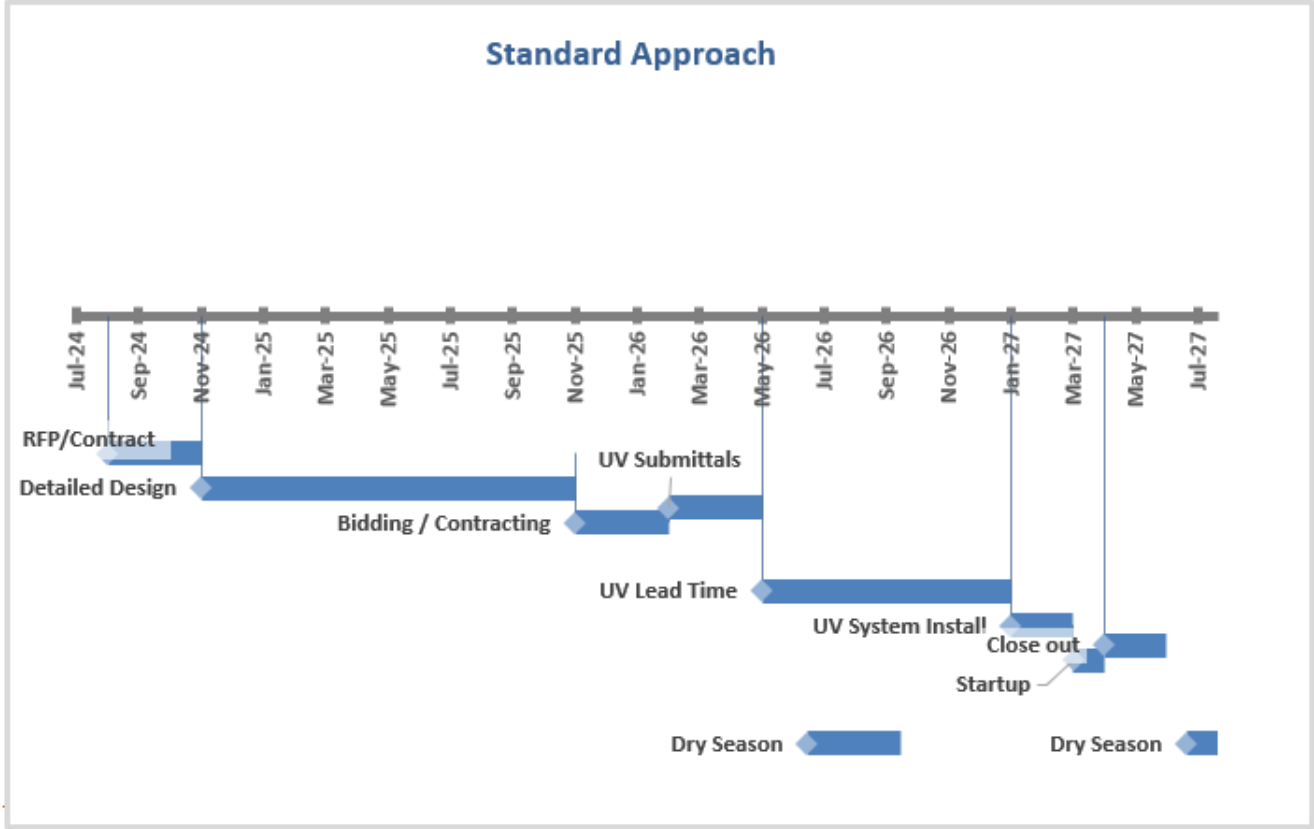

Figure 7-1. Potential schedule for UV system upgrade

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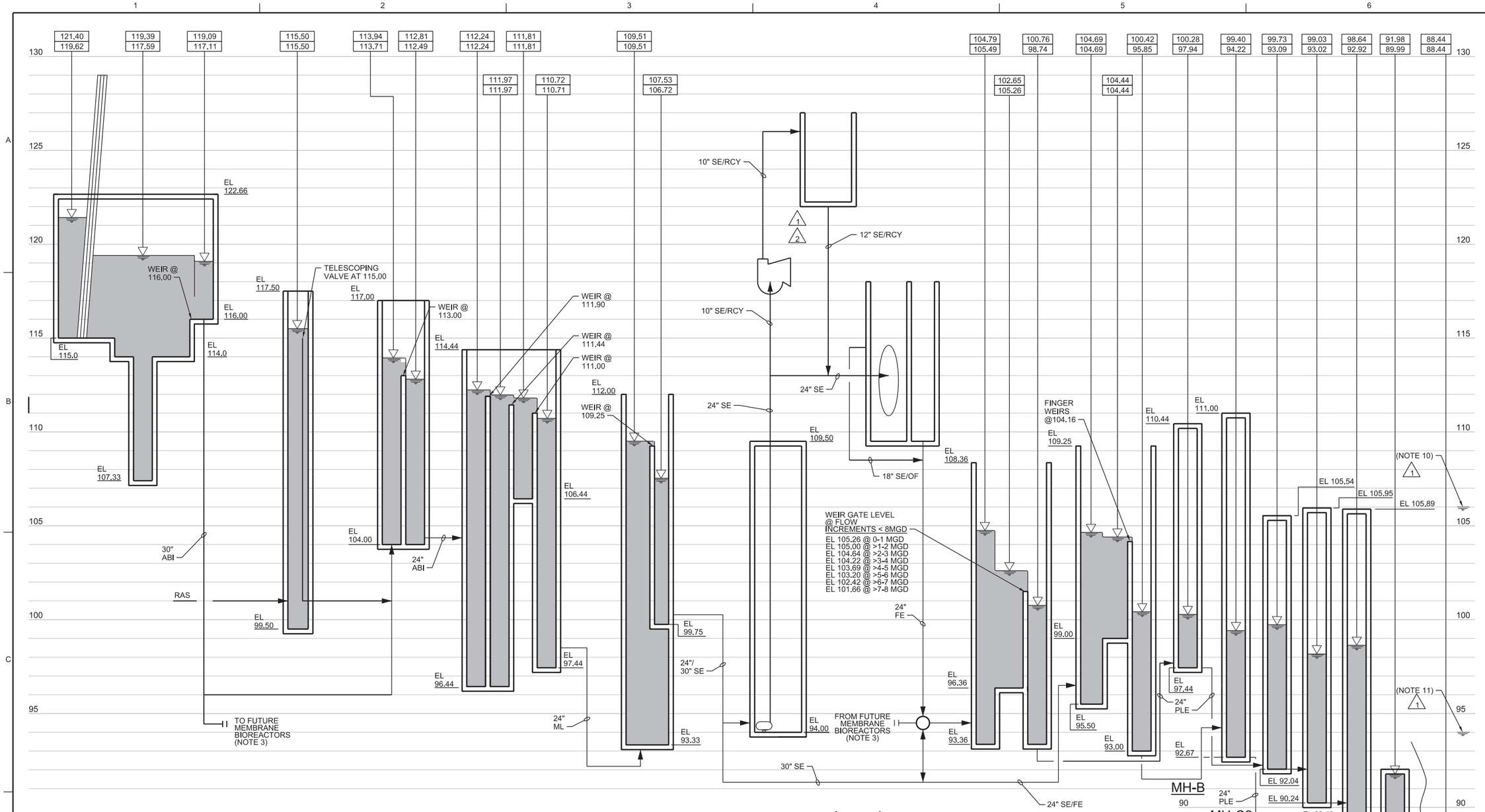
Attachment A: Hydraulic Profile



SCREENS | GRIT | STABILIZATION BASIN (NOTE 9) | AERATION BASIN INFLUENT SPLITTER BOX | AERATION BASIN | SECONDARY CLARIFIERS | FLOW CONTROL STRUCTURE (NOTE 5) | SE COOLING TOWERS (NOTE 6) | FILTERS (NOTE 6) | EXISTING UV NO. 1 (NOTE 7) | NEW UV NO. 2 (NOTE 7)

LEGEND:

XX.XX	HYDRAULIC GRADE LINE @ PEAK HOUR FLOW (PHF) (NOTE 2)
XX.XX	HYDRAULIC GRADE LINE @ PEAK DAY FLOW (PDF) (NOTE 2)

RECORD DRAWINGS

Revisions Drawn By JE BRENNWALD Date JAN 2014

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

CONDITIONS:

FLOWS (MGD)	PHF	PDF
INFLUENT	16.0	10.6
RAS	6.0	4.0
PLANT RECYCLE	0.8	0.53

UNITS IN SERVICE (QTY)	PHF	PDF
SCREENS	2	1
AERATION BASINS	3	2
SECONDARY CLARIFIERS	3	2
FILTERS	0	0
UV	2	2

NOTES:

1. RIVER AT 25-YEAR FLOOD STAGE: EL 88.44
2. WATER SURFACES SHOWN REPRESENT THE PEAK HOUR FLOW CONDTION.
3. FUTURE MEMBRANE BIOREACTORS TO TREAT 3 MGD AVERAGE DRY WEATHER FLOW.
4. NOT USED.
5. BURIED BUTTERFLY VALVE AT FLOW CONTROL STRUCTURE REMAINS CLOSED DURING WET WEATHER SEASON.
6. FILTERS AND SE COOLING TOWERS DO NOT OPERATE DURING WET WEATHER SEASON.
7. NEW UV CHANNEL NO. 2 OPERATES AS LEAD UNIT DURING WET WEATHER SEASON. EXISTING UV OPERATES AS LAG UNIT.
8. THE WET WEATHER SEASON SPANS NOVEMBER 1 TO APRIL 30.
9. STABILIZATION BASIN WATER SURFACE ELEVATION IS BASED 0.5 FEET OF HEAD OVER THE CIRCULAR WEIR (A TELESCOPING VALVE) AT A RAS FLOW RATE OF 3MGD TO THE BASIN.
10. RIVER AT 500-YEAR FLOOD STAGE: EL 106.00.
11. RIVER AT 100-YEAR FLOOD STAGE: EL 94.00.

REGISTERED PROFESSIONAL ENGINEER — OREGON — 73655PE — MICHELLE L. BENNHART — EXPIRES: 12/31/15

NO.	DATE	DSGN	DR	CHK	APVD	BY
1	11/2012	ME STEINER	JN HJELMBERG	ML BURKHART	APVD	KL MAESTRI
	01/2014					

REVISION: DCN 009

CONSTRUCTION RECORD DRAWINGS

LMB WBL KLM KLM

Design-Build-Operate
Wastewater Treatment Plant Improvements
City of Wilsonville
Wilsonville , OR 97070

CH2MHILL®

GENERAL

WET WEATHER HYDRAULIC PROFILE

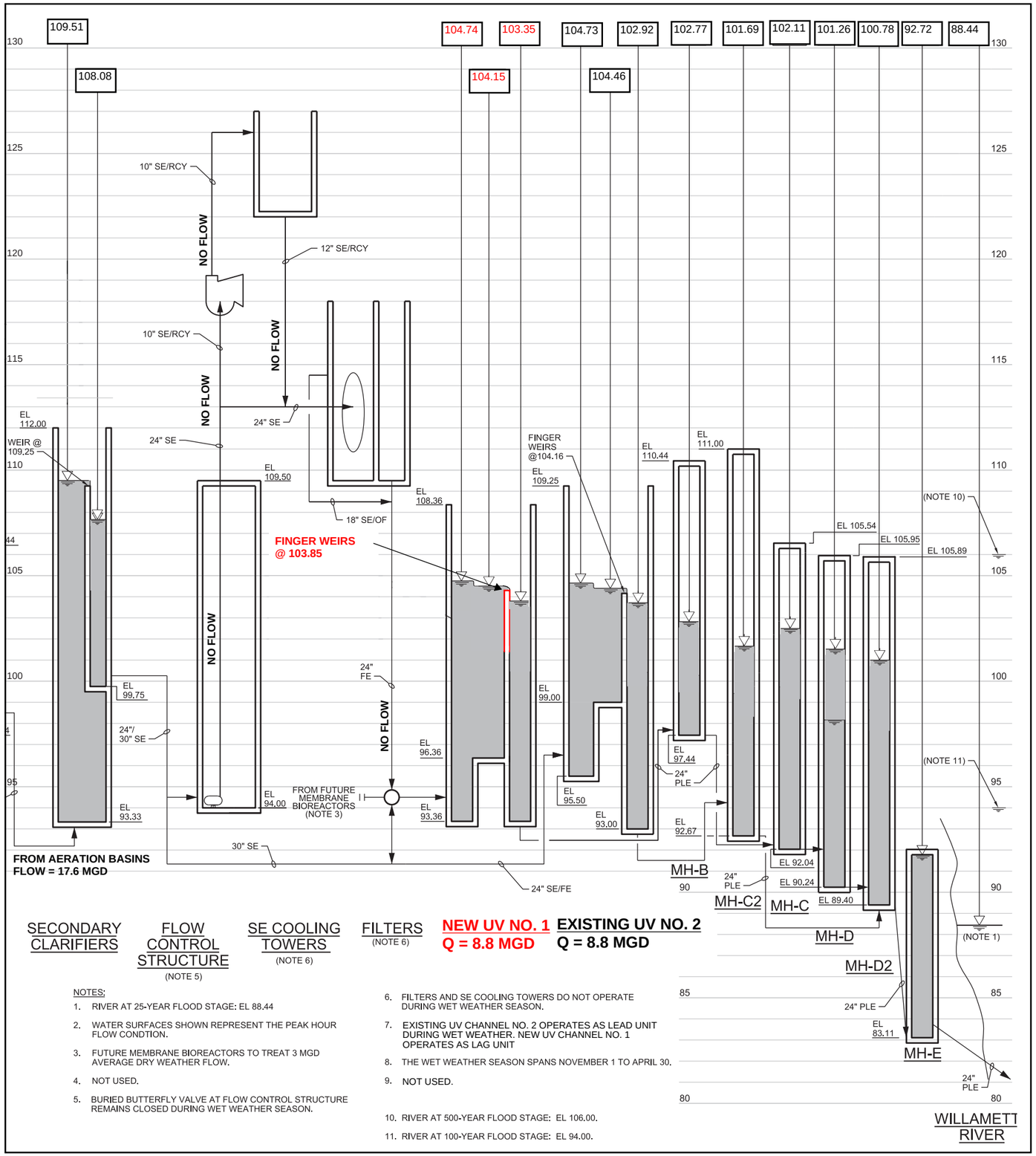
VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JUNE 2012
PROJ	425034
DWG	00-G-0093
SHEET	33

FILENAME: 00-G-0093_425034.dgn PLOT DATE: 2014\06\06 PLOT TIME: 3:16:23 PM

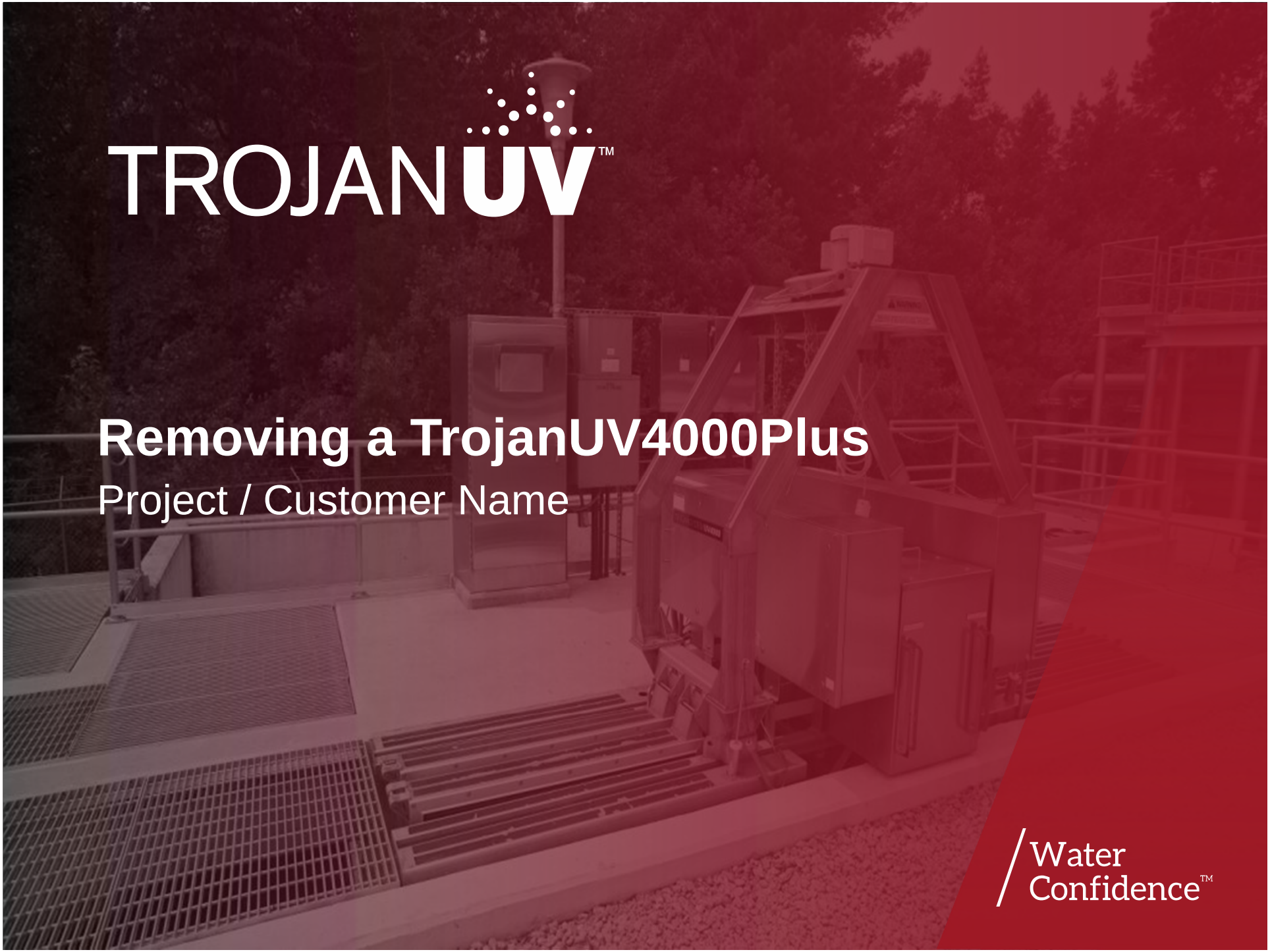
Attachment B: Hydraulic Profile with Updated UV System in Channel 1



NOTES:

1. RIVER AT 25-YEAR FLOOD STAGE: EL 88.44
2. WATER SURFACES SHOWN REPRESENT THE PEAK HOUR FLOW CONDTION.
3. FUTURE MEMBRANE BIOREACTORS TO TREAT 3 MGD AVERAGE DRY WEATHER FLOW.
4. NOT USED.
5. BURIED BUTTERFLY VALVE AT FLOW CONTROL STRUCTURE REMAINS CLOSED DURING WET WEATHER SEASON.
6. FILTERS AND SE COOLING TOWERS DO NOT OPERATE DURING WET WEATHER SEASON.
7. EXISTING UV CHANNEL NO. 2 OPERATES AS LEAD UNIT DURING WET WEATHER. NEW UV CHANNEL NO. 1 OPERATES AS LAG UNIT
8. THE WET WEATHER SEASON SPANS NOVEMBER 1 TO APRIL 30.
9. NOT USED.
10. RIVER AT 500-YEAR FLOOD STAGE: EL 106.00.
11. RIVER AT 100-YEAR FLOOD STAGE: EL 94.00.

Attachment C: TrojanUV4000 Removal Instructions



Removing a TrojanUV4000Plus

Project / Customer Name

Water Confidence™

MAKING THE UPGRADE

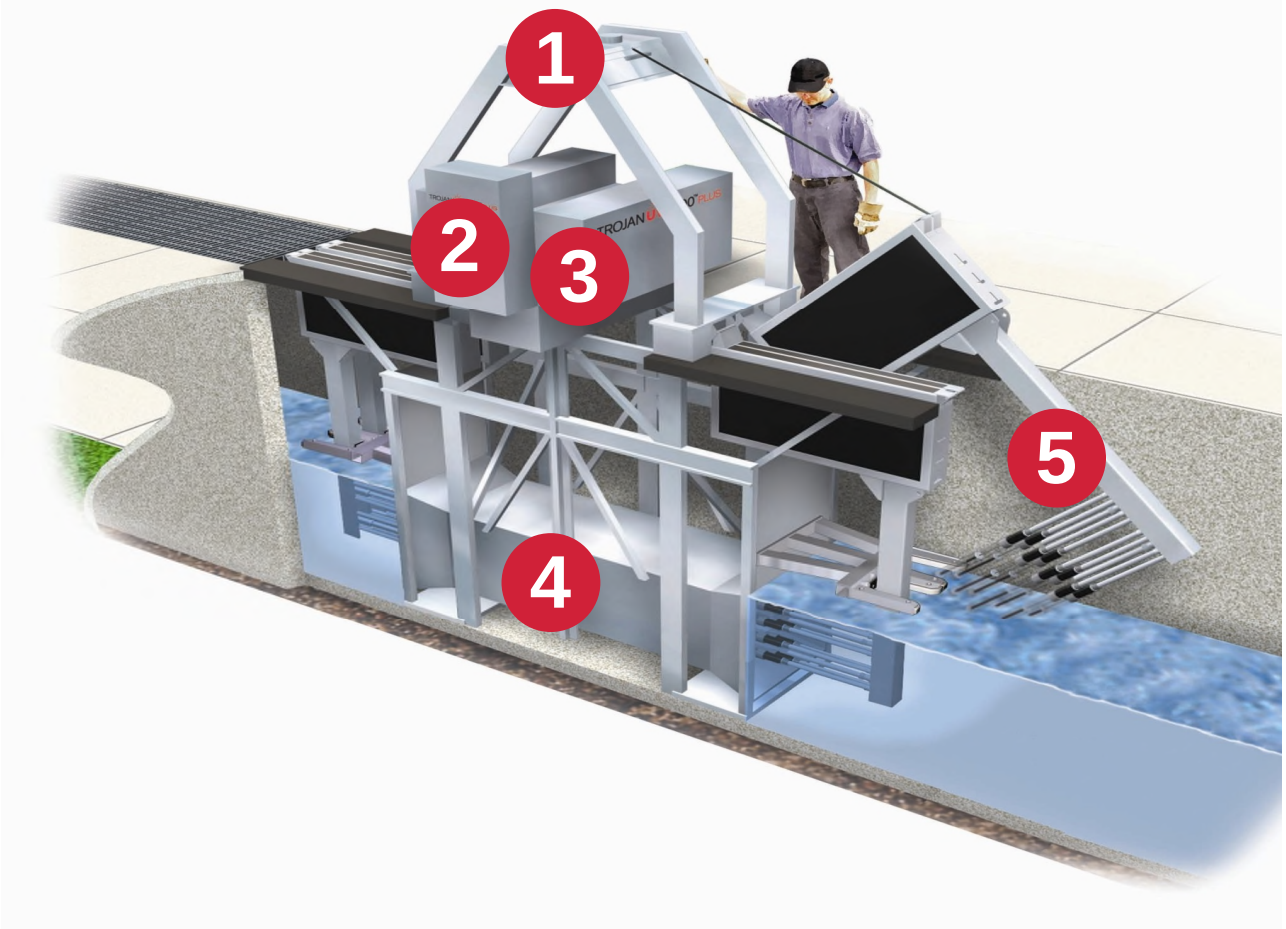
- Municipalities throughout the world are choosing TrojanUV systems for their disinfection upgrade and chlorine conversion projects
- Significant innovation has occurred in the 15 to 20 years since many UV systems have been placed in operation
- We have helped hundreds of municipalities replace and upgrade their UV disinfection system
- The following slides provide a quick step-by-step overview of how a TrojanUV4000Plus is removed from a channel

Then


Now

TROJANUV4000 CONFIGURATION

1. Module Removal Mechanism (MRM)
2. Hydraulic System Center (HSC)
3. Power Distribution Center (PDC)
4. Reactor Insert and Mounted Components
5. Module



STEP #1:
REMOVE MODULES

- Lift grating
- Lift modules using MRM
- Wash down modules
- Lower grating
- Remove lamps, sleeves and ballasts
- Disconnect all cables and hoses between PDC, HSC and modules
- Support module body using forklift truck and slings
- Remove entire module by removing module hinge nuts
- Estimated 5 hours / module

STEP #2:
REMOVE FLUIDS

- Remove coolant and hydraulic fluids from HSC power pack and coolant reservoir
- Store in suitable containers for disposal
- Estimated 2-3 hours per reactor

STEP #3:
REMOVE MRM

- Remove motor assembly
- Unbolt MRM from reactor
- Lift from reactor using forklift truck or crane
- Estimated 1 hour per MRM

STEP #4:
REMOVE PDC & HSC

- Unbolt PDCs from reactor
- Lift from reactor using forklift truck and slings
- Unbolt HSC from reactor
- Lift from reactor using forklift truck and slings
- Estimated 3 hours per reactor

STEP #5:
REMOVE BEAMS

- Beams that held the modules need to be removed
- One beam spans each bank (two beams per reactor)
- Estimated 1 hour per beam

STEP #6:
REMOVE REACTOR INSERT

- This is the most challenging step in the UV system removal process
- The SS reactor insert and beams are encased in concrete

Grouted Concrete

Reactor insert & coolant reservoir

STEP #6:
REMOVE REACTOR INSERT

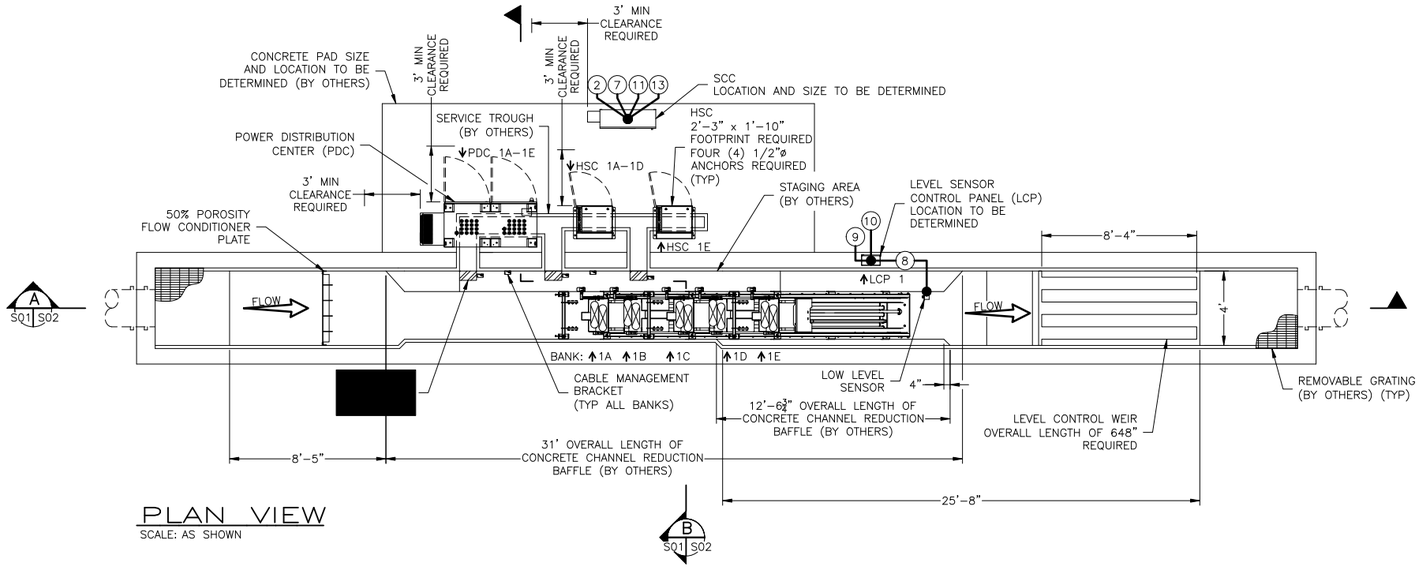
- The concrete will need to be chipped out to gain access to the reactor insert(s)
- Approx. volume of concrete to be removed: 15-20 yd^3
- Methods include jack-hammering, concrete and SS saw-cutting
- Ensure that coolant from insert in fully pumped out before removal
- Time to remove inserts varies based on methods used and experience

MAKING THE UPGRADE

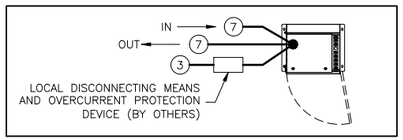
- TrojanUVSigna reactor (shown) does not require tight tolerances on channel floor or walls
- Designed to easily fit into existing TrojanUV4000 channels


TROJAN UV SIGNA™

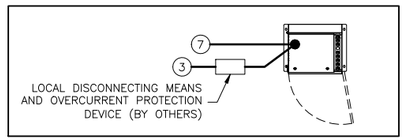
Attachment D: Preliminary Arrangement Drawings of the TrojanUVSigna and Veolia Aquaray 3XHO



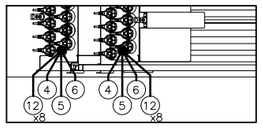
PLAN VIEW
SCALE: AS SHOWN



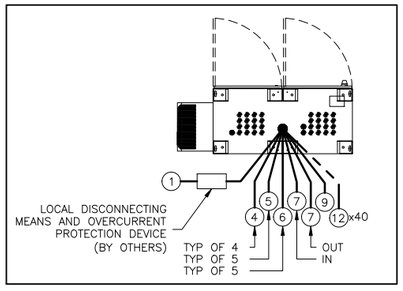
HSC 1A–1D INTERCONNECT DETAIL
SCALE:NOT TO SCALE



HSC 1E INTERCONNECT DETAIL
SCALE:NOT TO SCALE



UV BANK INTERCONNECT DETAIL
SCALE:NOT TO SCALE
NOTE: TYPICAL FOR ALL UV BANKS.
TROUGH NOT SHOWN FOR CLARITY.



PDC INTERCONNECT DETAIL
SCALE:NOT TO SCALE

TROJAN UVSIGNA™
EQUIPMENT INTERCONNECTIONS

No.	DESCRIPTION	FROM	TO
1	POWER DISTRIBUTION CENTER (PDC)* POWER SUPPLY 480Y/277V, 3 PHASE, 4 WIRE + GROUND 57 AMPS MAXIMUM CURRENT/PHASE 45 kVA/PDC POWER DRAW	DISTRIBUTION PANEL (DP) (BY OTHERS) (NOT SHOWN)	PDC (TOP OF PANEL)
2	SYSTEM CONTROL CENTER (SCC)* POWER SUPPLY 120V, 1 PHASE, 2 WIRE + GROUND 15 AMPS, 1.8 kVA	DP (BY OTHERS) (NOT SHOWN)	SCC
3	HYDRAULIC SYSTEM CENTER (HSC)* POWER SUPPLY 480V, 3 PHASE, 3 WIRE + GROUND 3 AMPS, 2.5 kVA	DP (BY OTHERS) (NOT SHOWN)	HSC
4	BONDING CONDUCTOR 8 AWG TYPE TWH STRANDED	PDC (UNDERSIDE OF PANEL)	UV BANKS
5	UV INTENSITY 4–20MA ANALOG INPUT (SUPPLIED)	UV BANKS	PDC (UNDERSIDE OF PANEL)
6	BANK IN PLACE PROXIMITY SENSOR 3 CONDUCTOR CABLES (SUPPLIED)	PROXIMITY SENSORS	PDC (UNDERSIDE OF PANEL)
7	MODBUS BELDEN 3106A OR EQUIVALENT (ONE LINE PER CHANNEL)	SCC	HSC & PDC (UNDERSIDE OF PANEL) (DAISY CHAINED)
8	DISCRETE LOW LEVEL SIGNAL 24 VDC – 2 CONDUCTORS	LOW LEVEL SENSOR	LEVEL SENSOR CONTROL BOX (LCP)
9	DISCRETE WATER LEVEL SIGNAL 2 CONDUCTORS	LEVEL SENSOR CONTROL BOX (LCP)	PDC (UNDERSIDE OF PANEL)
10	LEVEL SENSOR CONTROL BOX (LCP)* POWER SUPPLY 120V, 1 PHASE, 2 WIRE + GROUND, 0.12 kVA	DP (BY OTHERS) (NOT SHOWN)	LEVEL SENSOR CONTROL BOX (LCP)
11	FLOW METER 4–20 mA, DC ANALOG INPUT	FLOW METER PANEL (NOT SHOWN) (BY OTHERS)	SCC
12	LAMP CABLES (SUPPLIED)	UV BANKS	PDC (UNDERSIDE OF PANEL)
13	ETHERNET/IP COMMUNICATION	SCC	PLANT SCADA (BY OTHERS) (NOT SHOWN)

*** GROUND CONNECTION REQUIRED TO PLANT GRID (BY OTHERS).**

NOTES:
: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR – ¼" AGAINST A COMMON DATUM ELEVATION.
: ANCHOR BOLTS ARE NOT SUPPLIED BY TROJAN TECHNOLOGIES,
: SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS & INTERCONNECTIONS BY OTHERS.
: ELECTRICAL REQUIREMENTS SHOWN ARE TO SUPPLY TROJAN UV EQUIPMENT ONLY.
: REMOVABLE GRATING SECTIONS SHALL BE EASILY REMOVED BY ONE PERSON. MAXIMUM WEIGHT OF THE SECTIONS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE APPLICABLE JURISDICTION.
: CONTRACTOR TO REVIEW ALL TROJAN TECHNOLOGIES INSTALLATION INSTRUCTIONS PRIOR TO EQUIPMENT INSTALLATION.
: EFFLUENT LEVELS SHOWN REFLECT HYDRAULICS ASSOCIATED WITH TROJAN EQUIPMENT ONLY. EFFLUENT LEVELS MAY BE ALTERED DUE TO CHANNEL DEBRIS OR GEOMETRY.
: ANY UPSTREAM AND DOWNSTREAM WL ELEVATIONS BEYOND THOSE SHOWN WITHIN THIS LAYOUT DRAWING ARE OUTSIDE OF THE SCOPE OF TROJAN TECHNOLOGIES AND ARE THE RESPONSIBILITY OF THE CONSULTING ENGINEER.
: HYDRAULIC HOSE ELEVATIONS NOT TO EXCEED 12" ABOVE HSC MOUNTING ELEVATION.
: INCLUDED CABLE LENGTH ALLOWS FOR 28.5' ROUTING (RISE + RUN) BETWEEN CABLE/HOSE MANAGEMENT BRACKET AND UNDERSIDE OF PDC. (15.0' ROUTING ASSUMED BASED ON THIS LAYOUT.)
: INCLUDED HOSE LENGTH ALLOWS FOR 26.0' ROUTING (RISE + RUN) BETWEEN CABLE/HOSE MANAGEMENT BRACKET AND HOSE CONNECTION ON THE HSC. (16.5' ROUTING ASSUMED BASED ON THIS LAYOUT.)
: 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 FEET IS OF SUFFICIENT LENGTH TO ACCESS THE WORK AT THE CHANNEL.
**** SOLID GRATING REQUIRED TO BLOCK ULTRAVIOLET (UV) LIGHT.**

(4 DUTY BANKS / 1 REDUNDANT BANK)

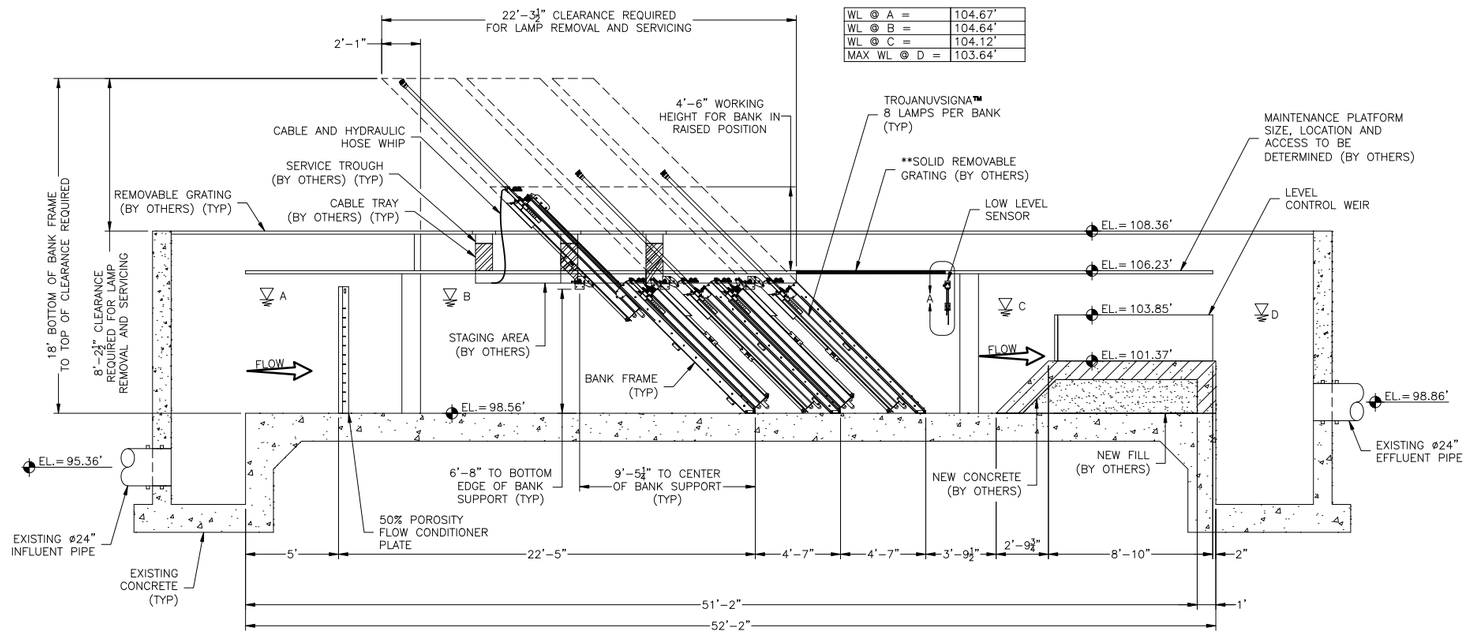
PRELIMINARY, NOT FOR CONSTRUCTION
VERIFY DIMENSIONS BEFORE COMMENCING CIVIL OR DESIGN WORK

DESIGN CRITERIA		
PEAK FLOW	8.8 **MGD**	
U.V TRANSMITTANCE AT 253.7 nm	55 %	
SUSPENDED SOLIDS	20 mg / L (30 DAY AVERAGE)	
DISINFECTION STANDARD	126 E.COLI / 100mL (30 DAY GEO MEAN)	

DESCRIPTION: LAYOUT, TROJANUVSIGNA
WILSONVILLE – UV4000 REPLACEMENT WWTP, OR

DRAWN BY : PD	DATE : 24AU19
CHECKED BY : MC	DATE : 24AU22
APPROVED BY : SS	DATE : 24AU22
SCALE (11x17) : 1/8" = 1'-0"	LOG NUMBER : N/A

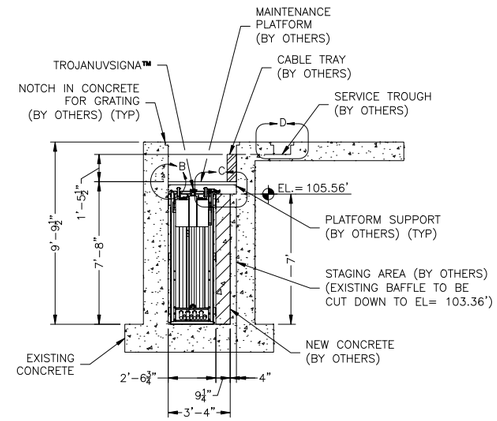
QUOTE NO. 245424
PROJECT NO. N/A
DWG NO. S01
REV. A



WL @ A =	104.67'
WL @ B =	104.64'
WL @ C =	104.12'
MAX WL @ D =	103.64'

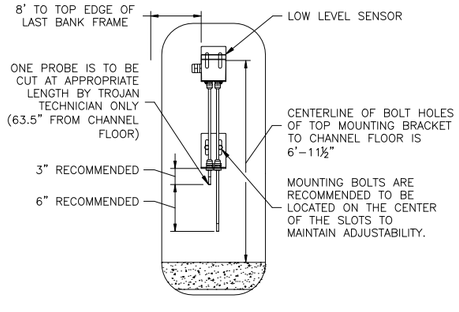
A SECTION

S01 S02 SCALE: AS SHOWN
NOTE: HSC, PDC, SCC, AND LCP NOT SHOWN FOR CLARITY.



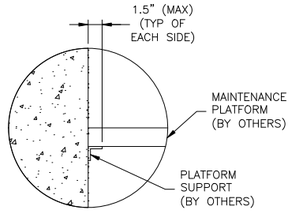
B SECTION

S01 S02 SCALE: AS SHOWN
NOTE: PDC, FLOW CONDITIONER PLATE, AND REMOVABLE GRATING (BY OTHERS) NOT SHOWN FOR CLARITY.



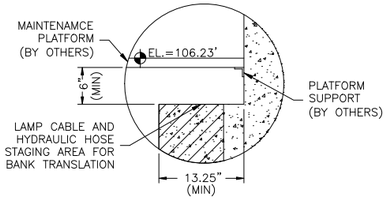
DETAIL A

SCALE:NOT TO SCALE



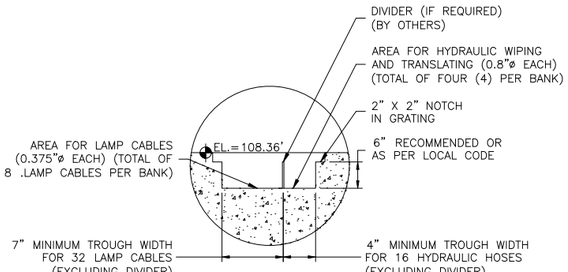
DETAIL B

SCALE:NOT TO SCALE



DETAIL C

SCALE:NOT TO SCALE



DETAIL D

SCALE:NOT TO SCALE
NOTE: REFER TO TROJAN TROUGH CABLE INSTALLATION GUIDELINE DC000601-017 OR LOCAL CODE IF MORE RESTRICTIVE. TROUGH WIDTHS BASED ON SOLID STYLE GRATING.

NOTES:

: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR – ¼" AGAINST A COMMON DATUM ELEVATION.
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: INCLUDED CABLE LENGTH ALLOWS FOR 28.5' ROUTING (RISE + RUN) BETWEEN CABLE/HOSE MANAGEMENT BRACKET AND UNDERSIDE OF PDC. (15.0' ROUTING ASSUMED BASED ON THIS LAYOUT.)
: INCLUDED HOSE LENGTH ALLOWS FOR 26.0' ROUTING (RISE + RUN) BETWEEN CABLE/HOSE MANAGEMENT BRACKET AND HOSE CONNECTION ON THE HSC. (16.5' ROUTING ASSUMED BASED ON THIS LAYOUT.)
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** SOLID GRATING REQUIRED TO BLOCK ULTRAVIOLET (UV) LIGHT.**

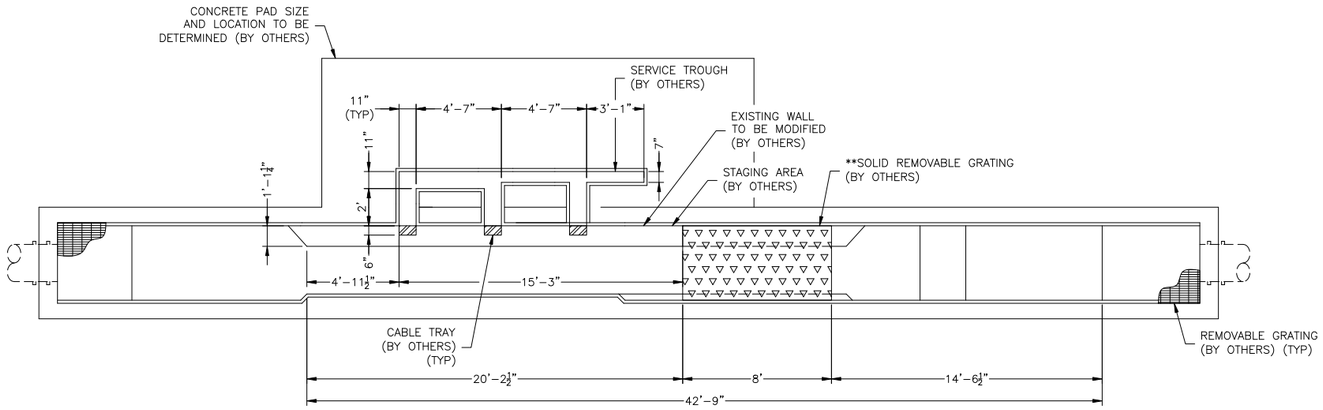
PRELIMINARY, NOT FOR CONSTRUCTION
VERIFY DIMENSIONS BEFORE COMMENCING CIVIL OR DESIGN WORK

TROJANUV™
A TROJAN TECHNOLOGIES BUSINESS

DESCRIPTION: LAYOUT, TROJANUVSIGNA
WILSONVILLE – UV4000 REPLACEMENT WWTP, OR

DRAWN BY : PD	DATE : 24AU19
CHECKED BY : MC	DATE : 24AU22
APPROVED BY : SS	DATE : 24AU22
SCALE (11x17) : 1/8" = 1'-0"	LOG NUMBER : N/A

QUOTE NO.	245424
PROJECT NO.	N/A
DWG NO.	S01
REV.	A



GRATING AND TROUGH PLAN VIEW

SCALE: AS SHOWN
NOTE: DESIGN OF GRATING SECTIONS SHOULD BE SIZED TO ALLOW FOR EASY REMOVAL BY SERVICE TECHNICIANS. SOLID GRATING MUST BE PROVIDED IN AREA INDICATED TO BLOCK UV LIGHT.

NOTES:

: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR – ¼" AGAINST A COMMON DATUM ELEVATION.
: ANCHOR BOLTS ARE NOT SUPPLIED BY TROJAN TECHNOLOGIES,
: SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS & INTERCONNECTIONS BY OTHERS.
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: INCLUDED CABLE LENGTH ALLOWS FOR 28.5' ROUTING (RISE + RUN) BETWEEN CABLE/HOSE MANAGEMENT BRACKET AND UNDERSIDE OF PDC. (15.0' ROUTING ASSUMED BASED ON THIS LAYOUT.)
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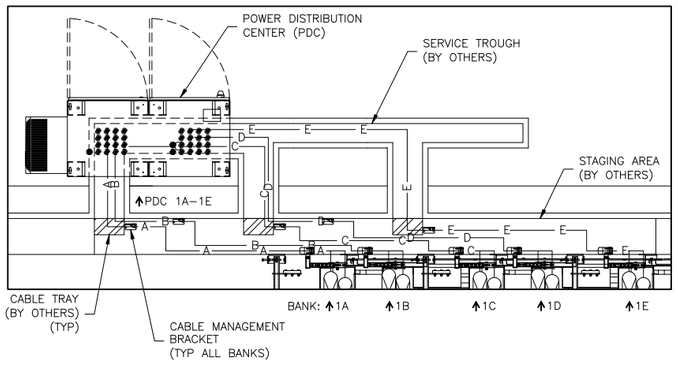
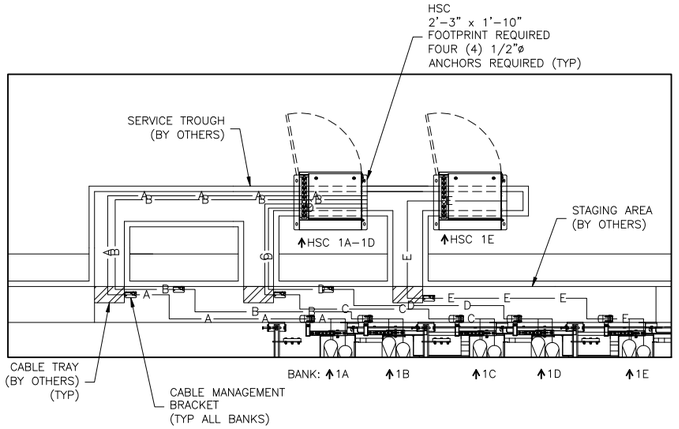
**** SOLID GRATING REQUIRED TO BLOCK ULTRAVIOLET (UV) LIGHT.**



LAMP CABLE ROUTING PLAN

SCALE: NOT TO SCALE
NOTE: HSC NOT SHOWN FOR CLARITY.



HYDRAULIC HOSE ROUTING PLAN

SCALE: NOT TO SCALE
NOTE: PDC NOT SHOWN FOR CLARITY.

PRELIMINARY, NOT FOR CONSTRUCTION
VERIFY DIMENSIONS BEFORE COMMENCING CIVIL OR DESIGN WORK

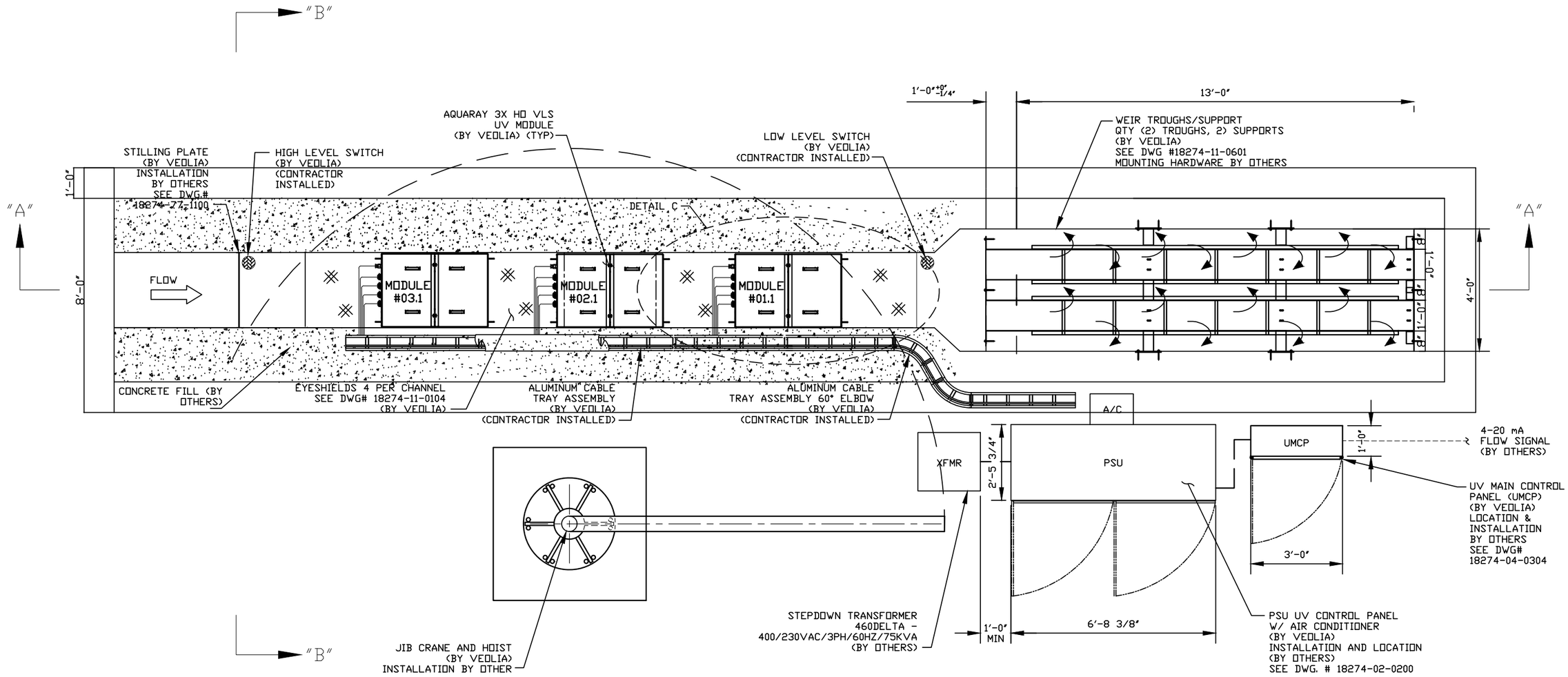
TROJANUV
A TROJAN TECHNOLOGIES BUSINESS

DESCRIPTION: LAYOUT, TROJANUVSIGNA WILSONVILLE – UV4000 REPLACEMENT WWTP, OR		QUOTE NO. 245424
DRAWN BY : PD	DATE : 24AU19	PROJECT NO. N/A
CHECKED BY : MC	DATE : 24AU22	
APPROVED BY : SS	DATE : 24AU22	DWG NO. S01 / REV. A
SCALE (11x17) : 1/8" = 1'–0"	LOG NUMBER : N/A	

NOTES

1. FOR SECTIONS & DETAILS OF LAYOUT, SEE SHEETS 2, 3, & 4 OF THIS DRAWING.

2. CONTACT ONZONIA IF ADDITIONAL INFORMATION IS REQUIRED.



PLAN VIEW

REV	DESCRIPTION	ECO	DWN	APPR	APPR	DATE

TOLERANCES UNLESS NOTED
DECIMALS .X .XX .XXX
ANGLES
FRAC

VEOLIA

CUSTOMER INFORMATION: WILSONVILLE, OR

SYSTEM PLAN LAYOUT
AQUARAY 3X VLS DISINFECTION SYSTEM

DRAWING NUMBER	REVISION
18274-77-0201	A1

REF.: -
DOC. OWNER: -

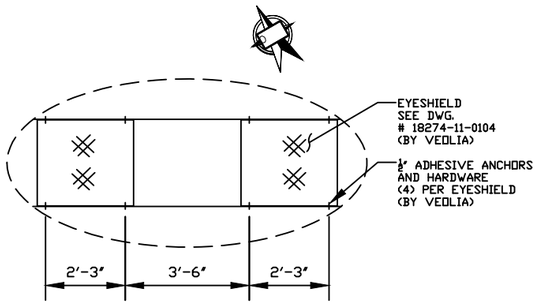
PROJECT NO.	PART/MATERIAL NO.	SCALE	SIZE	SHEET
			D	OF

LAST SAVED: Tuesday, May 7, 2024 2:02:15 PM

FILE LOCATION: C:\Users\REC129\Downloads\18274-77-0201 new.dwg

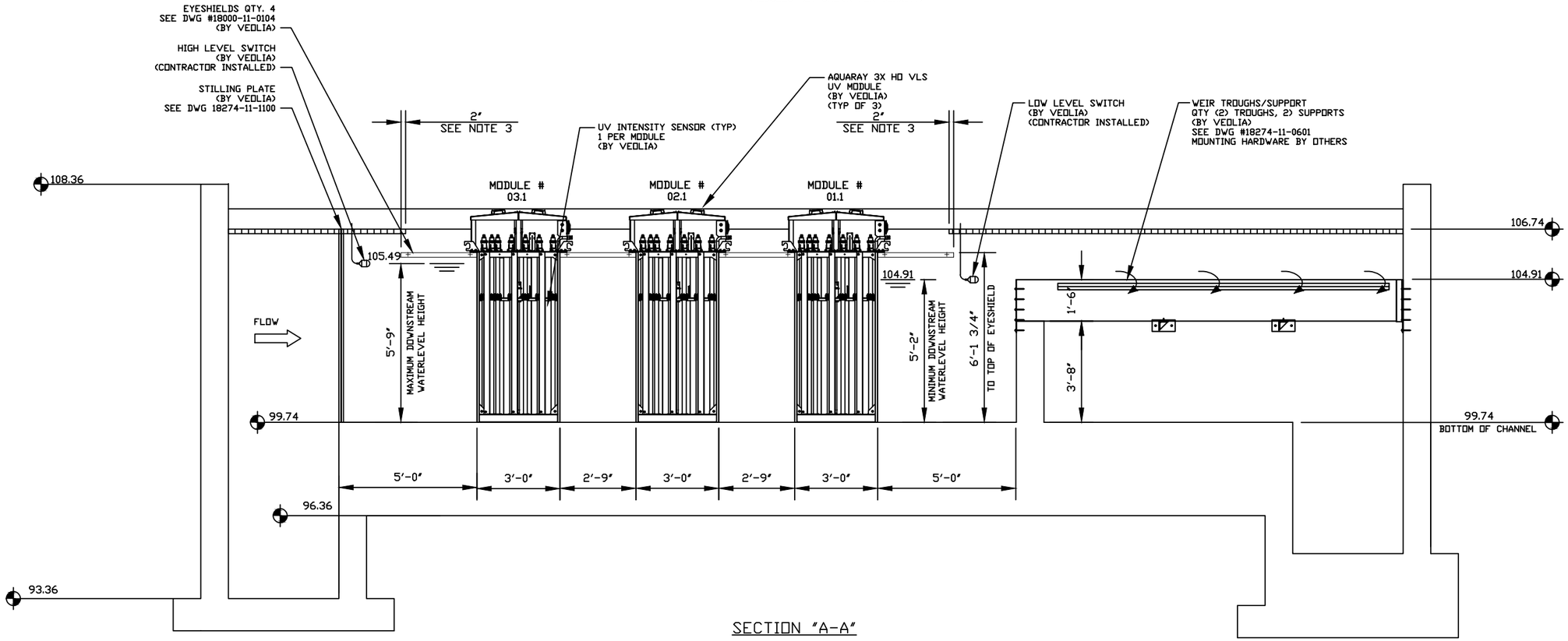
NOTES

1. FOR ADDITIONAL SECTIONS & DETAILS OF LAYOUT, SEE SHEET 3 & 4 OF THIS DRAWING.
2. FOR PLAN VIEW OF LAYOUT, SEE SHEET 1 OF THIS DRAWING.
3. GRATING TO BE INSTALLED OVER AREAS OF UV CHANNEL NOT COVERED BY UV MODULE OR EYESHEILD. 2" OVERLAP BETWEEN GRATING AND EYESHEILD IS RECOMMENDED.



DETAIL "C"

EYESHIELD ANCHOR BOLT LAYOUT
(MODULES NOT SHOWN FOR CLARITY)



SECTION "A-A"

REV	DESCRIPTION	ECO	DWN	APPR	APPR	DATE

TOLERANCES UNLESS NOTED
DECIMALS .X .XX .XXX
ANGLES
FRAC

VEOLIA

CUSTOMER INFORMATION
WILSONVILLE, OR

SYSTEM PLAN LAYOUT
AQUARAY 3X VLS DISINFECTION SYSTEM

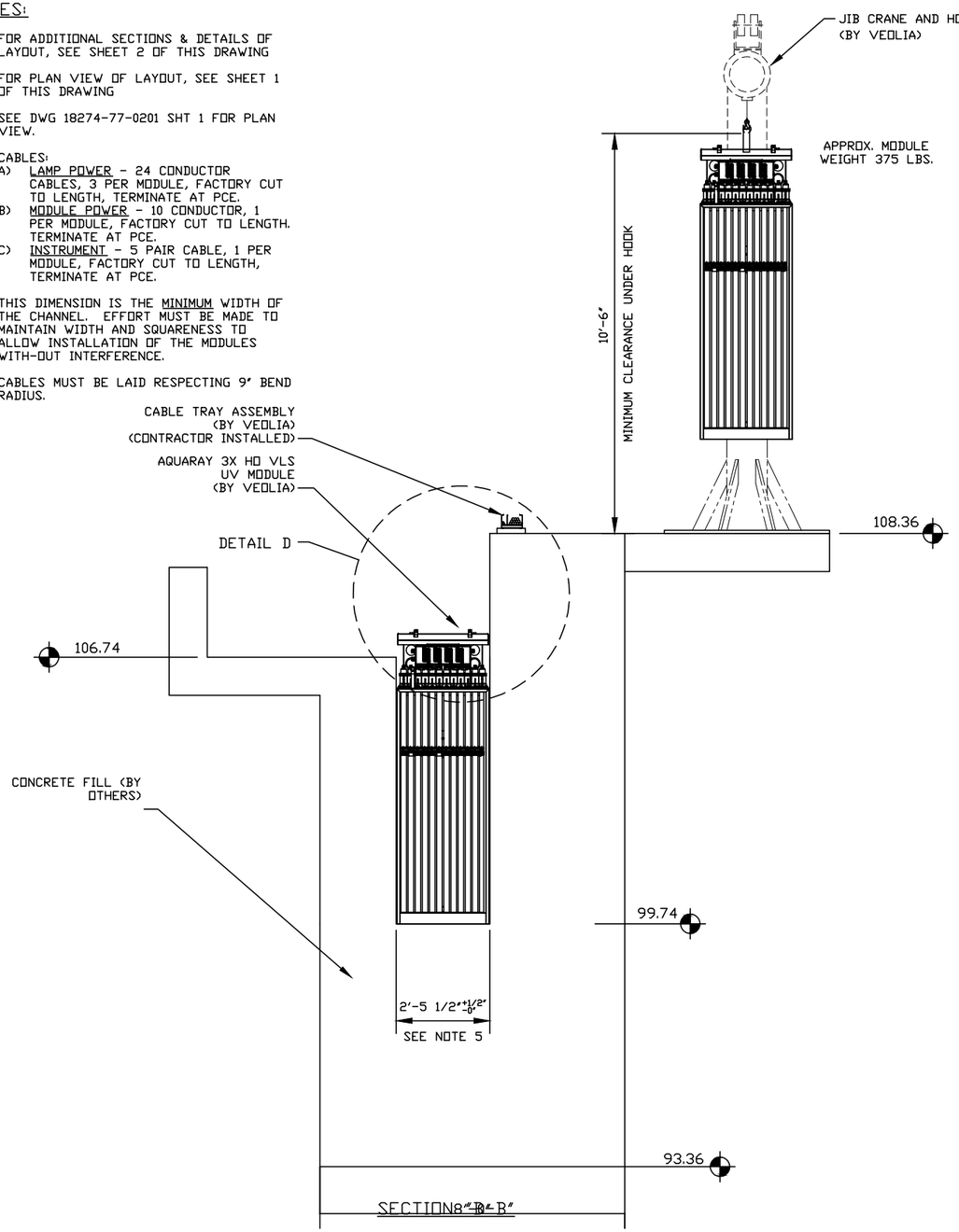
DRAWING NUMBER 18274-77-0201
REVISION A1
REF.: -
DOC. OWNER: -
PROJECT NO.
PART/MATERIAL NO.
SCALE
SIZE D
SHEET OF

LAST SAVED: Tuesday, May 7, 2024 2:02:15 PM

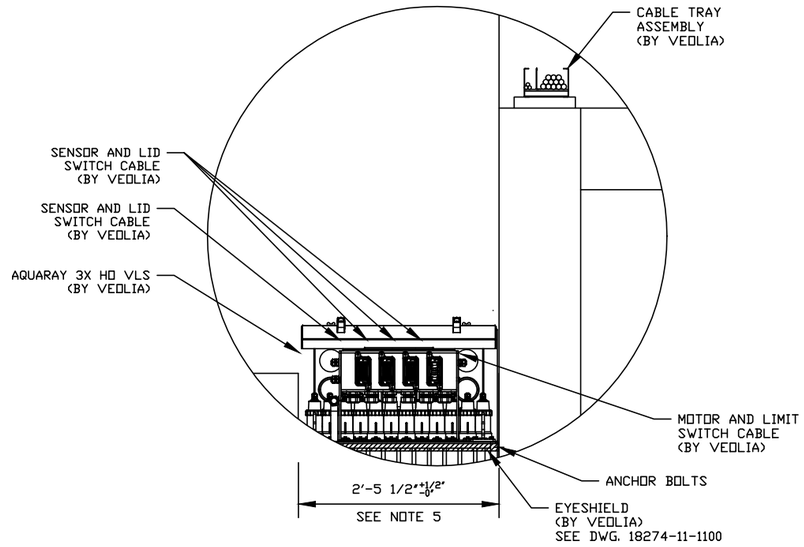
FILE LOCATION: C:\Users\REC129\Downloads\18274-77-0201 new.dwg

NOTES:

1. FOR ADDITIONAL SECTIONS & DETAILS OF LAYOUT, SEE SHEET 2 OF THIS DRAWING
2. FOR PLAN VIEW OF LAYOUT, SEE SHEET 1 OF THIS DRAWING
3. SEE DWG 18274-77-0201 SHT 1 FOR PLAN VIEW.
4. CABLES:
   A) LAMP POWER - 24 CONDUCTOR CABLES, 3 PER MODULE, FACTORY CUT TO LENGTH, TERMINATE AT PCE.
   B) MODULE POWER - 10 CONDUCTOR, 1 PER MODULE, FACTORY CUT TO LENGTH. TERMINATE AT PCE.
   C) INSTRUMENT - 5 PAIR CABLE, 1 PER MODULE, FACTORY CUT TO LENGTH, TERMINATE AT PCE.
5. THIS DIMENSION IS THE MINIMUM WIDTH OF THE CHANNEL. EFFORT MUST BE MADE TO MAINTAIN WIDTH AND SQUARENESS TO ALLOW INSTALLATION OF THE MODULES WITH-OUT INTERFERENCE.
6. CABLES MUST BE LAID RESPECTING 9" BEND RADIUS.



SECTION 8"-B"-B"



DETAIL "D"

REV	DESCRIPTION	ECO	DWN	APPR	APPR	DATE

TOLERANCES UNLESS NOTED
DECIMALS ANGLES
.X
.XX FRAC
.XXX

VEOLIA

CUSTOMER INFORMATION
WILSONVILLE, OR

SYSTEM PLAN LAYOUT
AQUARAY 3X VLS DISINFECTION SYSTEM

DRAWING NUMBER	REVISION
18274-77-0201	A1
REF.: -	DOC. OWNER: -

PROJECT NO.	PART/MATERIAL NO.	SCALE	SIZE	SHEET
			D	OF

LAST SAVED: Tuesday, May 7, 2024 2:02:15 PM

FILE LOCATION: C:\Users\REC129\Downloads\18274-77-0201 rev.dwg

Attachment E: Results of Cost Opinion

Memorandum

Date:	July 26, 2024
To:	Tim Mills, Portland, OR
From:	Javier Velez, Orlando, FL
Reviewed by:	William Agster, Denver, CO
Copy to:	Yadiel Rodriguez, Atlanta, GA
Project No.:	195468.002.205
Subject:	Wilsonville UV System Predesign
	BODR-Percent Design Completion
	Basis of Estimate of Probable Construction Cost

The Basis of Estimate Report and supporting estimate reports for the subject project are attached. Please call me if you have questions or need additional information.

Enclosures (3):

1. Basis of Estimate Report
2. Summary Estimate
3. Detailed Estimate

Basis of Estimate Report

Wilsonville UV System Predesign

Introduction

Brown and Caldwell (BC) is pleased to present this opinion of probable construction cost (estimate) prepared for the Wilsonville UV System Predesign, Wilsonville, OR.

Estimated Project Costs

Based on the typical accuracy of a Class 4 estimate, the expected ranges of costs are:

	Upper Range	Estimated Cost	Lower Range
	+ 50%		- 30 %
Alt 1 Trojan UV System	$3,921,179	$2,614,119	$1,829,683
Alt 2 Veolia UV System	$3,622,415	$2,414,943	$1,690,460

Summary

This Basis of Estimate contains the following information:

- Scope of work
- Background of this estimate
- Class of estimate
- Estimating methodology
- Direct cost development
- Indirect cost development
- Bidding assumptions
- Estimating assumptions
- Estimating exclusions
- Allowances for known but undefined work
- Contractor and other estimate markups

Scope of Work

This project will replace the UV system in Channel One while keeping Channel Two in operation. This document contains two BODR estimates. Alternate One is to provide a Trojan UV System, and Alternate 2 would provide a Veolia UV System.

Background of this Estimate

The attached estimate of probable construction cost is based on documents dated March 2024, received by the Estimating and Scheduling Group (ESG). These documents are described as Predesign Report based on the current project progression, additional or updated scope and/or quantities, and ongoing discussions with the project team. Further information can be found in the detailed estimate reports.

Class of Estimate

Design Completion

In accordance with the Association for the Advancement of Cost Engineering International (AACE) criteria, this is a Class 4 estimate. A Class 4 estimate is defined as a Planning Level or Design Technical Feasibility Estimate. Typically, engineering is from 1 to 15 percent complete. Class 4 estimates are used to prepare planning level cost scopes or to evaluate alternatives in design conditions and form the base work for the Class 3 Project Budget or Funding Estimate.

Expected accuracy for Class 4 estimates typically range from -30 to +50 percent, depending on the technological complexity of the project, appropriate reference information and the inclusion of an appropriate contingency determination. In unusual circumstances, ranges could exceed those shown.

Estimating Methodology

This estimate was prepared using quantity take-offs, vendor quotes and equipment pricing furnished either by the project team or by the estimator. The estimate includes direct labor costs and anticipated productivity adjustments to labor and equipment. Where possible, estimates for work anticipated to be performed by specialty subcontractors have been identified.

Construction labor crew and equipment hours were calculated from production rates contained in documents and electronic databases published by R.S. Means, Mechanical Contractors Association (MCA), National Electrical Contractors Association (NECA), and Rental Rate Blue Book for Construction Equipment (Blue Book).

This estimate was prepared using BC's estimating system, which consists of Sage Construction and Real Estate 300 estimating software engine (formerly Timberline) using RS Means database, historical project data, the latest vendor and material cost information, and other costs specific to the project location.

Electrical estimates are performed using ConEst Intellibid electrical estimating software with database provided by EPIC Services. The final number from the electrical estimate will be included in the Sage estimate, usually as an "electrical subcontract" number. Clients will be provided the detailed electrical estimate along with the Sage estimate in their deliverable.

Direct Cost Development

Costs associated with the General Provisions and the Special Provisions of the construction documents, which are collectively referred to as Contractor General Conditions (CGC), were based on the estimator's interpretation of the contract documents. The estimates for CGCs are divided into two groups: a time-related group (e.g., field personnel) and non-time-related group (e.g., bonds and insurance). Labor burdens such as health and welfare, vacation, union benefits, payroll taxes, and worker's compensation insurance are included in the labor rates. No trade discounts were considered.

Indirect Cost Development

Excise sales tax has been applied to the total probable contract value. A percentage allowance for contractor's home office expense has been included in the overall rate markups. The rate is standard for this type of heavy construction and is based on typical percentages outlined in Means Heavy Construction Cost Data.

The contractor's cost for builder's risk, general liability and vehicle insurance has been included in this estimate. Based on historical data, this is typically two to four percent of the overall construction contract

amount. These indirect costs have been included in this estimate as a percentage of the gross cost and are added after the net markups have been applied to the appropriate items.

Bidding Assumptions

The following bidding assumptions were considered in the development of this estimate.

1. Bidders must hold a valid, current Contractor's credentials, applicable to the type of project.
2. Bidders will develop estimates with a competitive approach to material pricing and labor productivity, and will not include allowances for changes, extra work, unforeseen conditions, or any other unplanned costs.
3. Estimated costs are based on a minimum of four bidders. Actual bid prices may increase for fewer bidders or decrease for a greater number of bidders.
4. Bidders will account for General Provisions and Special Provisions of the contract documents and will perform all work except that which will be performed by traditional specialty subcontractors as identified here:
   - Electrical
   - HVAC systems

Estimating Assumptions

As the design progresses through different completion stages, it is customary for the estimator to make assumptions to account for details that may not be evident from the documents. The following assumptions were used in the development of this estimate.

1. There are no concrete modifications on Alternate 1, Trojan UV System, that alter the structure of channel one, concrete repairs circumscribe to the grout at reactor inserts to be removed per the recommended Trojan System installation procedure.
2. Alternates 1 & 2 will require the installation of new gratings to channel one.
3. Alternates 1 & 2 will require the installation of a new UVT Analyzer, location not identified on documents.
4. Alternates 1 & 2 will not require replacement of the slide gates. Each system, Trojan and Veolia, will provide the required gates or finger weirs for each particular installation.
5. Contractor performs the work during normal daylight hours, nominally 7 a.m. to 5 p.m., Monday through Friday, in an 8-hour shift. No allowance has been made for additional shift work or weekend work.
6. Contractor has complete access for lay-down areas and mobile equipment.
7. Equipment rental rates are based on verifiable pricing from the local project area rental yards, Blue Book rates, and/or rates contained in the estimating database.
8. Contractor markup is based on conventionally accepted values that have been adjusted for project-area economic factors.
9. Major equipment costs are based on vendor supplied price quotes obtained by the project design team and/or estimators and on historical pricing of like equipment.
10. Process equipment vendor training using vendors' standard Operations and Maintenance (O&M) material is included in the purchase price of major equipment items where so stated in that quotation.
11. Bulk material quantities are based on manual quantity take-offs.
12. There is enough electrical power to feed the specified equipment. The local power company will supply power and transformers suitable for this facility.
13. Soils are of adequate nature to support the structures. No piles have been included in this estimate.

Estimating Exclusions

The following estimating exclusions were assumed in the development of this estimate.

1. Hazardous materials remediation and/or disposal.
2. O&M costs for the project except for the vendor supplied O&M manuals.
3. Utility agency costs for incoming power modifications.
4. Permits beyond those normally needed for the type of project and project conditions.

Allowances for Known but Undefined Work

The following allowances were made in the development of this estimate.

1. Electrical Instrumentation and Controls, Alt 1 - $863,520
2. Electrical Instrumentation and Controls, Alt 2 - $828,994
3. Utilities for new Flow Meter Manhole, Alt 1 & 2 - $184,032
4. New aluminum gratings on channel 1, Alt 1 & 2 - $75,591

Contractor and Other Estimate Markups

Contractor markup is based on conventionally accepted values which have been adjusted for project-area economic factors. Estimate markups are shown in Table 1.

Table 1. Estimate Markups

Item	Rate (%)
Net Cost Markups	
Labor markup	15
Materials and process equipment	10
Equipment (construction-related)	10
Subcontractor	10
Other – Process Equipment	8
Sales Tax (Excise-Gross Receipts-Contract Value)	10
Material Shipping and Handling	2
Gross Cost Markups	
Contractor General Conditions	15
Start-up, Training and O&M	2
Construction Contingency	30
Builders Risk, Liability and Auto Insurance	2
Performance and Payment Bonds	1.5
Escalation to Midpoint of Construction	8.2

Estimate Categories

Labor – this is labor to complete the work.

Materials – this is items (i.e. concrete, soil, steel, etc.) to build the project.

Subcontractor – this is the electrical sub and allowances.

Equipment – this is construction equipment to install the materials and process equipment.

Other – this is quoted process equipment.

Labor Markup

The labor rates used in the estimate were derived chiefly from the latest published State Prevailing Wage Rates. These include base rate paid to the laborer plus fringes. A labor burden factor is applied to these such that the final rates include all employer paid taxes. These taxes are FICA (which covers social security plus Medicare), Workers Comp (which varies based on state, employer experience and history) and unemployment insurance. The result is fully loaded labor rates. In addition to the fully loaded labor rate, an overhead and profit markup is applied at the back end of the estimate. This covers payroll and accounting, estimator's wages, home office rent, advertising, and owner profit.

Materials and Process Equipment Markup

This markup consists of the additional cost to the contractor beyond the raw dollar amount for material and process equipment. This includes shop drawing preparation, submittal and/or re-submittal cost, purchasing and scheduling materials and equipment, accounting charges including invoicing and payment, inspection of received goods, receiving, storage, overhead and profit.

Equipment (Construction) Markup

This markup consists of the costs associated with operating the construction equipment used in the project. Most GCs will rent rather than own the equipment and then charge each project for its equipment cost. The equipment rental cost does not include fuel, delivery and pick-up charges, additional insurance requirements on rental equipment, accounting costs related to home office receiving invoices and payment. However, the crew rates used in the estimate do account for the equipment rental cost. Occasionally, larger contractors will have some or all the equipment needed for the job, but to recoup their initial purchasing cost they will charge the project an internal rate for equipment use which is like the rental cost of equipment. The GC will apply an overhead and profit percentage to each individual piece of equipment whether rented or owned.

Subcontractor Markup

This markup consists of the GC's costs for subcontractors who perform work on the site. This includes costs associated with shop drawings, review of subcontractor's submittals, scheduling of subcontractor work, inspections, processing of payment requests, home office accounting, and overhead and profit on subcontracts.

Sales Tax (Excise-Gross Receipts-Contract Value)

This is the tax that the contractor must pay according to state and local taxation laws. The percentage is based on state, county, and local rates in place at the time the estimate was prepared. The percentage is applied to the total anticipated contract value.

Contractor Startup, Training, and O&M Manuals

This cost markup is often confused with either vendor startup or owner startup. It is the cost the GC incurs on the project beyond the vendor startup and owner startup costs. The GC generally will have project

personnel assigned to facilitate the installation, testing, startup, and O&M manual preparation for equipment that is put into operation by either the vendor or owner. These project personnel often include an electrician, pipe fitter or millwright, and/or I&E technician. These personnel are not included in the basic crew makeup to install the equipment but are there to assist and troubleshoot the startup and proper running of the equipment. The GC also incurs a cost for startup for such things as consumables (oil, fuel, filters, etc.), startup drawings and schedules, startup meetings and coordination with the plant personnel in other areas of the plant operation.

Builders Risk, Liability, and Vehicle Insurance

This percentage comprises all three items. There are many factors which make up this percentage, including the contractor's track record for claims in each of the categories. Another factor affecting insurance rates has been a dramatic price increase across the country over the past several years due to domestic and foreign influences. Consequently, in the construction industry we have observed a range of 0.5 to 1 percent for Builders Risk Insurance, 1 to 1.25 percent for General Liability Insurance, and 0.85 to 1 percent for Vehicle Insurance. Many factors affect each area of insurance, including project complexity and contractor's requirements and history. Instead of using numbers from a select few contractors, we believe it is more prudent to use a combined 2 percent to better reflect the general costs across the country. Consequently, the actual cost could be higher or lower based on the bidder, region, insurance climate, and the contractor's insurability at the time the project is bid.

Material Shipping and Handling

This can range from 2 to 6 percent, and is based on the type of project, material makeup of the project, and the region and location of the project. Material shipping and handling covers delivery costs from vendors, unloading costs (and in some instances loading and shipment back to vendors for rebuilt equipment), site paperwork, and inspection of materials prior to unloading at the project site. BC typically adjusts this percentage by the value of materials and whether vendors have included shipping costs in the quotes that were used to prepare the estimate. This cost also includes the GC's cost to obtain local supplies, e.g., oil, gaskets and bolts that may be missing from the equipment or materials shipped.

Escalation to Midpoint for Labor, Materials and Subcontractors

In addition to contingency, it is customary for projects that will be built over several years to include an escalation to midpoint of anticipated construction to account for the future escalation of labor, material, and equipment costs beyond values at the time the estimate is prepared. For this project, the anticipated rate of escalation is 4 percent per annum.

The estimated construction duration for this project is 18 months, exclusive of unusual weather or site conditions delays. Construction is anticipated to start November 1, 2024, and be completed by March 1, 2027. The escalation factors used in this estimate are calculated from the date of this estimate to the anticipated midpoint of construction which is approximately 23.7 months from the date of this estimate.

Undesigned/Undeveloped Contingency

The contingency factor covers unforeseen conditions, area economic factors, and general project complexity. This contingency is used to account for those factors that cannot be addressed in each of the labor and/or material installation costs. Based on industry standards, completeness of the project documents, project complexity, the current design stage and area factors, construction contingency can range from 10 to 50 percent.

Performance and Payment Bonds

Based on historical and industry data, this can range from 0.75 to 3 percent of the project total. There are several contributing factors including such items as size of the project, regional costs, contractor's historical record on similar projects, complexity, and current bonding limits. BC uses 1.5 percent for bonds, which we have determined to be reasonable for most heavy construction projects.

Estimate Summary Report

7/26/202410:35 AM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Wilsonville, OR
Wilsonville UV System Predesign
BODR Class 4 Estimate

Estimator	Javier Velez
BC Project Manager	Tim Mills
BC Office	Portland, OR
Est Version Number	1
QA/QC Reviewer	William Agster
QA/QC Review Date	July 23, 2024
BC Project Number	195468.002.205
Other Estimators	Yadiel Rodriguez
Alternates	ALT1 - Trojan UV System

Estimate Summary Report

7/26/202410:35 AM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Phase	Description	Gross Total Cost with Markups
01 Totals		
ALT1 Trojan UV System		
BI01 Process Mechanical		1,750,245
BI02 Electrical		863,873
ALT1 Trojan UV System		2,614,119
01 Totals		2,614,119

Estimate Detail Report

7/26/202410:34 AM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Wilsonville, OR
Wilsonville UV System Predesign
BODR Class 4 Estimate

Estimator	Javier Velez
Labor rate table	2024 BC 30 City Avg
BC Project Manager	Tim Mills
BC Office	Portland, OR
Est Version Number	1
QA/QC Reviewer	William Agster
QA/QC Review Date	July 23, 2024
BC Project Number	195468.002.205
Other Estimators	Yadiel Rodriguez
Factor table	Oregon-Portland
Alternates	ALT1 - Trojan UV System

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
01 Totals										
ALT1 Trojan UV System										
BI01 Process Mechanical										
20 Demolition										
02999 Demo and Remove Existing UV System										
02-22-04.50	General demolition crew, large demo - remove UV System	BC-0071	4.00 days	2,346.11	1,123.11	-	-	-	3,469.22	13,877
02-41-16.13	Concrete demolition, large urban projects, concrete, includes 20 mile haul, excludes foundation demolition, dump fees	0050	540.00 cf	3.10	0.65	-	-	-	3.75	2,024
02-22-03.30	Dump charge, typical urban city, fees only, bldg constr mat'ls,	BC-0006	600.00 ton	-	-	-	-	5.84	5.84	3,503
	Demo and Remove Existing UV System		**1.00 LS**	**11,057.91**	**4,842.85**			**3,502.80**	**19,403.56**	**19,404**
02999 Protect Existing Grating										
01-56-29.50	Grating protection, exterior plywood, 1 use, 3/4" thick	0200	75.00 sf	12.85	-	5.39	-	-	18.23	1,368
	Protect Existing Grating		**1.00 LS**	**963.43**		**404.18**			**1,367.61**	**1,368**
05999 Temporary Stop Logs (6' x 3.25")										
46-06-00.00	Influent channel stop logs, complete w/ frames	BC-0086	2.00 ea	510.17	-	424.42	-	-	934.59	1,869
	Temporary Stop Logs (6' x 3.25")		**1.00 LS**	**1,020.33**		**848.84**			**1,869.17**	**1,869**
	20 Demolition									**22,640**
25 Utilities										
33490 Trench for new Flow Meter Man Hole (Shored)										
31-23-16.13	Excavating, trench or continuous footing, common earth, 1-1/2 C.Y. excavator, 10' to 14' deep, excludes sheeting or dewatering	1000	96.30 bcy	2.43	2.07	-	-	-	4.50	434
01-54-33.40	Rent trench box, 8000 lb., 8' x 16'	7050	2.00 day	-	139.18	-	-	-	139.18	278
31-23-23.19	Trench box, move and reset	BC-0016	8.00 ea	82.02	69.94	-	-	-	151.96	1,216
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, crushed stone, 3/4" to 1/2", excludes compaction	0100	27.39 lcy	12.32	1.82	25.50	-	-	39.64	1,086
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	0500	23.82 bcy	6.60	1.38	-	-	-	7.98	190
33-05-97.10	Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	0400	1.00 clf	3.97	-	1.84	-	-	5.81	6
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, crushed stone, 3/4" to 1/2", excludes compaction	0100	76.67 lcy	12.32	1.82	25.50	-	-	39.64	3,039
31-23-23.23	Compaction, around structures and trenches, 2 passes, 18" wide, 6" lifts, walk behind, vibrating plate	7000	66.67 bcy	2.97	0.62	-	-	-	3.59	240
31-23-23.19	Loading trucks, 2.5 C.Y. bucket, front end loader, wheel mounted	BC-0011	96.30 bcy	0.62	0.49	-	-	-	1.11	107
31-23-23.18	Hauling,excavated borrow material,loose cubic yards,20 mile round trip,0.4 load/hr,base wide rate,12 cy truck,highway haulers,excludes loading	0560	120.37 lcy	15.45	23.72	-	-	-	39.18	4,716
02-22-03.30	Dump Charge, typical urban city, fees only, bldg constr mat'ls	BC-0006	145.05 ton	-	-	-	-	75.04	75.04	10,884
	Trench for new Flow Meter Man Hole (Shored)		**50.00 lf**	**89.04**	**84.07**	**53.10**		**217.67**	**443.88**	**22,194**
33521 24" Ductile Iron Pipe, buried										

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
33521 24" Ductile Iron Pipe, buried											
33-14-13.15	Water supply distribution piping,ductile iron pipe,cement lined,mechanical joint,fittings,18'lengths,24"diameter,class 50,excludes excavation backfill	2180	55.00	lf	54.53	4.46	192.09	-	-	251.08	13,810
33-14-13.15	Water supply distribution piping, joint restraint, ductile iron mechanical joints, 24" diameter	8790	6.00	ea	340.80	27.89	470.12	-	-	838.80	5,033
33-00-00.01	Utility pipe testing, nondestructive hydraulic pressure test	BC-0011	6.60	hr	77.10	34.14	-	-	-	111.24	734
33-05-61.10	Flow Meter manholes, frames and covers, concrete, precast, 6' inside diameter, excludes footing, excavation, backfill, frame and cover, add for depths over 8'	1220	4.00	vlf	231.31	34.14	436.53	-	-	701.97	2,808
33-05-61.10	Flow Meter manholes, frames and covers, concrete, precast, 6' inside diameter, 8' deep, excludes footing, excavation, backfill, frame and cover	1210	1.00	ea	1,850.44	273.08	11,500.00	-	-	13,623.52	13,624
33-05-61.10	Storm drainage manholes, rubber boots, 24", dia.	4240	4.00	ea	42.50	-	496.26	-	-	538.76	2,155
27-20-03.00	24" Magnetic flowmeters, 150# AWWA flanges	BC-0028	1.00	ea	1,091.67	124.67	18,416.44	-	-	19,632.78	19,633
40-05-05.00	Make Up Bolted Joint incl B-7 Nuts, Bolts, 1/16 Inch Rubber Gasket-Cls 150 (PN20) 24 Inch (600mm)	A243400006200	1.00	ea	110.07	-	591.30	-	-	701.37	701
33-05-61.10	Storm drainage manholes, frames and covers, precast concrete, 6' diameter manhole, 8" thick top	1500	1.00	ea	264.35	39.01	850.08	-	-	1,153.44	1,153
33-05-61.10	Storm drainage manholes, frames and covers, steps, standard sizes, aluminum	4100	12.00	ea	18.17	-	38.14	-	-	56.31	676
40-05-07.00	Hilti-Chemical Anchor - Pipe Support Size 24 Inch (600mm)	A246043000000	2.00	ea	55.04	-	60.46	-	-	115.49	231
40-05-07.00	In man hole pipe support for flow meter 24 Inch (600mm)	A246044000000	2.00	ea	198.12	-	82.44	-	-	280.56	561
33-14-13.15	Water supply distribution piping, joint restraint, ductile iron mechanical joints, 24" diameter	8790	1.00	ea	340.80	27.89	470.12	-	-	838.81	839
	24" Ductile Iron Pipe, buried		**55.00**	**lf**	**200.54**	**22.53**	**903.42**			**1,126.50**	**61,957**
	25 Utilities										**84,151**
30 Concrete & Surface Repair											
03330 Slab Transformer Pad 30' L x 10' W x 1' Thick											
31-22-16.10	Fine grading, fine grade for slab on grade, machine	1100	33.33	sy	1.38	0.83	-	-	-	2.21	74
03-05-13.25	Aggregate, stone, 3/4" to 1-1/2", prices per C.Y., includes material only	1050	11.11	cy	-	-	38.00	-	-	38.00	422
03-15-13.50	Waterstop, PVC, ribbed type, split, 3/8" thick x 6" wide	1300	38.00	lf	6.42	-	6.15	-	-	12.57	478
03-15-13.50	Waterstop, fittings, rubber, flat, dumbbell or center bulb, field union, 3/8" thick x 9" wide	5250	3.00	ea	16.69	-	37.03	-	-	53.72	161
03-21-10.60	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0600	0.83	ton	1,731.15	-	1,554.40	-	-	3,285.56	2,737
03-21-10.60	Reinforcing in place, unloading & sorting, add to above - slabs	2005	0.83	ton	66.70	25.46	-	-	-	92.16	77
03-21-10.60	Reinforcing in place, crane cost for handling, add to above, slabs	2215	0.83	ton	72.51	27.68	-	-	-	100.19	83
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,excludes all additives and treatments	0350	11.67	cy	-	-	233.28	-	-	233.28	2,722

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
03330 Slab Transformer Pad 30' L x 10' W x 1' Thick											
03-31-05.70	Structural concrete, placing, foundation mat, pumped, over 20 C.Y., includes vibrating, excludes material	2950	11.67	cy	15.22	2.54	-	-	-	17.76	207
03-35-29.30	Concrete finishing, floors, monolithic, machine trowel finish	0250	300.00	sf	1.38	0.06	-	-	-	1.44	432
03-39-13.50	Curing, sprayed membrane curing compound	0300	3.00	csf	15.28	-	23.41	-	-	38.69	116
03-35-29.30	Concrete finishing, floor, hardener, non-metallic, medium service, 0.75 psf, add	2350	300.00	sf	1.09	-	0.48	-	-	1.57	472
	Slab Transformer Pad 30' L x 10' W x 1' Thick		**11.11**	**cy**	**257.48**	**10.87**	**449.92**			**718.27**	**7,981**
03330 Channel Fill 2.19' Thick x 40' x 5' per Channel (1)											
31-22-16.10	Fine grading, fine grade for slab on grade, machine	1100	22.22	sy	1.23	1.01	-	-	-	2.24	50
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,includes BC standard additives	0350	17.11	cy	-	-	222.98	-	-	222.98	3,815
03-31-05.70	Structural concrete, placing, foundation mat, pumped, over 20 C.Y., includes vibrating, excludes material	2950	17.11	cy	13.72	2.41	-	-	-	16.12	276
03-35-29.30	Concrete finishing, floors, monolithic, machine trowel finish	0250	200.00	sf	1.22	0.07	-	-	-	1.30	260
03-39-13.50	Curing, sprayed membrane curing compound	0300	2.00	csf	13.92	-	17.89	-	-	31.81	64
03-35-29.30	Concrete finishing, floor, hardener, non-metallic, medium service, 0.75 psf, add	2350	200.00	sf	0.96	-	0.36	-	-	1.32	263
	Channel Fill 2.19' Thick x 40' x 5' per Channel (1)		**16.30**	**cy**	**44.59**	**4.82**	**240.70**			**290.12**	**4,728**
03345 Concrete Walls Adjustment											
03-11-13.85	C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	0150	16.00	lf	13.78	-	5.49	-	-	19.28	308
03-21-10.60	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0700	0.54	ton	1,019.10	-	1,417.88	-	-	2,436.98	1,309
03-21-10.60	Reinforcing in place, unloading & sorting, add - walls, cols, beams	2010	0.54	ton	51.04	20.22	-	-	-	71.27	38
03-21-10.60	Reinforcing, crane cost for handling, add to above, walls, cols, beams	2225	0.54	ton	55.47	21.97	-	-	-	77.45	42
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,includes BC standard additives	0350	9.02	cy	-	-	153.52	-	-	153.52	1,385
03-31-05.70	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	5350	9.02	cy	49.00	8.71	-	-	-	57.72	521
03-35-29.60	Concrete finishing, walls, float finish, 1/16" thick	0600	464.00	sf	2.63	-	0.25	-	-	2.88	1,336
03-82-16.10	Concrete impact drilling, for anchors, up to 4" D, 1/4" dia, in concrete or brick walls and floors, includes bit cost, layout and set up time, excl anchor	0100	38.00	ea	9.42	-	0.04	-	-	9.46	359
03-01-30.71	Concrete crack repair, structural repair by epoxy injection (ACI RAP-1), suitable for horizontal, vertical and overhead repairs, up to 1/4" (0.25") wide x 4" deep, pneumatic injection with 2-part bulk epoxy, excludes prep	1710	10.66	lf	2.82	1.49	0.54	-	-	4.85	52
03-63-05.10	Chemical anchoring, for rebar dowel, #3 in 1/2" diam hole, 5" embed, incl epoxy cartridge, excl layout, drilling & rebar	BC-0101	38.00	ea	9.89	-	3.55	-	-	13.44	511
04-05-19.16	Masonry anchors, wall tie dowels, plain, 5/8" diameter x 4" long	5750	3.80	c	-	-	148.41	-	-	148.41	564
	Concrete Walls Adjustment		**8.59**	**cy**	**378.28**	**13.63**	**355.68**			**747.59**	**6,424**
03800 Concrete Core Drilling for UV Cables											
03-82-13.10	Concrete core drilling, core, reinforced concrete slab, 12" diameter, up to 6" thick slab, includes bit cost, layout and set up time	1300	5.00	ea	120.82	10.88	1.78	-	-	133.49	667

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
03800 Concrete Core Drilling for UV Cables											
03-82-13.10	Concrete core drilling, includes bit cost, layout and set up time, minimum equipment/labor charge	1999	1.00	job	664.53	59.83	-	-	-	724.36	724
01-54-33.40	Rent aerial lift, scissor type, over 30' high, 1500 lb. capacity, electric	0040	3.00	day	-	211.76	-	-	-	211.76	635
	Concrete Core Drilling for UV Cables		**1.00**	**ls**	**1,268.65**	**749.49**	**8.92**			**2,027.06**	**2,027**
	30 Concrete & Surface Repair										**21,160**
34 Metals											
05115 Aluminum Gratings											
05-53-13.10	Floor grating, aluminum, 2-1/4" x 3/16" bearing bars @ 1-3/16" OC, cross bars @ 4" OC, over 300 S.F., field fabricated from panels	0148	450.00	sf	3.72	0.16	61.50	-	-	65.38	29,420
05-53-19.30	Grating frame, aluminum, 1" to 1-1/2" D, field fabricated	0020	130.00	lf	13.14	-	4.78	-	-	17.92	2,330
05-53-19.30	Grating frame, aluminum, 1" to 1-1/2" D, field fabricated, for each corner, add	0100	4.00	ea	-	-	4.61	-	-	4.61	18
05-12-04.40	Bolt, hex head, 316SS, 3/4" dia x 2" L, incl nut & washer	BC-2200	20.00	each	8.10	-	7.05	-	-	15.16	303
05-58-21.05	Eye/sling hook w/ hammerlock coupling, grade 80 for lifting, 15 Ton	0160	4.00	ea	-	-	520.00	-	-	520.00	2,080
	Aluminum Gratings		**450.00**	**sf**	**7.87**	**0.16**	**67.86**			**75.89**	**34,152**
	34 Metals										**34,152**
40 Install New Trojan System											
40500 New Analyzer and Sampler Lines											
40-05-31.13	Pipe Plain End-PVC--Sch 80 1/2 Inch (13mm)	A041002100000	100.00	lf	-	-	0.47	-	-	0.47	47
40-05-31.13	Fitting Socket Weld-PVC-Ell45-Sch 80 1/2 Inch (13mm)	A042211100000	15.00	ea	-	-	3.94	-	-	3.94	59
40-05-31.13	Fitting Socket Weld-PVC-Ell90-Sch 80 1/2 Inch (13mm)	A042212100000	15.00	ea	-	-	2.30	-	-	2.30	34
40-05-31.13	Fitting Socket Weld-PVC-Tee-Sch 80 1/2 Inch (13mm)	A042214100000	5.00	ea	-	-	7.22	-	-	7.22	36
40-05-31.13	Fitting Socket Weld-PVC-Cap-Sch 80 1/2 Inch (13mm)	A042217100000	2.00	ea	-	-	4.38	-	-	4.38	9
40-05-31.13	Fitting Socket Weld-PVC-Coupling-Sch 80 1/2 Inch (13mm)	A042219100000	5.00	ea	-	-	4.92	-	-	4.92	25
40-05-05.00	Pipe Erection-Handle Fittings-Plastic-Sch 80 1/2 Inch (13mm)	L043466100001	42.00	ea	6.60	-	-	-	-	6.60	277
40-05-31.13	Pipe Erection-Straight Run-PVC-Sch 80 1/2 Inch (13mm)	L044002100P1	100.00	lf	6.60	-	-	-	-	6.60	660
40-05-05.00	Pipe Erection-Make Up Cemented Plastic Socket Joint-Non-Specific 1/2 Inch (13mm)	L043461000000	87.00	ea	55.03	-	-	-	-	55.03	4,788
40-05-07.00	Pipe Support 1/2 Inch (13mm)	A046044000000	4.00	ea	55.03	-	13.19	-	-	68.22	273
40-05-07.00	Hanger Rod 1/2 Inch (13mm)	A046045000000	4.00	ea	22.01	-	13.19	-	-	35.20	141

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
40500 New Analyzer and Sampler Lines										
40-05-07.00	Hilti-Chemical Anchor - Pipe Support Size 1/2 Inch (13mm)	A046043000000	4.00 ea	11.01	-	5.50	-	-	16.50	66
40-05-05.00	Field Testing-Hydrotest-Non-Specific 1/2 Inch (13mm)	L049048000000	100.00 lf	0.28	-	-	-	-	0.28	28
27-20-10.00	UVT Analyzers	BC-0036	1.00 ea	472.57	-	16,000.00	-	-	16,472.57	16,473
	New Analyzer and Sampler Lines		**100.00 lf**	**65.78**		**163.37**			**229.15**	**22,915**
46999 Install Trojan UV Disinfection System										
46-06-00.00	UV disinfection 1 channel sys, quoted by Trojan, included with BC Design reports	BC-1126	1.00 ea	57,297.07	500.00	548,500.00	-	-	606,297.07	606,297
	Install Trojan UV Disinfection System		**1.00 LS**	**57,297.07**	**500.00**	**548,500.00**			**606,297.07**	**606,297**
	40 Install New Trojan System									**629,212**
	BI01 Process Mechanical									**791,316**
BI02 Electrical										
90 Electrical, Instrumentation, and Controls Subcontract										
26002 Electrical, Instrumentation, and Controls Subcontract										
26-00-00.02	EI&C Subcontract, from electrical estimate report	BC-0006	1.00 LS	-	-	-	407,367.07	-	407,367.07	407,367
	Electrical, Instrumentation, and Controls Subcontract		**1.00 ls**				**407,367.07**		**407,367.07**	**407,367**
	90 Electrical, Instrumentation, and Controls Subcontract									**407,367**
	BI02 Electrical									**407,367**
	ALT1 Trojan UV System									**1,198,683**
	01 Totals									**1,198,683**

Wilsonville UV System Predesign

Estimate Totals

Description	Rate	Hours	Amount	Totals
Labor		1,059 hrs	104,049	
Material			660,956	
Subcontract			407,367	
Equipment		162 hrs	11,924	
Other			14,386	
			1,198,682	**1,198,682**
Labor Mark-up	15.00 %		15,607	
Material Mark-up	10.00 %		66,096	
Subcontractor Mark-up	10.00 %		40,737	
Construction Equipment Mark-up	10.00 %		1,192	
Other - Process Equip Mark-up	8.00 %		1,151	
			124,783	**1,323,465**
Material Shipping & Handling	2.00 %		13,219	
Material Sales Tax	8.00 %		52,877	
Other - Process Eqp Sales Tax	8.00 %		1,151	
Net Markups			**67,247**	**1,390,712**
Contractor General Conditions	15.00 %		208,607	
			208,607	**1,599,319**
Start-Up, Training, O&M	2.00 %		31,986	
			31,986	**1,631,305**
Undesign/Undevelop Contingency	30.00 %		489,392	
			489,392	**2,120,697**
Bldg Risk, Liability Auto Ins	2.00 %		42,414	
			42,414	**2,163,111**
Payment and Performance Bonds	1.50 %		32,447	
			32,447	**2,195,558**
Excise Tax	10.00 %		219,556	
			219,556	**2,415,114**
Escalation to Midpoint (ALL)	8.24 %		199,005	
Gross Markups			**199,005**	**2,614,119**
Total				**2,614,119**

Estimate Summary Report

7/25/2024 4:48 PM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Wilsonville, OR
Wilsonville UV System Predesign
BODR Class 4 Estimate

Estimator	Javier Velez
BC Project Manager	Tim Mills
BC Office	Portland, OR
Est Version Number	1
QA/QC Reviewer	William Agster
QA/QC Review Date	July 23, 2024
BC Project Number	195468.002.205
Other Estimators	Yadiel Rodriguez
Alternates	ALT2 - Veolia UV System

Estimate Summary Report

7/25/2024 4:48 PM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Phase	Description	Gross Total Cost with Markups
01 Totals		
ALT2 Veolia Aquaray 3X UV System		
20 Demolition		
BI01 Process Mechanical		48,958
20 Demolition		**48,958**
25 Utilities		
BI01 Process Mechanical		184,964
25 Utilities		**184,964**
30 Concrete & Surface Repair		
BI01 Process Mechanical		48,781
30 Concrete & Surface Repair		**48,781**
34 Metals		
BI01 Process Mechanical		75,593
34 Metals		**75,593**
35 Jib Crane		
BI01 Process Mechanical		86,624
35 Jib Crane		**86,624**
41 Install New Veoila System		
BI01 Process Mechanical		1,141,031
41 Install New Veoila System		**1,141,031**
90 Electrical, Instrumentation, and Controls Subcontract		
BI02 Electrical		828,994
90 Electrical, Instrumentation, and Controls Subcontract		**828,994**
ALT2 Veolia Aquaray 3X UV System		**2,414,945**

Estimate Summary Report

7/25/2024 4:48 PM

BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Phase	Description	Gross Total Cost with Markups
01 Totals		2,414,945

Estimate Detail Report

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BC Project Number: 195468.002.205
Estimate Version Number: 1
Estimate Date: July 23, 2024
Lead Estimator: Javier Velez

Wilsonville UV System Predesign

Wilsonville, OR
Wilsonville UV System Predesign
BODR Class 4 Estimate

Estimator	Javier Velez
Labor rate table	2024 BC 30 City Avg
BC Project Manager	Tim Mills
BC Office	Portland, OR
Est Version Number	1
QA/QC Reviewer	William Agster
QA/QC Review Date	July 23, 2024
BC Project Number	195468.002.205
Other Estimators	Yadiel Rodriguez
Factor table	Oregon-Portland
Alternates	ALT2 - Veolia UV System

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
01 Totals											
ALT2 Veolia Aquaray 3X UV System											
20 Demolition											
BI01 Process Mechanical											
02999 Demo and Remove Existing UV System											
02-22-04.50	General demolition crew, large demo - remove UV System	BC-0071	4.00	days	2,346.11	1,123.11	-	-	-	3,469.22	13,877
02-41-16.13	Concrete demolition, large urban projects, concrete, includes 20 mile haul, excludes foundation demolition, dump fees	0050	540.00	cf	3.10	0.65	-	-	-	3.75	2,024
02-22-03.30	Dump charge, typical urban city, fees only, bldg constr mat'ls,	BC-0006	600.00	ton	-	-	-	-	5.84	5.84	3,503
	Demo and Remove Existing UV System		**1.00**	**LS**	**11,057.91**	**4,842.85**			**3,502.80**	**19,403.56**	**19,404**
02999 Protect Existing Grating											
01-56-29.50	Grating protection, exterior plywood, 1 use, 3/4" thick	0200	75.00	sf	12.85	-	5.39	-	-	18.23	1,368
	Protect Existing Grating		**1.00**	**LS**	**963.43**		**404.18**			**1,367.61**	**1,368**
05999 Temporary Stop Logs (6' x 3.25")											
46-06-00.00	Influent channel stop logs, complete w/ frames	BC-0086	2.00	ea	510.17	-	424.42	-	-	934.59	1,869
	Temporary Stop Logs (6' x 3.25")		**1.00**	**LS**	**1,020.33**		**848.84**			**1,869.17**	**1,869**
	BI01 Process Mechanical										**22,640**
	20 Demolition										**22,640**
25 Utilities											
BI01 Process Mechanical											
33490 Trench for new Flow Meter Man Hole (Shored)											
31-23-16.13	Excavating, trench or continuous footing, common earth, 1-1/2 C.Y. excavator, 10' to 14' deep, excludes sheeting or dewatering	1000	96.30	bcy	2.43	2.07	-	-	-	4.50	434
01-54-33.40	Rent trench box, 8000 lb., 8' x 16'	7050	2.00	day	-	139.18	-	-	-	139.18	278
31-23-23.19	Trench box, move and reset	BC-0016	8.00	ea	82.02	69.94	-	-	-	151.96	1,216
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, crushed stone, 3/4" to 1/2", excludes compaction	0100	27.39	lcy	12.32	1.82	25.50	-	-	39.64	1,086
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	0500	23.82	bcy	6.60	1.38	-	-	-	7.98	190
33-05-97.10	Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 2", excludes excavation and backfill	0400	1.00	clf	3.97	-	1.84	-	-	5.81	6
31-23-23.16	Fill by borrow and utility bedding, for pipe and conduit, crushed stone, 3/4" to 1/2", excludes compaction	0100	76.67	lcy	12.32	1.82	25.50	-	-	39.64	3,039
31-23-23.23	Compaction, around structures and trenches, 2 passes, 18" wide, 6" lifts, walk behind, vibrating plate	7000	66.67	bcy	2.97	0.62	-	-	-	3.59	240
31-23-23.19	Loading trucks, 2.5 C.Y. bucket, front end loader, wheel mounted	BC-0011	96.30	bcy	0.62	0.49	-	-	-	1.11	107
31-23-23.18	Hauling,excavated borrow material,loose cubic yards,20 mile round trip,0.4 load/hr,base wide rate,12 cy truck,highway haulers,excludes loading	0560	120.37	lcy	15.45	23.72	-	-	-	39.18	4,716

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
33490 Trench for new Flow Meter Man Hole (Shored)											
02-22-03.30	Dump Charge, typical urban city, fees only, bldg constr mat'ls	BC-0006	145.05	ton	-	-	-	-	75.04	75.04	10,884
	Trench for new Flow Meter Man Hole (Shored)		**50.00**	**lf**	**89.04**	**84.07**	**53.10**		**217.67**	**443.88**	**22,194**
33521 24" Ductile Iron Pipe, buried											
33-14-13.15	Water supply distribution piping,ductile iron pipe,cement lined,mechanical joint,fittings,18'lengths,24"diameter,class 50,excludes excavation backfill	2180	55.00	lf	54.53	4.46	192.09	-	-	251.08	13,810
33-14-13.15	Water supply distribution piping, joint restraint, ductile iron mechanical joints, 24" diameter	8790	6.00	ea	340.80	27.89	470.12	-	-	838.80	5,033
33-00-00.01	Utility pipe testing, nondestructive hydraulic pressure test	BC-0011	6.60	hr	77.10	34.14	-	-	-	111.24	734
33-05-61.10	Flow Meter manholes, frames and covers, concrete, precast, 6' inside diameter, excludes footing, excavation, backfill, frame and cover, add for depths over 8'	1220	4.00	vlf	231.31	34.14	436.53	-	-	701.97	2,808
33-05-61.10	Flow Meter manholes, frames and covers, concrete, precast, 6' inside diameter, 8' deep, excludes footing, excavation, backfill, frame and cover	1210	1.00	ea	1,850.44	273.08	11,500.00	-	-	13,623.52	13,624
33-05-61.10	Storm drainage manholes, rubber boots, 24", dia.	4240	4.00	ea	42.50	-	496.26	-	-	538.76	2,155
27-20-03.00	24" Magnetic flowmeters, 150# AWWA flanges	BC-0028	1.00	ea	1,091.67	124.67	18,416.44	-	-	19,632.78	19,633
40-05-05.00	Make Up Bolted Joint incl B-7 Nuts, Bolts, 1/16 Inch Rubber Gasket-Cls 150 (PN20) 24 Inch (600mm)	A243400006200	1.00	ea	110.07	-	591.30	-	-	701.37	701
33-05-61.10	Storm drainage manholes, frames and covers, precast concrete, 6' diameter manhole, 8" thick top	1500	1.00	ea	264.35	39.01	850.08	-	-	1,153.44	1,153
33-05-61.10	Storm drainage manholes, frames and covers, steps, standard sizes, aluminum	4100	12.00	ea	18.17	-	38.14	-	-	56.31	676
40-05-07.00	Hilti-Chemical Anchor - Pipe Support Size 24 Inch (600mm)	A246043000000	2.00	ea	55.04	-	60.46	-	-	115.49	231
40-05-07.00	In man hole pipe support for flow meter 24 Inch (600mm)	A246044000000	2.00	ea	198.12	-	82.44	-	-	280.56	561
33-14-13.15	Water supply distribution piping, joint restraint, ductile iron mechanical joints, 24" diameter	8790	1.00	ea	340.80	27.89	470.12	-	-	838.81	839
	24" Ductile Iron Pipe, buried		**55.00**	**lf**	**200.54**	**22.53**	**903.42**			**1,126.50**	**61,957**
	BI01 Process Mechanical										**84,151**
	25 Utilities										**84,151**

30 Concrete & Surface Repair

BI01 Process Mechanical

03061 Concrete Surface Repair, Form and Pour ACI RAP-4

03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), sound the concrete surface to locate delaminated areas	2010	104.00	sf	0.36	-	-	-	-	0.36	37
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), remove concrete in repair areas to fully expose reinforcing bars	2020	104.00	sf	8.63	0.19	-	-	-	8.82	917
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), mark the perimeter of each repair area	2030	104.00	sf	0.36	-	-	-	-	0.36	37

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
03061 Concrete Surface Repair, Form and Pour ACI RAP-4										
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), saw cut the perimeter of each repair area down to reinforcing bars, approx. 1 " deep, includes blade cost, layout and set up time	2040	80.00 lf	4.50	0.55	0.03	-	-	5.08	407
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), drill holes for expansion shields, 3/4" diameter, up to 4" deep, includes bit cost, layout and set up time, excl anchor	2140	26.00 ea	16.83	-	-	-	-	16.83	438
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), final cleaning by high pressure water	2160	104.00 sf	1.32	0.28	-	-	-	1.60	167
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), blow off dust/debris with oil-free dry compressed air	2170	104.00 sf	0.05	0.00	-	-	-	0.05	5
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), build wood forms including chutes where needed for concrete placement, 1 use of form materials	2180	104.00 sfca	4.67	-	6.89	-	-	11.56	1,202
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), insert expansion shield, coil rod, coil tie and plastic cone in each hole, 1 use of fasteners	2190	26.00 ea	23.67	-	9.06	-	-	32.73	851
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), install wood forms and fasten with coil rod and coil nut, 10 uses of fasteners, 4 uses of bracing lumber	2200	104.00 sfca	4.67	-	0.97	-	-	5.64	586
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), mix bagged repair material with mixing paddle	2210	8.67 cf	23.99	-	11.82	-	-	35.81	310
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), place repair material by hand and consolidate	2230	8.67 cf	7.20	0.23	-	-	-	7.42	64
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), remove wood forms	2240	104.00 sfca	2.80	-	-	-	-	2.80	292
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), chip/grind off extra concrete at fill chutes	2250	5.00 ea	86.28	1.92	0.19	-	-	88.39	442
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), break ties and patch voids	2260	26.00 ea	2.67	-	0.10	-	-	2.76	72
03-01-30.72	Surface repairs using form-and-pour techniques (ACI RAP-4), cure with sprayed membrane curing compound	2270	104.00 sf	0.23	-	0.19	-	-	0.42	44
	Concrete Surface Repair, Form and Pour ACI RAP-4		**104.00 sf**	**44.09**	**1.01**	**11.35**			**56.46**	**5,872**
03330 Slab Transformer Pad 30' L x 10' W x 1' Thick										
31-22-16.10	Fine grading, fine grade for slab on grade, machine	1100	33.33 sy	1.38	0.83	-	-	-	2.21	74
03-05-13.25	Aggregate, stone, 3/4" to 1-1/2", prices per C.Y., includes material only	1050	11.11 cy	-	-	38.00	-	-	38.00	422
03-15-13.50	Waterstop, PVC, ribbed type, split, 3/8" thick x 6" wide	1300	38.00 lf	6.42	-	6.15	-	-	12.57	478
03-15-13.50	Waterstop, fittings, rubber, flat, dumbbell or center bulb, field union, 3/8" thick x 9" wide	5250	3.00 ea	16.69	-	37.03	-	-	53.72	161
03-21-10.60	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0600	0.83 ton	1,731.15	-	1,554.40	-	-	3,285.56	2,737
03-21-10.60	Reinforcing in place, unloading & sorting, add to above - slabs	2005	0.83 ton	66.70	25.46	-	-	-	92.16	77
03-21-10.60	Reinforcing in place, crane cost for handling, add to above, slabs	2215	0.83 ton	72.51	27.68	-	-	-	100.19	83

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
03330 Slab Transformer Pad 30' L x 10' W x 1' Thick										
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,excludes all additives and treatments	0350	11.67 cy	-	-	233.28	-	-	233.28	2,722
03-31-05.70	Structural concrete, placing, foundation mat, pumped, over 20 C.Y., includes vibrating, excludes material	2950	11.67 cy	15.22	2.54	-	-	-	17.76	207
03-35-29.30	Concrete finishing, floors, monolithic, machine trowel finish	0250	300.00 sf	1.38	0.06	-	-	-	1.44	432
03-39-13.50	Curing, sprayed membrane curing compound	0300	3.00 csf	15.28	-	23.41	-	-	38.69	116
03-35-29.30	Concrete finishing, floor, hardener, non-metallic, medium service, 0.75 psf, add	2350	300.00 sf	1.09	-	0.48	-	-	1.57	472
	Slab Transformer Pad 30' L x 10' W x 1' Thick		**11.11 cy**	**257.48**	**10.87**	**449.92**			**718.27**	**7,981**
03345 Concrete Walls Adjustment										
03-11-13.85	C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	0150	16.00 lf	13.78	-	5.49	-	-	19.28	308
03-21-10.60	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0700	0.54 ton	1,019.10	-	1,417.88	-	-	2,436.98	1,309
03-21-10.60	Reinforcing in place, unloading & sorting, add - walls, cols, beams	2010	0.54 ton	51.04	20.22	-	-	-	71.27	38
03-21-10.60	Reinforcing, crane cost for handling, add to above, walls, cols, beams	2225	0.54 ton	55.47	21.97	-	-	-	77.45	42
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,includes BC standard additives	0350	9.02 cy	-	-	153.52	-	-	153.52	1,385
03-31-05.70	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	5350	9.02 cy	49.00	8.71	-	-	-	57.72	521
03-35-29.60	Concrete finishing, walls, float finish, 1/16" thick	0600	464.00 sf	2.63	-	0.25	-	-	2.88	1,336
03-82-16.10	Concrete impact drilling, for anchors, up to 4" D, 1/4" dia, in concrete or brick walls and floors, includes bit cost, layout and set up time, excl anchor	0100	38.00 ea	9.42	-	0.04	-	-	9.46	359
03-01-30.71	Concrete crack repair, structural repair by epoxy injection (ACI RAP-1), suitable for horizontal, vertical and overhead repairs, up to 1/4" (0.25") wide x 4" deep, pneumatic injection with 2-part bulk epoxy, excludes prep	1710	10.66 lf	2.82	1.49	0.54	-	-	4.85	52
03-63-05.10	Chemical anchoring, for rebar dowel, #3 in 1/2" diam hole, 5" embed, incl epoxy cartridge, excl layout, drilling & rebar	BC-0101	38.00 ea	9.89	-	3.55	-	-	13.44	511
04-05-19.16	Masonry anchors, wall tie dowels, plain, 5/8" diameter x 4" long	5750	3.80 c	-	-	148.41	-	-	148.41	564
	Concrete Walls Adjustment		**8.59 cy**	**378.28**	**13.63**	**355.68**			**747.59**	**6,424**
03800 Concrete Core Drilling for UV Cables										
03-82-13.10	Concrete core drilling, core, reinforced concrete slab, 12" diameter, up to 6" thick slab, includes bit cost, layout and set up time	1300	5.00 ea	120.82	10.88	1.78	-	-	133.49	667
03-82-13.10	Concrete core drilling, includes bit cost, layout and set up time, minimum equipment/labor charge	1999	1.00 job	664.53	59.83	-	-	-	724.36	724
01-54-33.40	Rent aerial lift, scissor type, over 30' high, 1500 lb. capacity, electric	0040	3.00 day	-	211.76	-	-	-	211.76	635
	Concrete Core Drilling for UV Cables		**1.00 ls**	**1,268.65**	**749.49**	**8.92**			**2,027.06**	**2,027**
	BI01 Process Mechanical									**22,304**
	30 Concrete & Surface Repair									**22,304**

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
34 Metals										
BI01 Process Mechanical										
05115 Aluminum Gratings										
05-53-13.10	Floor grating, aluminum, 2-1/4" x 3/16" bearing bars @ 1-3/16" OC, cross bars @ 4" OC, over 300 S.F., field fabricated from panels	0148	450.00 sf	3.72	0.16	61.50	-	-	65.38	29,420
05-53-19.30	Grating frame, aluminum, 1" to 1-1/2" D, field fabricated	0020	130.00 lf	13.14	-	4.78	-	-	17.92	2,330
05-53-19.30	Grating frame, aluminum, 1" to 1-1/2" D, field fabricated, for each corner, add	0100	4.00 ea	-	-	4.61	-	-	4.61	18
05-12-04.40	Bolt, hex head, 316SS, 3/4" dia x 2" L, incl nut & washer	BC-2200	20.00 each	8.10	-	7.05	-	-	15.16	303
05-58-21.05	Eye/sling hook w/ hammerlock coupling, grade 80 for lifting, 15 Ton	0160	4.00 ea	-	-	520.00	-	-	520.00	2,080
	Aluminum Gratings		**450.00 sf**	**7.87**	**0.16**	**67.86**			**75.89**	**34,152**
	BI01 Process Mechanical									**34,152**
	34 Metals									**34,152**
35 Jib Crane										
BI01 Process Mechanical										
03320 Footing for Jib Crane										
31-23-16.16	Structural excavation for minor structures, bank measure, for spread and mat footings, elevator pits, and small building foundations, common earth, 3/4 C.Y. bucket, machine excavation, hydraulic backhoe	6035	3.46 bcy	16.81	11.45	-	-	-	28.26	98
03-21-10.60	Reinforcing steel, in place, footings, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0500	0.22 ton	1,991.80	-	1,527.60	-	-	3,519.40	760
03-21-10.60	Reinforcing steel, unload and sort, add to base	2000	0.22 ton	69.80	27.70	-	-	-	97.50	21
31-23-16.13	Excavating, trench or continuous footing, common earth, trim sides and bottom for concrete pours, excludes sheeting or dewatering	2100	23.33 sf	1.36	0.11	-	-	-	1.47	34
03-31-05.35	Structural concrete,ready mix,normal weight,4500 psi,includes local aggregate,sand,portland cement and water,includes BC standard additives	0350	3.63 cy	-	-	328.32	-	-	328.32	1,191
03-31-05.70	Structural concrete, placing, pile caps, pumped, 6 C.Y. to 10 C.Y., includes vibrating, excludes material	3900	3.63 cy	31.31	5.57	-	-	-	36.88	134
	Footing for Jib Crane		**3.63 cy**	**178.80**	**18.83**	**419.24**			**616.87**	**2,239**
03365 Dowels, connect to existing concrete										
03-82-16.10	Concrete impact drilling, for anchors, up to 4" D, 1/2" dia, in concrete or brick walls and floors, includes bit cost, layout and set up time, excl anchor	0300	6.00 ea	17.17	-	0.06	-	-	17.23	103
03-82-16.10	Concrete impact drilling, for anchors, 1/2" dia, in concrete or brick walls and floors, includes bit cost, layout and set up time, excl anchor, for each additional inch of depth in same hole, add	0350	6.00 ea	3.44	-	0.01	-	-	3.45	21
03-63-05.10	Chemical anchoring, for rebar dowel, #3 in 1/2" diam hole, 5" embed, incl epoxy cartridge, excl layout, drilling & rebar	BC-0101	6.00 ea	12.02	-	5.28	-	-	17.30	104
03-21-10.60	Reinforcing steel, in place, dowels, deformed, 2' long, #3, A615, grade 60	2400	6.00 ea	4.02	-	0.64	-	-	4.67	28
03-15-08.60	Waterstop, hydrophilic 0.79" x 0.39" w/ primer	BC-0001	1.00 lf	5.94	-	2.20	-	-	8.14	8

Phase	Description	Item	Takeoff Quantity		Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
	Dowels, connect to existing concrete		**1.00**	**ls**	**225.83**		**38.14**			**263.97**	**264**
46999 Jib Cane											
41-22-13.19	Jib cranes, wall hung, cantilever, 1/2 ton capacity, 20' span	0150	1.00	ea	1,596.74		35,000.00			36,596.74	36,597
	Jib Cane		**1.00**	**ea**	**1,596.74**		**35,000.00**			**36,596.74**	**36,597**
	BI01 Process Mechanical										**39,099**
	35 Jib Crane										**39,099**
41 Install New Veoila System											
BI01 Process Mechanical											
40500 New Analyzer and Sampler Lines											
40-05-31.13	Pipe Plain End-PVC--Sch 80 1/2 Inch (13mm)	A041002100000	100.00	lf	-	-	0.47	-	-	0.47	47
40-05-31.13	Fitting Socket Weld-PVC-Ell45-Sch 80 1/2 Inch (13mm)	A042211100000	15.00	ea	-	-	3.94	-	-	3.94	59
40-05-31.13	Fitting Socket Weld-PVC-Ell90-Sch 80 1/2 Inch (13mm)	A042212100000	15.00	ea	-	-	2.30	-	-	2.30	34
40-05-31.13	Fitting Socket Weld-PVC-Tee-Sch 80 1/2 Inch (13mm)	A042214100000	5.00	ea	-	-	7.22	-	-	7.22	36
40-05-31.13	Fitting Socket Weld-PVC-Cap-Sch 80 1/2 Inch (13mm)	A042217100000	2.00	ea	-	-	4.38	-	-	4.38	9
40-05-31.13	Fitting Socket Weld-PVC-Coupling-Sch 80 1/2 Inch (13mm)	A042219100000	5.00	ea	-	-	4.92	-	-	4.92	25
40-05-05.00	Pipe Erection-Handle Fittings-Plastic-Sch 80 1/2 Inch (13mm)	L043466100001	42.00	ea	6.60	-	-	-	-	6.60	277
40-05-31.13	Pipe Erection-Straight Run-PVC-Sch 80 1/2 Inch (13mm)	L044002100P1	100.00	lf	6.60	-	-	-	-	6.60	660
40-05-05.00	Pipe Erection-Make Up Cemented Plastic Socket Joint-Non-Specific 1/2 Inch (13mm)	L043461000000	87.00	ea	55.03	-	-	-	-	55.03	4,788
40-05-07.00	Pipe Support 1/2 Inch (13mm)	A046044000000	4.00	ea	55.03	-	13.19	-	-	68.22	273
40-05-07.00	Hanger Rod 1/2 Inch (13mm)	A046045000000	4.00	ea	22.01	-	13.19	-	-	35.20	141
40-05-07.00	Hilti-Chemical Anchor - Pipe Support Size 1/2 Inch (13mm)	A046043000000	4.00	ea	11.01	-	5.50	-	-	16.50	66
40-05-05.00	Field Testing-Hydrotest-Non-Specific 1/2 Inch (13mm)	L049048000000	100.00	lf	0.28	-	-	-	-	0.28	28
27-20-10.00	UVT Analyzers	BC-0036	1.00	ea	472.57	-	16,000.00	-	-	16,472.57	16,473
	New Analyzer and Sampler Lines		**100.00**	**lf**	**65.78**		**163.37**			**229.15**	**22,915**
46999 Install Veolia Aquaray 3X UV Disinfection System One Channel											

Phase	Description	Item	Takeoff Quantity	Labor Cost/Unit	Equip Cost/Unit	Material Cost/Unit	Sub Cost/Unit	Other Cost/Unit	Total Cost/Unit	Total Amount
46999 Install Veolia Aquaray 3X UV Disinfection System One Channel										
46-06-00.00	UV disinfection 1 channel sys, quoted by Veolia, included with BC Design reports	BC-1126	1.00 ea	57,297.07	500.00	435,000.00	-	-	492,797.07	492,797
	Install Veolia Aquaray 3X UV Disinfection System One Channel		**1.00 LS**	**57,297.07**	**500.00**	**435,000.00**			**492,797.07**	**492,797**
	BI01 Process Mechanical									**515,712**
	41 Install New Veolia System									**515,712**
90 Electrical, Instrumentation, and Controls Subcontract										
BI02 Electrical										
26002 Electrical, Instrumentation, and Controls Subcontract										
26-00-00.02	EI&C Subcontract, from electrical estimate report	BC-0006	1.00 LS	-	-	-	391,251.67	-	391,251.67	391,252
	Electrical, Instrumentation, and Controls Subcontract		**1.00 ls**				**391,251.67**		**391,251.67**	**391,252**
	BI02 Electrical									**391,252**
	90 Electrical, Instrumentation, and Controls Subcontract									**391,252**
	ALT2 Veolia Aquaray 3X UV System									**1,109,311**
	01 Totals									**1,109,311**

Wilsonville UV System Predesign

Estimate Totals

Description	Rate	Hours	Amount	Totals
Labor		1,125 hrs	110,379	
Material			581,274	
Subcontract			391,252	
Equipment		174 hrs	12,019	
Other			14,386	
			1,109,310	**1,109,310**
Labor Mark-up	15.00 %		16,557	
Material Mark-up	10.00 %		58,127	
Subcontractor Mark-up	10.00 %		39,125	
Construction Equipment Mark-up	10.00 %		1,202	
Other - Process Equip Mark-up	8.00 %		1,151	
			116,162	**1,225,472**
Material Shipping & Handling	2.00 %		11,625	
Material Sales Tax	8.00 %		46,502	
Other - Process Eqp Sales Tax	8.00 %		1,151	
Net Markups			**59,278**	**1,284,750**
Contractor General Conditions	15.00 %		192,713	
			192,713	**1,477,463**
Start-Up, Training, O&M	2.00 %		29,549	
			29,549	**1,507,012**
Undesign/Undevelop Contingency	30.00 %		452,104	
			452,104	**1,959,116**
Bldg Risk, Liability Auto Ins	2.00 %		39,182	
			39,182	**1,998,298**
Payment and Performance Bonds	1.50 %		29,975	
			29,975	**2,028,273**
Excise Tax	10.00 %		202,827	
			202,827	**2,231,100**
Escalation to Midpoint (ALL)	8.24 %		183,843	
Gross Markups			**183,843**	**2,414,943**
Total				**2,414,943**

Job ID: 195468-BODR
Project: Wilsonville UV System Predesign
Cost Estimator: Yadiel Rodriguez
Project Manager: Tim Mills
Wilsonville OR

Bid Summary Report

25 Jul 2024 15:35:47

Tax Rate status: Default **Bid Name:** UV SYSTEM E&I/C **Bid Template:** STANDARD

Drawing	Phase	Quote $	Material $	Equip $	SubCon $	Labor Hrs
	UV ELEC SYSTEM TROJAN > DEMOLITION	0.00	500.00	1,500.00	0.00	78.00
	UV ELEC SYSTEM TROJAN > DISTRIBUTION EQUIPMENT	0.00	42,541.19	0.00	0.00	56.05
	UV ELEC SYSTEM TROJAN > GROUNDING	0.00	3,623.48	0.00	0.00	54.83
	UV ELEC SYSTEM TROJAN > CONDUIT & WIRE	0.00	16,038.85	0.00	0.00	256.66
	UV ELEC SYSTEM TROJAN > INSTRUMENTATION	0.00	8,171.63	0.00	0.00	154.72
	UV ELEC SYSTEM TROJAN > INDUSTRIAL CONTROL	0.00	68,515.71	0.00	0.00	246.49
	UV ELEC SYSTEM TROJAN > MISCELLANEOUS	0.00	10,000.00	0.00	0.00	80.00
	UV ELEC SYSTEM VEOLIA > DEMOLITION	0.00	500.00	1,500.00	0.00	78.00
	UV ELEC SYSTEM VEOLIA > DISTRIBUTION EQUIPMENT	0.00	45,373.73	0.00	0.00	48.60
	UV ELEC SYSTEM VEOLIA > GROUNDING	0.00	3,623.48	0.00	0.00	54.83
	UV ELEC SYSTEM VEOLIA > CONDUIT & WIRE	0.00	11,038.71	0.00	0.00	233.67
	UV ELEC SYSTEM VEOLIA > INSTRUMENTATION	0.00	17,224.28	0.00	0.00	152.36
	UV ELEC SYSTEM VEOLIA > INDUSTRIAL CONTROL	0.00	66,000.00	0.00	0.00	160.00
	UV ELEC SYSTEM VEOLIA > MISCELLANEOUS	0.00	10,000.00	0.00	0.00	80.00
	Sheet Totals:	0.00	303,151.07	3,000.00	0.00	1,734.20
	Tax:	0.00	0.00	0.00	0.00	
	Sub Total (Quo/Mat/Equip/Sub):				306,151.07	
	Sales Tax:				0.00	
	Sub Total:				306,151.07	306,151.07

Bid Notes:

TAX RATES

Material:	0.0000%
Quote:	0.0000%
Labor:	0.0000%
Equipment:	0.0000%
Subcontract:	0.0000%
Job:	0.0000%

MISCELLANEOUS

Avg. Lbr. Rate (Cost):	138.99
Avg. Lbr. Rate (Bid):	146.30
Total Square Feet:	0.00
Cost Per Sq. Ft.:	0.00
Labor $ Per Sq. Ft.:	0.00
Labor Hrs Per Sq. Ft.:	0.00
Quantity of Units:	0.00
Cost Per Unit:	0.00
Calc. Adjustment:	0.00%

Direct Labor $:	204,878.92
Indirect Labor $:	59,386.22
Labor Escalation:	0.00
Labor Tax:	0.00
Direct Job Costs (10.00%):	79,890.31
Prime Cost:	650,306.52
Overhead (Avg. 13.24%):	99,277.03
Net Cost:	749,583.55
Profit (Avg. 5.00%):	39,451.77
Job Tax:	0.00
Bond (1.2000%):	9,583.42
Lump Sum:	0.00
Selling Price:	798,618.74

Job ID: 195468-BODR
Project: Wilsonville UV System Predesign
Cost Estimator: Yadiel Rodriguez
Project Manager: Tim Mills
Wilsonville OR

Bid Phase Totals

25 Jul 2024 15:37:59

Tax Rate status: Default **Bid Name:** UV SYSTEM E&I/C **Bid Template:** STANDARD

	Material $	Labor Hrs	Labor $	Quotes $	Equip. $	Sub-Con. $	Phase Total $
UV ELEC SYSTEM TROJAN > DEMOLITION	1,437.79	78.00	14,719.45	-	1,794.26	-	17,951.50
UV ELEC SYSTEM TROJAN > DISTRIBUTION EQUIPMENT	65,073.27	56.05	10,576.68	-	-	-	75,649.95
UV ELEC SYSTEM TROJAN > GROUNDING	5,657.40	54.83	10,347.02	-	-	-	16,004.42
UV ELEC SYSTEM TROJAN > CONDUIT & WIRE	25,073.73	256.66	48,434.72	-	-	-	73,508.44
UV ELEC SYSTEM TROJAN > INSTRUMENTATION	12,829.71	154.72	29,197.75	-	-	-	42,027.46
UV ELEC SYSTEM TROJAN > INDUSTRIAL CONTROL	105,163.37	246.49	46,515.36	-	-	-	151,678.72
UV ELEC SYSTEM TROJAN > MISCELLANEOUS	15,449.70	80.00	15,096.87	-	-	-	30,546.57
Subtotal: UV ELEC SYSTEM TROJAN	**230,684.97**	**926.75**	**174,887.85**	**-**	**1,794.26**	**-**	**407,367.07**
UV ELEC SYSTEM VEOLIA > DEMOLITION	1,437.79	78.00	14,719.45	-	1,794.26	-	17,951.50
UV ELEC SYSTEM VEOLIA > DISTRIBUTION EQUIPMENT	69,380.47	48.60	9,171.54	-	-	-	78,552.01
UV ELEC SYSTEM VEOLIA > GROUNDING	5,657.40	54.83	10,347.02	-	-	-	16,004.42
UV ELEC SYSTEM VEOLIA > CONDUIT & WIRE	17,387.64	233.67	44,095.14	-	-	-	61,482.78
UV ELEC SYSTEM VEOLIA > INSTRUMENTATION	26,644.39	152.36	28,751.71	-	-	-	55,396.10
UV ELEC SYSTEM VEOLIA > INDUSTRIAL CONTROL	101,124.55	160.00	30,193.75	-	-	-	131,318.30
UV ELEC SYSTEM VEOLIA > MISCELLANEOUS	15,449.70	80.00	15,096.87	-	-	-	30,546.57
Subtotal: UV ELEC SYSTEM VEOLIA	**237,081.93**	**807.45**	**152,375.48**	**-**	**1,794.26**	**-**	**391,251.67**
Bid Total:	**467,766.90**	**1,734.20**	**327,263.33**	**-**	**3,588.52**	**-**	**798,618.74**

Job ID: 195468-BODR
Project: Wilsonville UV System Predesign
Cost Estimator: Yadiel Rodriguez
Project Manager: Tim Mills
Wilsonville OR

Takeoff

25 Jul 2024 15:39:49

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** DEMOLITION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** DEMOLITION *****				
	40.00				**- EXT UV**				
380001	40.00	EA	M		DEMOLITION BY MAN HOUR	0.0000	0.00	1.0000	40.00
	0.00				**- CONDUIT INTERCEPT & PREPARATION**				
380001	1.00	EA	M		DEMOLITION BY MAN HOUR	500.0000	500.00	32.0000	32.00
660010	6.00	HR	E		FORKLIFT	250.0000	1,500.00	1.0000	6.00
					Phase Totals:		**2,000.00**		**78.00**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** DISTRIBUTION EQUIPMENT

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** DISTRIBUTION EQUIPMENT *****				
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	20,000.0000	20,000.00	40.0000	40.00
	0.00				**- HARMONIC MITIGATION XFMR**				
190081	1.00	EA	M	50KVA	3PH ISOLATION XFMR FLOOR MTD	15,000.0000	15,000.00	5.0000	5.00
50	1.00	LS	M	MCC PAD	MCC HOUSE KEEPING PAD/SECTION	350.0000	350.00	2.0000	2.00
161657	4.00	EA	M	4"x 4"x .04 57psi	POLYURETHANE PAD	4.7500	19.00	0.0500	0.20
TITLE	1.00	EA	M		- 3/8" ANCHORING IN CONCRETE	0.0000	0.00	0.0000	0.00
160291	1.00	EA	M	3/8 x 3 1/2"	STN-STL T304 WEDGE ANCHOR	4.0320	4.03	0.1500	0.15
160453	1.00	EA	M	3/8"	STN-STL FLAT WASHER	0.3200	0.32	0.0010	0.00
160960	1.00	EA	M	3/8-16	STN-STL HEX NUTS	0.3800	0.38	0.0300	0.03
500244	1.00	EA	M	3/8 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.2200	0.22
	0.00				**- PDC DISCONNECTS**				
220227	1.00	EA	M	200/3	F/HD/600V N-4 4X 5 SAFETY-SW	5,505.0100	5,505.01	3.8500	3.85
	0.00				**- HSC DISCONNECTS**				
220238	1.00	EA	M	30/3	NF/HD/600V N-4 4X 5 SAFETY-SW	1,518.6200	1,518.62	1.0000	1.00
TITLE	1.00	EA	M	STN-STL	PNL MTG KIT STRUT	0.0000	0.00	0.0000	0.00
240747	11.00	FT	M	1 5/8" x 1 5/8"H	STN-STL 316 STRUT 14G SLOTTED	8.4300	92.73	0.0800	0.88
160285	8.00	EA	M	1/4 x 2 1/4"	STN-STL T304 WEDGE ANCHOR	2.1094	16.88	0.1000	0.80
160451	8.00	EA	M	1/4"	STN-STL FLAT WASHER	0.2200	1.76	0.0010	0.01
161173	8.00	EA	M	1/4 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.1800	1.44
240879	4.00	EA	M	1/4-20	STN-STL STRUT NUT (1-5/8" WIDE)	7.5500	30.20	0.0600	0.24
160854	4.00	EA	M	1/4-20 x 1"	STN-STL MACHINE SCREWS	0.3431	1.37	0.0560	0.22
160471	4.00	EA	M	1/4 x 1"	STN-STL FENDER WASHER	0.2218	0.89	0.0010	0.00
					Phase Totals:		**42,541.19**		**56.05**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** GROUNDING

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** GROUNDING/BONDING *****				
	0.00				**- DIST. EQUIP GROUNDING**				
850010	4.00	EA	M	3/4 x 10	COPPER GROUND ROD	48.2800	193.12	1.0000	4.00
850022	3.00	EA	M	3/4 x 10	COPPER CLAD GROUND ROD	38.2000	114.60	1.0000	3.00
850175	1.00	EA	M	10"RNDx 10"D	GROUND INSPECTION WELL - POLYETHYLENE	45.5100	45.51	1.0000	1.00
850344	2.00	EA	M	4/0	GRND-ROD SPLICE CADWELD	20.0000	40.00	1.3500	2.70
850061	1.00	EA	M	3/4.	GROUND ROD CLAMP -HEAVY DUTY	5.8100	5.81	0.1000	0.10
70232	120.00	FT	M	4/0	BARE CU (STR)	7.2318	867.82	0.0203	2.44
	0.00				**- GROUNDING STUB-UP**				
10201	60.00	FT	M	1 1/2	PVC SCH 80	3.8532	231.19	0.0500	3.00
20381	12.00	EA	M	1 1/2	PVC SCH 80 90-DEG EL	7.8956	94.75	0.1750	2.10
31377	12.00	EA	M	1 1/2	PVC COUPLING	0.5279	6.33	0.0700	0.84
31325	12.00	EA	M	1 1/2	PVC FEMALE ADAPTER	0.8567	10.28	0.1500	1.80
40221	12.00	EA	M	1 1/2	PLASTIC BUSHING	0.3866	4.64	0.0500	0.60
161378	24.00	EA	M	1 1/2	PVC 2-HOLE STRAP	0.7123	17.10	0.0340	0.82
161160	48.00	EA	M	#10-12 x 1"	PLASTIC ANCHOR	0.0613	2.94	0.0200	0.96
161130	48.00	EA	M	#10 x 1"	GALV SHEET METAL SCREW	0.0500	2.40	0.0170	0.82
161173	48.00	EA	M	1/4 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.1800	8.64
70232	240.00	FT	M	4/0	BARE CU (STR)	7.2318	1,735.63	0.0203	4.87
100067	8.00	EA	M	4/0	CU CRIMP LUG 2-HOLE	8.9200	71.36	0.5950	4.76
850434	2.00	EA	M	4/0	CADWELD CONDUCTOR TO STEEL-FLAT	20.0000	40.00	1.0500	2.10
850471	2.00	EA	M	#4/0	CADWELD COPPER WIRE TO #4 HORIZ REBAR	20.0000	40.00	1.0200	2.04
850374	5.00	EA	M	4/0	TEE/WYE SPLICE CADWELD	20.0000	100.00	1.6500	8.25
					Phase Totals:		**3,623.48**		**54.83**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** CONDUIT & WIRE *****				
	0.00				**CHANNEL-1 W/4-UV BANK**				
	1.00				**UV SWCHB TO XFMR-1**				
TITLE	1.00	EA	M		SLAB-ON CONDUIT PVC SCH 40 & PVC-CTD	0.0000	0.00	0.0000	0.00
10168	25.00	FT	M	2	PVC SCH 40	3.1104	77.76	0.0800	2.00
390709	5.00	FT	M		STEEL TIE WIRE	0.0720	0.36	0.0600	0.30
31314	1.00	EA	M	2	PVC END BELLS	3.7769	3.78	0.2300	0.23
31338	2.00	EA	M	2	PVC MALE ADAPTER	1.1191	2.24	0.3000	0.60
20963	2.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	185.60	1.2000	2.40
30823	2.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	43.45	0.7000	1.40
10260	10.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	167.90	0.1800	1.80
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
10556	2.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	0.80
70069	135.00	FT	M	1/0	XHHW CU (STR)	4.1642	562.17	0.0240	3.24
70200	45.00	FT	M	6.	GREEN XHHW CU (GRD 200A)	1.2355	55.60	0.0120	0.54
100044	3.00	EA	M	1/0	CU CRIMP LUG 1-HOLE	4.7300	14.19	0.6000	1.80
100039	1.00	EA	M	6.	CU CRIMP LUG 1-HOLE	1.4200	1.42	0.3500	0.35
100563	6.00	EA	M	1/0	WIRE TERMINATION LBR	1.0000	6.00	0.3600	2.16
100557	2.00	EA	M	6.	WIRE TERMINATION LBR	0.5000	1.00	0.2200	0.44
100837	8.00	EA	M	LABEL -MD	WIRE LABEL - MEDIUM	1.3500	10.80	0.0000	0.00
91090	4.00	EA	M	MEGGER #4 - #1000	MEGGER TEST - #4 & LARGER	0.0000	0.00	0.2500	1.00
20286	1.00	EA	M	2	PVC SCH 40 45-DEG EL	2.3499	2.35	0.5000	0.50
	0.00				**XFMR-1 TO CHANNEL-1 BKR-A TO D 4-BANKS**				
TITLE	4.00	EA	M		GRC - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
70064	240.00	FT	M	6.	XHHW CU (STR)	1.2355	296.52	0.0120	2.88
70199	60.00	FT	M	8	GREEN XHHW CU (GRD 100A)	0.8534	51.20	0.0100	0.60
100039	16.00	EA	M	6.	CU CRIMP LUG 1-HOLE	1.4200	22.72	0.3500	5.60
100742	8.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	8.12	0.1000	0.80
100557	32.00	EA	M	6.	WIRE TERMINATION LBR	0.5000	16.00	0.2200	7.04
100556	16.00	EA	M	8	WIRE TERMINATION LBR	0.5000	8.00	0.2000	3.20
100836	40.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	30.00	0.0000	0.00
91089	20.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	3.00

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
TITLE	1.00	EA	M	1 1/2	LIQUIDTITE CONDUIT	0.0000	0.00	0.0000	0.00
50084	3.00	FT	M	1 1/2	LIQUIDTITE CONDUIT	4.1602	12.48	0.1500	0.45
50095	1.00	EA	M	1 1/2	LIQUIDTITE 90D ANGLE CONNECTOR	38.9200	38.92	0.4320	0.43
50106	1.00	EA	M	1 1/2	LIQUIDTITE STRAIGHT CONNECTOR	17.0369	17.04	0.3600	0.36
40131	2.00	EA	M	1 1/2	GRND BUSHING INSULATED	10.2429	20.49	0.5000	1.00
	0.00				**SOUTH SIDE**				
	1.00				**NEW ACTUATOR-1**				
TITLE	1.00	EA	M		GRC PVC-CTD - MOTOR CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	25.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	179.77	0.0800	2.00
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	5.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	51.47	0.0300	0.15
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	270.00	FT	M	12	XHHW CU (STR)	0.3217	86.85	0.0070	1.89
70197	90.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	28.95	0.0070	0.63
100742	3.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	3.04	0.1000	0.30
100742	1.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	1.01	0.1000	0.10
100554	6.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.50	0.1600	0.96
100554	2.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.50	0.1600	0.32
100836	8.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	6.00	0.0000	0.00
91089	4.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.60
	0.00				**NORTH SIDE**				
	1.00				**JB TO JB**				
TITLE	1.00	EA	M		GRC PVC-CTD - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
10260	40.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	671.61	0.1800	7.20
10556	3.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	1.20
240992	7.00	EA	M	2	PVC-CTD STRUT CLAMP	28.1818	197.27	0.0400	0.28
20951	3.00	EA	M	2	PVC-CTD GRC FLD-BEND	0.0000	0.00	2.0000	6.00
20963	3.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	278.40	1.2000	3.60
30823	3.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	65.18	0.7000	2.10
31018	1.00	EA	M	2	PVC-CTD GRC (MYERS) HUB W/G	99.9500	99.95	1.0000	1.00
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
710527	2.00	EA	M	10x8x6	PULL BOX FGL HINGED QR-CVR N4X	163.8000	327.60	1.0000	2.00
	1.00				**ACTUATOR-1**				
TITLE	1.00	EA	M		GRC PVC-CTD - MOTOR CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	25.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	179.77	0.0800	2.00
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	5.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	51.47	0.0300	0.15
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	375.00	FT	M	12	XHHW CU (STR)	0.3217	120.63	0.0070	2.63
70197	125.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	40.21	0.0070	0.88
100742	3.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	3.04	0.1000	0.30
100742	1.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	1.01	0.1000	0.10
100554	6.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.50	0.1600	0.96
100554	2.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.50	0.1600	0.32

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100836	8.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	6.00	0.0000	0.00
91089	4.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.60
	0.00								
	1.00				**JB TO JB POWER**				
TITLE	1.00	EA	M		GRC PVC-CTD - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10260	50.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	839.51	0.1800	9.00
10556	3.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	1.20
240992	9.00	EA	M	2	PVC-CTD STRUT CLAMP	28.1818	253.64	0.0400	0.36
161685	1.00	EA	M	1-1/2" TO 2"	SS CONDUIT SUPPORT	32.0000	32.00	1.0000	1.00
20951	3.00	EA	M	2	PVC-CTD GRC FLD-BEND	0.0000	0.00	2.0000	6.00
20963	3.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	278.40	1.2000	3.60
30823	3.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	65.18	0.7000	2.10
31018	1.00	EA	M	2	PVC-CTD GRC (MYERS) HUB W/G	99.9500	99.95	1.0000	1.00
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
710501	3.00	EA	M	10x8x4	T316 STN-STL BOX CLMP CVR N4X	689.4000	2,068.20	1.6250	4.88
TITLE	3.00	EA	M	STN-STL	PNL MTG KIT STRUT	0.0000	0.00	0.0000	0.00
240747	6.00	FT	M	1 5/8" x 1 5/8"H	STN-STL 316 STRUT 14G SLOTTED	8.7500	52.50	0.1225	0.74
160194	12.00	EA	M	1/4-20	STN-STEEL HD BEAM CLAMP	13.1900	158.28	0.3000	3.60
160854	12.00	EA	M	1/4-20 x 1"	STN-STL MACHINE SCREWS	0.3431	4.12	0.0700	0.84
160471	12.00	EA	M	1/4 x 1"	STN-STL FENDER WASHER	0.2218	2.66	0.0012	0.01
240879	12.00	EA	M	1/4-20	STN-STL STRUT NUT (1-5/8" WIDE)	4.8015	57.62	0.0720	0.86
160854	12.00	EA	M	1/4-20 x 1"	STN-STL MACHINE SCREWS	0.3431	4.12	0.0700	0.84
160471	12.00	EA	M	1/4 x 1"	STN-STL FENDER WASHER	0.2218	2.66	0.0012	0.01
	1.00				**HSC**				
TITLE	1.00	EA	M		GRC PVC-CTD - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	210.00	FT	M	12	XHHW CU (STR)	0.3217	67.55	0.0070	1.47
70197	70.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	22.52	0.0070	0.49
100554	6.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.50	0.1600	0.96
100554	2.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.50	0.1600	0.32
100836	8.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	6.00	0.0000	0.00
91089	4.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.60
	1.00				**SCC**				
TITLE	1.00	EA	M		SLAB-ON CONDUIT PVC SCH 40 & PVC-CTD	0.0000	0.00	0.0000	0.00
10165	10.00	FT	M	1	PVC SCH 40	1.5283	15.28	0.0525	0.53
390709	3.00	FT	M		STEEL TIE WIRE	0.0720	0.22	0.0600	0.18
31311	1.00	EA	M	1	PVC END BELLS	1.7979	1.80	0.1600	0.16
31335	2.00	EA	M	1	PVC MALE ADAPTER	0.5959	1.19	0.1800	0.36
20960	2.00	EA	M	1	PVC-CTD GRC 90-ELBOW	44.0404	88.08	0.7000	1.40
30820	2.00	EA	M	1	PVC-CTD GRC COUPLING	11.2093	22.42	0.4000	0.80
31015	1.00	EA	M	1	PVC-CTD GRC (MYERS) HUB W/G	49.6900	49.69	0.5500	0.55
10257	10.00	FT	M	1	PVC-CTD GRC 40MIL	9.1517	91.52	0.1000	1.00
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
10553	2.00	EA	M	1	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.2000	0.40
70061	60.00	FT	M	12	XHHW CU (STR)	0.3217	19.30	0.0070	0.42
70197	30.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	9.65	0.0070	0.21
100554	4.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.00	0.1600	0.64
100836	6.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	4.50	0.0000	0.00
91089	3.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.45
	1.00				**AIT-XXX**				
TITLE	1.00	EA	M		GRC PVC-CTD - MOTOR CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	240.00	FT	M	12	XHHW CU (STR)	0.3217	77.20	0.0070	1.68
70197	120.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	38.60	0.0070	0.84
100742	2.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	2.03	0.1000	0.20
100742	0.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	0.00	0.1000	0.00
100554	4.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.00	0.1600	0.64
100554	0.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.00	0.1600	0.00
100836	6.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	4.50	0.0000	0.00
91089	3.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.45
	1.00				**POWER CABLES PROVIDE BY TROJAN**				
	0.00				**UV BANK CABLE MANAGEMENT**				
TITLE	1.00	EA	M		CABLE TRAY - 9" RUN AL ASMYS	0.0000	0.00	0.0000	0.00
654362	30.00	FT	M	18"	ALUM LADDER CABLE TRAY 9"RUNGS-6"DEPTH	15.0000	450.00	0.1165	3.50
652886	30.00	FT	M	18" WIDTH	CABLE TRAY VENT STRAIGHT FLAT COVER	10.0000	300.00	0.0400	1.20
653628	10.00	EA	M	2-1/4"	CABLE TRAY CLAMP/GUIDE	0.0000	0.00	0.1500	1.50
70232	42.00	FT	M	4/0	BARE CU (STR)	0.0000	0.00	0.0203	0.85
653623	6.00	EA	M	#6 - 4/0	CABLE TRAY LAY-IN GROUND CLAMP	0.0000	0.00	0.5000	3.00
100047	1.00	EA	M	4/0	CU CRIMP LUG 1-HOLE	0.0000	0.00	0.5250	0.53
850425	1.00	EA	M	4/0	CADWELD HORIZ TEE CABLE MOLD	0.0000	0.00	1.6500	1.65
653662	1.00	EA	M	6" WIDTH	CABLE TRAY EXPANSION CONNECTION	0.0000	0.00	0.3500	0.35
653683	1.00	EA	M	6" WIDTH	CABLE TRAY COVER CLAMPS - PAIR	0.0000	0.00	0.0600	0.06
653691	1.00	EA	M	6" WIDTH	CABLE ROLLERS FOR TRAY SETUP	0.0000	0.00	0.4000	0.40
653699	1.00	EA	M	CABLE TRAY	SINGLE BULLWHEEL SETUP	0.0000	0.00	0.7000	0.70

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
653700	1.00	EA	M	CABLE TRAY	TRIPLE BULLWHEEL SETUP	0.0000	0.00	0.8000	0.80
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	2,500.0000	2,500.00	40.0000	40.00
	1.00				**MISC POWER CABLES MAIN PDP**				
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	2,500.0000	2,500.00	40.0000	40.00
					Phase Totals:		**16,038.85**		**256.66**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** INSTRUMENTATION *****				
	0.00				**SUPPLIED WITH THE UV SYSTEM VENDOR**				
	1.00				**AIT-XXXX**				
TITLE	1.00	EA	M		AIT - ANALYZER TRANSMITTER	0.0000	0.00	0.0000	0.00
34	1.00	EA	M	AIT	ANALYZER	0.0000	0.00	4.0000	4.00
45	1.00	EA	M	CALIB VERIFY	INSTRUMENT CALIBRATION VERIFY	0.0000	0.00	0.5000	0.50
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50
100552	5.00	EA	M	16	WIRE TERMINATION LBR	0.2500	1.25	0.1200	0.60
23	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0500	0.25
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	3.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.48
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	3.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	22.07	0.3500	1.05
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
90492	30.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	15.90	0.0140	0.42
100553	5.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.25	0.1400	0.70
100836	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0000	0.00
	1.00				**LIT-XXXX**				
TITLE	1.00	EA	M		LIT - LEVEL TRANSMITTER (RADAR)	0.0000	0.00	0.0000	0.00
450022	1.00	EA	M		LEVEL TRANSMITTER	0.0000	0.00	3.5000	3.50
45	1.00	EA	M	CALIB VERIFY	INSTRUMENT CALIBRATION VERIFY	0.0000	0.00	0.5000	0.50
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100552	5.00	EA	M	16	WIRE TERMINATION LBR	0.2500	1.25	0.1200	0.60
23	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0500	0.25
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
450029	6.00	EA	M		ELEMENT TRANSMITTER	0.0000	0.00	2.0000	12.00
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	9.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	1.44
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	3.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	81.00	1.0000	3.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	1.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	7.36	0.3500	0.35
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	5.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	12.78	0.0000	0.00
40062	2.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	13.60	0.2125	0.43
90492	100.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	53.00	0.0140	1.40
100553	4.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.00	0.1400	0.56
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0000	0.00
	0.00				**EXT FE-XXXX (REUSE EXT CONDUIT ROUTE)**				
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	3.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.48
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	3.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	22.07	0.3500	1.05
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
90492	520.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	275.60	0.0140	7.28
100553	4.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.00	0.1400	0.56
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0000	0.00
	1.00				**JB TO JB**				
TITLE	1.00	EA	M		GRC PVC-CTD - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10260	40.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	671.61	0.1800	7.20
10556	3.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	1.20
240992	7.00	EA	M	2	PVC-CTD STRUT CLAMP	28.1818	197.27	0.0400	0.28
161685	1.00	EA	M	1-1/2" TO 2"	SS CONDUIT SUPPORT	32.0000	32.00	1.0000	1.00
20951	3.00	EA	M	2	PVC-CTD GRC FLD-BEND	0.0000	0.00	2.0000	6.00
20963	3.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	278.40	1.2000	3.60
30823	3.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	65.18	0.7000	2.10
31018	1.00	EA	M	2	PVC-CTD GRC (MYERS) HUB W/G	99.9500	99.95	1.0000	1.00
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
710502	2.00	EA	M	12x10x6	T316 STN-STL BOX CLMP CVR N4X	981.9000	1,963.80	2.1250	4.25
TITLE	1.00	EA	M	STN-STL	PNL MTG KIT STRUT	0.0000	0.00	0.0000	0.00
240747	2.00	FT	M	1 5/8" x 1 5/8"H	STN-STL 316 STRUT 14G SLOTTED	8.7500	17.50	0.1225	0.25
160285	4.00	EA	M	1/4 x 2 1/4"	STN-STL T304 WEDGE ANCHOR	2.1094	8.44	0.2000	0.80
160451	4.00	EA	M	1/4"	STN-STL FLAT WASHER	0.1400	0.56	0.0012	0.00
161173	4.00	EA	M	1/4 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.2000	0.80
240879	4.00	EA	M	1/4-20	STN-STL STRUT NUT (1-5/8" WIDE)	4.8015	19.21	0.0720	0.29
160854	4.00	EA	M	1/4-20 x 1"	STN-STL MACHINE SCREWS	0.3431	1.37	0.0700	0.28
160471	4.00	EA	M	1/4 x 1"	STN-STL FENDER WASHER	0.2218	0.89	0.0012	0.00
	1.00				**CONTROL CABLE PROVIDED**				
12	1.00	LS	M	Allowance	INSTRUMENT & CONTROL ALLOWANCE	2,500.0000	2,500.00	60.0000	60.00
					Phase Totals:		**8,171.63**		**154.72**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** INDUSTRIAL CONTROL

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** INDUSTRIAL CONTROL *****				
9	1.00	LS	M	ALLOWANCE	CONTROL PROGRAMMING	15,000.0000	15,000.00	20.0000	20.00
	0.00				**PROGRAMMING W/MAIN DCS, HARDWARE & CONDUIT & WIRE (DATA NOT INCLUDED)**				
8	1.00	LS	M	ALLOWANCE	CONTROL SYSTEM ALLOWANCE	50,000.0000	50,000.00	70.0000	70.00
	1.00				**- UV PDC PROVIDED BY VENDOR**				
TITLE	1.00	EA	M		LCP-1 CONTROL CABINET	0.0000	0.00	0.0000	0.00
183	1.00	LS	M	LCP CABINET	LCP CONTROL CABINET	0.0000	0.00	20.0000	20.00
500255	1.00	EA	M	MISC	MATERIAL	200.0000	200.00	4.0000	4.00
	1.00				**- UV SCC PROVIDED BY VENDOR**				
TITLE	4.00	EA	M		LCP-1 CONTROL CABINET	0.0000	0.00	0.0000	0.00
183	4.00	LS	M	LCP CABINET	LCP CONTROL CABINET	0.0000	0.00	10.0000	40.00
500255	4.00	EA	M	MISC	MATERIAL	200.0000	800.00	4.0000	16.00
	1.00				**- UV HSC PROVIDED BY VENDOR**				
TITLE	4.00	EA	M		LCP-1 CONTROL CABINET	0.0000	0.00	0.0000	0.00
183	4.00	LS	M	LCP CABINET	LCP CONTROL CABINET	0.0000	0.00	10.0000	40.00
500255	4.00	EA	M	MISC	MATERIAL	200.0000	800.00	4.0000	16.00
	1.00				**- PDC TO HSC**				
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10257	20.00	FT	M	1	PVC-CTD GRC 40MIL	9.1517	183.03	0.0600	1.20
10553	3.00	EA	M	1	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1500	0.45
240989	4.00	EA	M	1	PVC-CTD STRUT CLAMP	13.5141	54.06	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	0.0000	0.00
20948	3.00	EA	M	1	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.6600	1.98
20960	3.00	EA	M	1	PVC-CTD GRC 90-ELBOW	44.0404	132.12	0.4900	1.47
30820	3.00	EA	M	1	PVC-CTD GRC COUPLING	11.2093	33.63	0.3500	1.05
31015	1.00	EA	M	1	PVC-CTD GRC (MYERS) HUB W/G	49.6900	49.69	0.5000	0.50
30850	1.00	EA	M	1	PVC-CTD GRC LB COND-BODY F-7	80.4400	80.44	0.8750	0.88
50560	3.00	FT	M	1	LIQUIDTITE PVC-CTD STN-STEEL	0.1812	0.54	0.0660	0.20
50572	1.00	EA	M	1	PVC-CTD LIQUID-TITE STR-CONN	96.0600	96.06	0.4500	0.45
50592	1.00	EA	M	1	PVC-CTD LIQUID-TITE 90D-CONN	148.8400	148.84	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.1000	0.10
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.1000	0.10
100553	1.00	EA	M	14	WIRE TERMINATION LBR	0.2500	0.25	0.0300	0.03

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** INDUSTRIAL CONTROL

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100836	1.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	0.75	0.0500	0.05
TITLE	1.00	EA	M		GRC - NETWORK CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
90382	60.00	FT	M	23/4PR	CAT6 CABLE CMP PLENUM -BLUE	0.3863	23.18	0.0100	0.60
70196	60.00	FT	M	14	GREEN XHHW CU (GRD 15A)	0.2255	13.53	0.0042	0.25
430124	2.00	EA	M	553913-1	DATA PLUG CONN	0.7500	1.50	0.0850	0.17
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0500	0.20
	1.00				**- PDC TO SCC**				
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10257	20.00	FT	M	1	PVC-CTD GRC 40MIL	9.1517	183.03	0.0600	1.20
10553	3.00	EA	M	1	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1500	0.45
240989	4.00	EA	M	1	PVC-CTD STRUT CLAMP	13.5141	54.06	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	0.0000	0.00
20948	3.00	EA	M	1	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.6600	1.98
20960	3.00	EA	M	1	PVC-CTD GRC 90-ELBOW	44.0404	132.12	0.4900	1.47
30820	3.00	EA	M	1	PVC-CTD GRC COUPLING	11.2093	33.63	0.3500	1.05
31015	1.00	EA	M	1	PVC-CTD GRC (MYERS) HUB W/G	49.6900	49.69	0.5000	0.50
30850	1.00	EA	M	1	PVC-CTD GRC LB COND-BODY F-7	80.4400	80.44	0.8750	0.88
50560	3.00	FT	M	1	LIQUIDTITE PVC-CTD STN-STEEL	0.1812	0.54	0.0660	0.20
50572	1.00	EA	M	1	PVC-CTD LIQUID-TITE STR-CONN	96.0600	96.06	0.4500	0.45
50592	1.00	EA	M	1	PVC-CTD LIQUID-TITE 90D-CONN	148.8400	148.84	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.1000	0.10
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.1000	0.10
100553	1.00	EA	M	14	WIRE TERMINATION LBR	0.2500	0.25	0.0300	0.03
100836	1.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	0.75	0.0500	0.05
TITLE	1.00	EA	M		GRC - NETWORK CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
90382	60.00	FT	M	23/4PR	CAT6 CABLE CMP PLENUM -BLUE	0.3863	23.18	0.0100	0.60
70196	60.00	FT	M	14	GREEN XHHW CU (GRD 15A)	0.2255	13.53	0.0042	0.25
430124	2.00	EA	M	553913-1	DATA PLUG CONN	0.7500	1.50	0.0850	0.17
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0500	0.20
					Phase Totals:		**68,515.71**		**246.49**

Phase: UV ELEC SYSTEM TROJAN
└**SubPhase:** MISCELLANEOUS

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				**ONE ELECTRICIAN & ONE INSTRUMENTATION FOR ONE WEEKS**				
199	1.00	LS	M		E&I COMMISIONING	10,000.0000	10,000.00	80.0000	80.00
						Phase Totals:	**10,000.00**		**80.00**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** DEMOLITION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** DEMOLITION *****				
	40.00				**- EXT UV**				
380001	40.00	EA	M		DEMOLITION BY MAN HOUR	0.0000	0.00	1.0000	40.00
	0.00				**- CONDUIT INTERCEPT & PREPARATION**				
380001	1.00	EA	M		DEMOLITION BY MAN HOUR	500.0000	500.00	32.0000	32.00
660010	6.00	HR	E		FORKLIFT	250.0000	1,500.00	1.0000	6.00
					Phase Totals:		**2,000.00**		**78.00**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** DISTRIBUTION EQUIPMENT

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** DISTRIBUTION EQUIPMENT *****				
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	20,000.0000	20,000.00	40.0000	40.00
	0.00				**- HARMONIC MITIGATION XFMR**				
190082	1.00	EA	M	75KVA	3PH ISOLATION XFMR FLOOR MTD	25,000.0000	25,000.00	6.0000	6.00
50	1.00	LS	M	MCC PAD	MCC HOUSE KEEPING PAD/SECTION	350.0000	350.00	2.0000	2.00
161657	4.00	EA	M	4"x 4"x .04 57psi	POLYURETHANE PAD	4.7500	19.00	0.0500	0.20
TITLE	1.00	EA	M		- 3/8" ANCHORING IN CONCRETE	0.0000	0.00	0.0000	0.00
160291	1.00	EA	M	3/8 x 3 1/2"	STN-STL T304 WEDGE ANCHOR	4.0320	4.03	0.1500	0.15
160453	1.00	EA	M	3/8"	STN-STL FLAT WASHER	0.3200	0.32	0.0010	0.00
160960	1.00	EA	M	3/8-16	STN-STL HEX NUTS	0.3800	0.38	0.0300	0.03
500244	1.00	EA	M	3/8 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.2200	0.22
					Phase Totals:		**45,373.73**		**48.60**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** GROUNDING

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** GROUNDING/BONDING *****				
	0.00				**- DIST. EQUIP GROUNDING**				
850010	4.00	EA	M	3/4 x 10	COPPER GROUND ROD	48.2800	193.12	1.0000	4.00
850022	3.00	EA	M	3/4 x 10	COPPER CLAD GROUND ROD	38.2000	114.60	1.0000	3.00
850175	1.00	EA	M	10"RNDx 10"D	GROUND INSPECTION WELL - POLYETHYLENE	45.5100	45.51	1.0000	1.00
850344	2.00	EA	M	4/0	GRND-ROD SPLICE CADWELD	20.0000	40.00	1.3500	2.70
850061	1.00	EA	M	3/4.	GROUND ROD CLAMP -HEAVY DUTY	5.8100	5.81	0.1000	0.10
70232	120.00	FT	M	4/0	BARE CU (STR)	7.2318	867.82	0.0203	2.44
	0.00				**- GROUNDING STUB-UP**				
10201	60.00	FT	M	1 1/2	PVC SCH 80	3.8532	231.19	0.0500	3.00
20381	12.00	EA	M	1 1/2	PVC SCH 80 90-DEG EL	7.8956	94.75	0.1750	2.10
31377	12.00	EA	M	1 1/2	PVC COUPLING	0.5279	6.33	0.0700	0.84
31325	12.00	EA	M	1 1/2	PVC FEMALE ADAPTER	0.8567	10.28	0.1500	1.80
40221	12.00	EA	M	1 1/2	PLASTIC BUSHING	0.3866	4.64	0.0500	0.60
161378	24.00	EA	M	1 1/2	PVC 2-HOLE STRAP	0.7123	17.10	0.0340	0.82
161160	48.00	EA	M	#10-12 x 1"	PLASTIC ANCHOR	0.0613	2.94	0.0200	0.96
161130	48.00	EA	M	#10 x 1"	GALV SHEET METAL SCREW	0.0500	2.40	0.0170	0.82
161173	48.00	EA	M	1/4 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0000	0.00	0.1800	8.64
70232	240.00	FT	M	4/0	BARE CU (STR)	7.2318	1,735.63	0.0203	4.87
100067	8.00	EA	M	4/0	CU CRIMP LUG 2-HOLE	8.9200	71.36	0.5950	4.76
850434	2.00	EA	M	4/0	CADWELD CONDUCTOR TO STEEL-FLAT	20.0000	40.00	1.0500	2.10
850471	2.00	EA	M	#4/0	CADWELD COPPER WIRE TO #4 HORIZ REBAR	20.0000	40.00	1.0200	2.04
850374	5.00	EA	M	4/0	TEE/WYE SPLICE CADWELD	20.0000	100.00	1.6500	8.25
					Phase Totals:		**3,623.48**		**54.83**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				**PROVIDED BY VEOLIA**				
TITLE	1.00	EA	M		CABLE TRAY - 9" RUN AL ASMYS	0.0000	0.00	0.0000	0.00
654362	30.00	FT	M	18"	ALUM LADDER CABLE TRAY 9"RUNGS-6"DEPTH	0.0000	0.00	0.1165	3.50
654371	2.00	EA	M	18"	45D ELBOW ALUM-LADDER TRAY 9"RUNGS 6"D	0.0000	0.00	1.4742	2.95
652886	30.00	FT	M	18" WIDTH	CABLE TRAY VENT STRAIGHT FLAT COVER	0.0000	0.00	0.0400	1.20
653628	10.00	EA	M	2-1/4"	CABLE TRAY CLAMP/GUIDE	0.0000	0.00	0.1500	1.50
70232	42.00	FT	M	4/0	BARE CU (STR)	0.0000	0.00	0.0203	0.85
653623	6.00	EA	M	#6 - 4/0	CABLE TRAY LAY-IN GROUND CLAMP	0.0000	0.00	0.5000	3.00
100047	1.00	EA	M	4/0	CU CRIMP LUG 1-HOLE	0.0000	0.00	0.5250	0.53
850425	1.00	EA	M	4/0	CADWELD HORIZ TEE CABLE MOLD	0.0000	0.00	1.6500	1.65
653662	1.00	EA	M	6" WIDTH	CABLE TRAY EXPANSION CONNECTION	0.0000	0.00	0.3500	0.35
653683	1.00	EA	M	6" WIDTH	CABLE TRAY COVER CLAMPS - PAIR	0.0000	0.00	0.0600	0.06
653691	1.00	EA	M	6" WIDTH	CABLE ROLLERS FOR TRAY SETUP	0.0000	0.00	0.4000	0.40
653699	1.00	EA	M	CABLE TRAY	SINGLE BULLWHEEL SETUP	0.0000	0.00	0.7000	0.70
653700	1.00	EA	M	CABLE TRAY	TRIPLE BULLWHEEL SETUP	0.0000	0.00	0.8000	0.80
	0.00				***** CONDUIT & WIRE *****				
	1.00				**UV SWCHB TO XFMR-1**				
TITLE	1.00	EA	M		SLAB-ON CONDUIT PVC SCH 40 & PVC-CTD	0.0000	0.00	0.0000	0.00
10168	25.00	FT	M	2	PVC SCH 40	3.1104	77.76	0.0800	2.00
390709	5.00	FT	M		STEEL TIE WIRE	0.0720	0.36	0.0600	0.30
31314	1.00	EA	M	2	PVC END BELLS	3.7769	3.78	0.2300	0.23
31338	2.00	EA	M	2	PVC MALE ADAPTER	1.1191	2.24	0.3000	0.60
20963	2.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	185.60	1.2000	2.40
30823	2.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	43.45	0.7000	1.40
10260	10.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	167.90	0.1800	1.80
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
10556	2.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	0.80
70069	135.00	FT	M	1/0	XHHW CU (STR)	4.1642	562.17	0.0240	3.24
70200	45.00	FT	M	6.	GREEN XHHW CU (GRD 200A)	1.2355	55.60	0.0120	0.54
100044	3.00	EA	M	1/0	CU CRIMP LUG 1-HOLE	4.7300	14.19	0.6000	1.80
100039	1.00	EA	M	6.	CU CRIMP LUG 1-HOLE	1.4200	1.42	0.3500	0.35
100563	6.00	EA	M	1/0	WIRE TERMINATION LBR	1.0000	6.00	0.3600	2.16

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100557	2.00	EA	M	6.	WIRE TERMINATION LBR	0.5000	1.00	0.2200	0.44
100837	8.00	EA	M	LABEL -MD	WIRE LABEL - MEDIUM	1.3500	10.80	0.0000	0.00
91090	4.00	EA	M	MEGGER #4 - #1000	MEGGER TEST - #4 & LARGER	0.0000	0.00	0.2500	1.00
20286	1.00	EA	M	2	PVC SCH 40 45-DEG EL	2.3499	2.35	0.5000	0.50
	1.00				**XFMR-1 TO PSU**				
TITLE	1.00	EA	M		SLAB-ON CONDUIT PVC SCH 40 & PVC-CTD	0.0000	0.00	0.0000	0.00
10168	25.00	FT	M	2	PVC SCH 40	3.1104	77.76	0.0800	2.00
390709	5.00	FT	M		STEEL TIE WIRE	0.0720	0.36	0.0600	0.30
31314	1.00	EA	M	2	PVC END BELLS	3.7769	3.78	0.2300	0.23
31338	2.00	EA	M	2	PVC MALE ADAPTER	1.1191	2.24	0.3000	0.60
20963	2.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	185.60	1.2000	2.40
30823	2.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	43.45	0.7000	1.40
10260	10.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	167.90	0.1800	1.80
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
10556	2.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	0.80
70069	135.00	FT	M	1/0	XHHW CU (STR)	4.1642	562.17	0.0240	3.24
70200	45.00	FT	M	6.	GREEN XHHW CU (GRD 200A)	1.2355	55.60	0.0120	0.54
100044	3.00	EA	M	1/0	CU CRIMP LUG 1-HOLE	4.7300	14.19	0.6000	1.80
100039	1.00	EA	M	6.	CU CRIMP LUG 1-HOLE	1.4200	1.42	0.3500	0.35
100563	6.00	EA	M	1/0	WIRE TERMINATION LBR	1.0000	6.00	0.3600	2.16
100557	2.00	EA	M	6.	WIRE TERMINATION LBR	0.5000	1.00	0.2200	0.44
100837	8.00	EA	M	LABEL -MD	WIRE LABEL - MEDIUM	1.3500	10.80	0.0000	0.00
91090	4.00	EA	M	MEGGER #4 - #1000	MEGGER TEST - #4 & LARGER	0.0000	0.00	0.2500	1.00
20286	1.00	EA	M	2	PVC SCH 40 45-DEG EL	2.3499	2.35	0.5000	0.50
	0.00				**PSU TO UMCP**				
TITLE	4.00	EA	M		GRC - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
70064	240.00	FT	M	6.	XHHW CU (STR)	1.2355	296.52	0.0120	2.88
70199	60.00	FT	M	8	GREEN XHHW CU (GRD 100A)	0.8534	51.20	0.0100	0.60
100039	16.00	EA	M	6.	CU CRIMP LUG 1-HOLE	1.4200	22.72	0.3500	5.60
100742	8.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	8.12	0.1000	0.80
100557	32.00	EA	M	6.	WIRE TERMINATION LBR	0.5000	16.00	0.2200	7.04
100556	16.00	EA	M	8	WIRE TERMINATION LBR	0.5000	8.00	0.2000	3.20

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100836	40.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	30.00	0.0000	0.00
91089	20.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	3.00
TITLE	1.00	EA	M	1 1/2	LIQUIDTITE CONDUIT	0.0000	0.00	0.0000	0.00
50084	3.00	FT	M	1 1/2	LIQUIDTITE CONDUIT	4.1602	12.48	0.1500	0.45
50095	1.00	EA	M	1 1/2	LIQUIDTITE 90D ANGLE CONNECTOR	38.9200	38.92	0.4320	0.43
50106	1.00	EA	M	1 1/2	LIQUIDTITE STRAIGHT CONNECTOR	17.0369	17.04	0.3600	0.36
40131	2.00	EA	M	1 1/2	GRND BUSHING INSULATED	10.2429	20.49	0.5000	1.00
	0.00				**SOUTH SIDE**				
	1.00				**NEW ACTUATOR-1**				
TITLE	1.00	EA	M		GRC PVC-CTD - MOTOR CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	25.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	179.77	0.0800	2.00
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	5.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	51.47	0.0300	0.15
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	270.00	FT	M	12	XHHW CU (STR)	0.3217	86.85	0.0070	1.89
70197	90.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	28.95	0.0070	0.63
100742	3.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	3.04	0.1000	0.30
100742	1.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	1.01	0.1000	0.10
100554	6.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.50	0.1600	0.96
100554	2.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.50	0.1600	0.32
100836	8.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	6.00	0.0000	0.00
91089	4.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.60
	0.00				**NORTH SIDE**				

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	1.00				**JB TO JB**				
TITLE	1.00	EA	M		GRC PVC-CTD - CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10260	40.00	FT	M	2	PVC-CTD GRC 40MIL	16.7902	671.61	0.1800	7.20
10556	3.00	EA	M	2	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.4000	1.20
240992	7.00	EA	M	2	PVC-CTD STRUT CLAMP	28.1818	197.27	0.0400	0.28
20951	3.00	EA	M	2	PVC-CTD GRC FLD-BEND	0.0000	0.00	2.0000	6.00
20963	3.00	EA	M	2	PVC-CTD GRC 90-ELBOW	92.8000	278.40	1.2000	3.60
30823	3.00	EA	M	2	PVC-CTD GRC COUPLING	21.7274	65.18	0.7000	2.10
31018	1.00	EA	M	2	PVC-CTD GRC (MYERS) HUB W/G	99.9500	99.95	1.0000	1.00
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
710527	2.00	EA	M	10x8x6	PULL BOX FGL HINGED QR-CVR N4X	163.8000	327.60	1.0000	2.00
	1.00				**ACTUATOR-1**				
TITLE	1.00	EA	M		GRC PVC-CTD - MOTOR CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	25.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	179.77	0.0800	2.00
10552	2.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.32
240988	5.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	51.47	0.0300	0.15
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	2.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	0.78
20959	2.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	54.21	0.6000	1.20
30819	2.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	14.71	0.3500	0.70
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
70061	375.00	FT	M	12	XHHW CU (STR)	0.3217	120.63	0.0070	2.63
70197	125.00	FT	M	12.	GREEN XHHW CU (GRD 20A)	0.3217	40.21	0.0070	0.88
100742	3.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	3.04	0.1000	0.30
100742	1.00	EA	M	#10 HOLE	INSULATED RING CRIMP LUG 12-10	1.0148	1.01	0.1000	0.10

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** CONDUIT & WIRE

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100554	6.00	EA	M	12	WIRE TERMINATION LBR	0.2500	1.50	0.1600	0.96
100554	2.00	EA	M	12	WIRE TERMINATION LBR	0.2500	0.50	0.1600	0.32
100836	8.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	6.00	0.0000	0.00
91089	4.00	EA	M	MEGGER #16 - #6	MEGGER TEST - #6 & UNDER	0.0000	0.00	0.1500	0.60
	0.00								
	1.00				**POWER CABLES PROVIDE BY VEOLIA**				
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	2,500.0000	2,500.00	60.0000	60.00
	1.00				**MISC POWER CABLES MAIN PDP**				
6	1.00	LS	M	ALLOWANCE	ELECTRICAL CONSTRUCTION ALLOWANCE	2,500.0000	2,500.00	40.0000	40.00
						Phase Totals:	**11,038.71**		**233.67**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** INSTRUMENTATION *****				
	1.00				**AIT-XXXX**				
TITLE	1.00	EA	M		AIT - ANALYZER TRANSMITTER	0.0000	0.00	0.0000	0.00
34	1.00	EA	M	AIT	ANALYZER	2,500.0000	2,500.00	4.0000	4.00
45	1.00	EA	M	CALIB VERIFY	INSTRUMENT CALIBRATION VERIFY	0.0000	0.00	0.5000	0.50
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50
100552	5.00	EA	M	16	WIRE TERMINATION LBR	0.2500	1.25	0.1200	0.60
23	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0500	0.25
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	3.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.48
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	3.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	22.07	0.3500	1.05
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
90492	30.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	15.90	0.0140	0.42
100553	5.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.25	0.1400	0.70
100836	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0000	0.00
	1.00				**LIT-XXXX**				
TITLE	1.00	EA	M		LIT - LEVEL TRANSMITTER (RADAR)	0.0000	0.00	0.0000	0.00
450022	1.00	EA	M		LEVEL TRANSMITTER	2,500.0000	2,500.00	3.5000	3.50
45	1.00	EA	M	CALIB VERIFY	INSTRUMENT CALIBRATION VERIFY	0.0000	0.00	0.5000	0.50
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50
100552	5.00	EA	M	16	WIRE TERMINATION LBR	0.2500	1.25	0.1200	0.60

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
23	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0500	0.25
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
450029	6.00	EA	M		ELEMENT TRANSMITTER	0.0000	0.00	2.0000	12.00
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	9.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	1.44
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	3.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	81.00	1.0000	3.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	1.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	7.36	0.3500	0.35
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	5.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	12.78	0.0000	0.00
40062	2.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	13.60	0.2125	0.43
90492	100.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	53.00	0.0140	1.40
100553	4.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.00	0.1400	0.56
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0000	0.00
	0.00				**EXT FE-XXXX (REUSE EXT CONDUIT ROUTE)**				
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	3.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.48
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	3.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	22.07	0.3500	1.05
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
90492	520.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	275.60	0.0140	7.28
100553	4.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.00	0.1400	0.56
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0000	0.00
	1.00				**UVT-AIT**				
TITLE	1.00	EA	M		AIT - ANALYZER TRANSMITTER	0.0000	0.00	0.0000	0.00
34	1.00	EA	M	AIT	ANALYZER	6,500.0000	6,500.00	4.0000	4.00
45	1.00	EA	M	CALIB VERIFY	INSTRUMENT CALIBRATION VERIFY	0.0000	0.00	0.5000	0.50
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50
100552	5.00	EA	M	16	WIRE TERMINATION LBR	0.2500	1.25	0.0300	0.15
23	5.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.75	0.0500	0.25
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
TITLE	1.00	EA	M		GRC PVC-CTD - INSTRUMENT CONDUIT & WIRE	0.0000	0.00	0.0000	0.00
10256	20.00	FT	M	3/4	PVC-CTD GRC 40MIL	7.1909	143.82	0.0800	1.60
10552	3.00	EA	M	3/4	CONDUIT CUT/THREAD/REAM	0.0000	0.00	0.1600	0.48
240988	4.00	EA	M	3/4	PVC-CTD STRUT CLAMP	10.2944	41.18	0.0300	0.12
161684	1.00	EA	M	1/2" TO 1"	SS CONDUIT SUPPORT	27.0000	27.00	1.0000	1.00
20947	3.00	EA	M	3/4	PVC-CTD GRC FLD-BEND	0.0000	0.00	0.3900	1.17
20959	3.00	EA	M	3/4	PVC-CTD GRC 90-ELBOW	27.1046	81.31	0.6000	1.80
30819	3.00	EA	M	3/4	PVC-CTD GRC COUPLING	7.3552	22.07	0.3500	1.05
31014	1.00	EA	M	3/4	PVC-CTD GRC (MYERS) HUB W/G	46.4800	46.48	0.4500	0.45
30849	1.00	EA	M	3/4	PVC-CTD GRC LB COND-BODY F-7	97.1900	97.19	0.6500	0.65
50559	3.00	FT	M	3/4	LIQUIDTITE PVC-CTD STN-STEEL	0.1620	0.49	0.0630	0.19
50571	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE STR-CONN	70.4400	70.44	0.4500	0.45
50591	1.00	EA	M	3/4	PVC-CTD LIQUID-TITE 90D-CONN	86.2600	86.26	0.4500	0.45
40070	1.00	OZ	M	OUNCE	DEGREASING SPRAY	0.8827	0.88	0.0000	0.00
40055	1.00	OZ	M	OUNCE	THREAD-COMPOUND-PVC-CTD	2.5560	2.56	0.0000	0.00
40062	1.00	OZ	M	OUNCE	PVC-CTD SPRAY-ON SEALANT	6.7985	6.80	0.2125	0.21
90492	520.00	FT	M	16/1PR	CNTRL CBL SHLD TWSTD PR	0.5300	275.60	0.0140	7.28
100553	4.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.00	0.1400	0.56

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** INSTRUMENTATION

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
100836	4.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	3.00	0.0000	0.00
	1.00				**CONTROL CABLE PROVIDED BY VEOLIA**				
	1.00				**LSL-XXX**				
TITLE	1.00	EA	M		LS - LEVEL SWITCH	0.0000	0.00	0.0000	0.00
450076	1.00	EA	M		LEVEL SWITCH FLOAT	0.0000	0.00	2.4000	2.40
43	1.00	EA	M	LOOP CHECK	LOOP CHECK CIRCUIT	0.0000	0.00	0.5000	0.50
100553	6.00	EA	M	14	WIRE TERMINATION LBR	0.2500	1.50	0.1400	0.84
23	6.00	EA	M	LABEL -SM	WIRE LABEL - SMALL	0.7500	4.50	0.0500	0.30
500255	1.00	EA	M	MISC	MATERIAL	1.0000	1.00	0.0000	0.00
12	1.00	LS	M	Allowance	INSTRUMENT & CONTROL ALLOWANCE	2,500.0000	2,500.00	60.0000	60.00
					Phase Totals:		**17,224.28**		**152.36**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** INDUSTRIAL CONTROL

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				***** INDUSTRIAL CONTROL *****				
	0.00				**PROGRAMMING W/MAIN DCS, HARDWARE & CONDUIT & WIRE (DATA NOT INCLUDED IN VEOLIA)**				
8	1.00	LS	M	ALLOWANCE	CONTROL SYSTEM ALLOWANCE	65,000.0000	65,000.00	80.0000	80.00
	1.00				**- UV PSU PROVIDED BY VENDOR**				
TITLE	1.00	EA	M		LCP-1 CONTROL CABINET	0.0000	0.00	0.0000	0.00
183	1.00	LS	M	LCP CABINET	LCP CONTROL CABINET	0.0000	0.00	20.0000	20.00
500255	1.00	EA	M	MISC	MATERIAL	200.0000	200.00	4.0000	4.00
	1.00				**- UV UMCPS PROVIDED BY VENDOR**				
TITLE	4.00	EA	M		LCP-1 CONTROL CABINET	0.0000	0.00	0.0000	0.00
183	4.00	LS	M	LCP CABINET	LCP CONTROL CABINET	0.0000	0.00	10.0000	40.00
500255	4.00	EA	M	MISC	MATERIAL	200.0000	800.00	4.0000	16.00
					Phase Totals:		**66,000.00**		**160.00**

Phase: UV ELEC SYSTEM VEOLIA
└**SubPhase:** MISCELLANEOUS

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
	0.00				**ONE ELECTRICIAN & ONE INSTRUMENTATION FOR ONE WEEKS**				
199	1.00	LS	M		E&I COMMISIONING	10,000.0000	10,000.00	80.0000	80.00
						Phase Totals:	**10,000.00**		**80.00**
						Job Totals:	**306,151.07**		**1,734.20**