CITY OF WILSONVILLE
GMP AMENDMENT TO CM/GC CONTRACT

THIS AMENDMENT IS BETWEEN:

OWNER: **The City of Wilsonville**

And

CONSTRUCTION MANAGER/ GENERAL CONTRACTOR (referred to as Contractor in the General Conditions and referred to as "the CM/GC" in the Contract):

Kiewit Infrastructure West Co.

The Project is: **WRWTP Expansion/Upgrade Project**

Date of Original CM/GC Contract ("Contract"): **9/13/21 by City Attorney**

Date of this Amendment: _____

The Owner and CM/GC amend the Contract as set forth below. Capitalized terms not otherwise used in this Amendment shall have the meanings given in the Contract. Except as amended, the Contract remains in full force and effect.

1. GMP. The parties agree that the GMP for the Project is $25,317,288.00, consisting of the Preconstruction Fee, the cost for the Work and the CM/GC Fee (stated as a fixed dollar lump sum amount), as follows. Additive alternative bid items are described in the drawings and in specification section 01 00 60 Summary of Work. The GMP includes additive alternate bid items 7, 9, 11, and 12.

Preconstruction Fee:	$ 198,328.00
Cost for the Work:	$ 23,816,196.00
CM/GC Fee (Fixed Dollar Amount):	$ 1,302,764.00

GMP (the Contract Sum/Total of above categories):
$ 25,317,288.00

For purposes of determining the GMP, the cost for the Work which includes the CM/GC's Contingency, prior amendments related to Ozone Procurement, the Fixed Cost for GC Work, and the costs of all components and systems required for a complete, fully functional Project.

2. Basis of GMP. The GMP is based on the GMP Supporting Documents attached as Attachments A-I. Attachments A and B are incorporated by reference herein, and not attached due to size.
   A. Attachment A – Willamette River Water Treatment Plant Expansion, WRWTP Issued for Construction Specifications (1271 pages) and Drawings (203 pages), dated March 4, 2022, Prepared for City of Wilsonville, Prepared by Stantec Consulting Services, Inc.
   B. Attachment B – Willamette River Water Treatment Plant Expansion, WRWTP Addendum 1 Specification (7 pages, attached) and Drawings (61 pages), dated April 27, 2022, Prepared for City of Wilsonville, Prepared by Stantec Consulting Services, Inc.
   C. Attachment C – A list of the clarifications, exclusions and assumptions made by the CM/GC in the preparation of the GMP proposal to supplement the information contained in the Plans and Specifications.
   D. Attachment D – The proposed GMP, including a statement of the cost organized by major elements of work, trade categories, allowances, contingency, and other items and the associated fees that comprise the GMP in a format mutually agreed to with the total Contract Sum as modified being, notwithstanding anything to the contrary in the Contract (including references to "Cost of the Work" which will no longer apply), paid on a lump sum basis in accordance with the mutually agreed Schedule of Values which will be based upon Attachment D.
   E. Attachment E – A detailed Critical Path Diagram Schedule illustrating the sequence of construction and duration of work activities included in the GMP and a schedule of the Construction Documents issuance dates upon which the date of Substantial Completion is based. Based on this schedule, revised Notice to Proceed date is anticipated to be issued on or about May 9, 2022. Substantial Completion, Project Close out and Commissioning will be complete by May 1, 2024.
   F. Attachment F – Risk and contingency analysis.
   G. Attachment G – The CM/GC organization chart assumed for the GMP.
   H. Attachment H – Labor, equipment, materials, and subcontract rates included in the GMP.
   I. Attachment I – Maintenance and Operation Plan

J. Attachment J – WRWTP – Staff Durations and Cost Analysis with names, positions, and durations identified under "Potential Reduced Scope" grouping.

3. Bonds. CM/GC shall obtain new payment and performance bonds, or increase the amount of the performance and payment bonds previously provided in connection with this CM/GC Contract, as required by Section G of the General Conditions, so that each new bond, or with respect to increases in existing bonds, the sum amount of each existing bond and the increase in the amount of each such existing bond, shall equal or exceed the GMP, prior to supplying any labor or materials for prosecution of the Work under this GMP Amendment.

4. Tax Compliance. By signature of this Contract, the undersigned certifies under penalty of perjury that the undersigned is authorized to act on behalf of CM/GC and that CM/GC is, to the best of the undersigned knowledge, not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 401.792 to 401.816 and ORS chapters 118, 314, 316, 317, 318, 320, 321, and 323; the elderly rental assistance program under ORS 310.630 to 310.706, and local taxes administered by the Department of Revenue under ORS 305.620 and, finally, the City of Wilsonville business license fee under Wilsonville Code.

5. In Article 5.1, replace "December 2021" with "May 9, 2022".

6. In Article 6.4.7: replace "Cost of the Work" with "Cost for the Work"; insert "additive and deductive" between "unforeseen" and "costs"; replace "are approved for use in advance by Owner" with "require specific written approval by Owner in advance of use by the CM/GC".

THIS GMP AMENDMENT TO CM/GC CONTRACT is executed in two (2) original copies of which one is to be delivered to the CM/GC, and the remainder to Owner.

CM/GC:

CM/GC

By:_____

Print Name:_____

As Its:_____

Employer I.D. No._____

OWNER:

CITY OF WILSONVILLE

By:_____

Print Name:_____

As Its:_____

APPROVED AS TO FORM:

_____

Ryan Adams, Assistant City Attorney
City of Wilsonville, Oregon

SECTION 01 10 00 - SUMMARY OF WORK

PART 1 -- GENERAL

1.1 THE SUMMARY

A. The project is the Willamette River Water Treatment Plant Expansion / Upgrade CIP #1144. Roles are: OWNER—the City of Wilsonville; CM/GC or CONTRACTOR – Kiewit Infrastructure West Co.; ENGINEER – Stantec Consulting Services Inc.

B. The WORK to be performed under this Contract shall consist of furnishing plant, tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The WORK of this Contract comprises the construction of a 20 million gallon per day water filtration plant expansion, including raw water pump replacement, finished water pumps, ozone system equipment replacement, chemical storage facility improvements, an electrical switchgear building, a standby generator with diesel fuel tank, seismic retrofits to existing facilities, installation of baffles within clearwell, site work, residuals handling / pumping improvements, integration of control systems, and appurtenant work, as an expansion of existing treatment facilities. Portions of the WORK involve the installation of equipment and materials to be furnished by the OWNER.

B. The WORK is located at the OWNER's Willamette River Water Treatment Plant, 10350 SW Arrowhead Creek Lane, Wilsonville, Oregon 97070.

C. The CONTRACTOR shall procure, furnish and install all equipment in accordance with the Contract Documents.

D. Work performed by the CONTRACTOR will also include, but is not limited to, the following:

1. The CONTRACTOR will be responsible for ensuring that all protection devices in each MCC have been set and tested appropriately.

2. The CONTRACTOR shall obtain and comply with all necessary permits for the work. The OWNER will be responsible for any required permit fees.

a. The following is a summary of the permits:

1) OWNER initiated and CONTRACTOR obtained permits: Apply for and obtain the permits listed in the following table:

OWNER Initiated and Transferred to CONTRACTOR Permits		
Permitting Authority	**Name of Permit**	**Permittee**
City of Wilsonville	Structural Permit	Contractor
City of Wilsonville	Mechanical Permit	Contractor
City of Wilsonville	Electrical Permit	Contractor

2) OWNER initiated and CONTRACTOR obtained permits: Some permit applications have been initiated by the OWNER during design and will be provided to the CONTRACTOR to assist the CONTRACTOR in securing those permits. OWNER does not guarantee the accuracy of the permit applications, requirements, and/or fees. Apply for and obtain the permits listed the following table:

OWNER Obtained and Transferred to CONTRACTOR Permits		
Permitting Authority	**Name of Permit**	**Permittee**
City of Wilsonville Building Department	Building Permit	Contractor
Oregon Department of Environmental Quality (DEQ)	1200-C	Contractor

3) OWNER obtained permits:

OWNER Obtained and Transferred to CONTRACTOR Permits		
Permitting Authority	**Name of Permit**	**Permittee**
Oregon Department of Environmental Water Quality	Water Quality Certification	Owner
City of Wilsonville	Site Design Review	Owner

b. Complete the permit applications and submit to the permitting agency. Coordinate with the OWNER as necessary to clarify permit requirements. Unless the permitted activity is specifically limited, permits obtained cover the entire WORK.

c. The absence of information does not relieve the CONTRACTOR of responsibility for determining and verifying the extent of permits required and for obtaining permits.

d. Furnish copies of all permits obtained by the CONTRACTOR to the OWNER through the formal submittal process.

e. Inform the OWNER of any conflicts between permits and contract documents.

f. Copies of permits obtained by the OWNER will be provided to the CONTRACTOR.

g. CONTRACTOR shall maintain a notebook of all permits on the construction site.

h. All permits shall be closed out upon completion of the WORK.

1.3 CONTRACT METHOD

A. The WORK hereunder (WRWTP Expansion / Upgrade Project) will be constructed under the Construction Manager / General Contractor (CM/GC) contract between City of Wilsonville and Kiewit Infrastructure West Co. dated September 13th, 2021. The CM/GC shall develop and work within the Guaranteed Maximum Price (GMP). Through amendment number 1 (October 20th, 2021) and amendment number 2 (December 6, 2021).

1.4 WORK BY OTHERS

A. Where 2 or more contracts are being performed at one time on the same Site or adjacent land in such manner that work under one contract may interfere with work under another, the OWNER will determine the sequence and order of the Work in either or both contracts. When the Site of one contract is the necessary or convenient means of access for performance of work under another, the OWNER may grant privilege of access or other reasonable privilege to the contractor so desiring, to the extent, amount , and in manner and at time that the OWNER may determine. No OWNER determination of method or time or sequence or order of the work or access privilege shall be the basis for a claim for delay or damage except under provisions of the General Conditions for temporary suspensions of the work. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the work of such other contractors, and shall cooperate fully with such contractors to allow continued safe access to their respective portions of the Site, as required to perform work under their respective contracts.

B. Interference With Work On Utilities**:** The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.5 WORK SEQUENCE

A. Refer to 01 14 00 Construction Constraints.

1.6 ADDITIVE ALTERNATE BID ITEMS

A. Additive alternate construction scope items are described below and throughout the drawings. All construction scope not specifically identified as an additive alternate is in the base project and is inherently included in the compensation amount. Additive alternate construction scope items are not included in the base project unless specifically identified in the CM/GC Contract and Amendments with an agreed to compensation amount. If the CM/GC Contractor and the OWNER agree in the future to include an additive alternate construction scope item into the project, those parties shall agree on the compensation amount and schedule, and then execute a contract amendment indicating such.

1. Additive Alternate Bid Item 1 – Raw Water Pump #4 (2-P-4): Demolition of Existing Raw Water Pump #4, VFD, Associated Piping, Valves, Conduits, Conductors Appurtenances, and Concrete Pump Base; New Raw Water Pump #4 (Installation only), VFD (2-P-4 VFD) (installation only), Seismic Bracing, Associated Piping,

Valves, Appurtenances, Conduit, Conductors, and Concrete Pump Base; Exclusive of Additive Alternate Bid Item 11 (Drawings: I-009, 2I-601, 2DD101, 2D-101, 2D-301, 2D-501, ED-602, E-606, E-608, 2ED101, 2E-101, and Specification Section: 26 29 23, 43 24 13)

2. Additive Alternate Bid Item 2 – Workshop in Existing Generator Room: Conversion of Room to Workshop Space (Drawings: 9A-101, 9A-102, 9A-201, and Specification Sections: 06 20 00, 08 51 13, and 08 81 00)

3. Additive Alternate Bid Item 3 – Finished Water Pump #5 (9-P-5): Finished Water Pump #5: Demolition of Existing Concrete Pump Base; New Finished Water Pump #5 (installation only), VFD (9-P-5 VFD) (installation only), Associated Piping, Valves, Appurtenances, Conduit, Conductors, and Concrete Pump Base; Exclusive of Additive Alternate Bid Item 12 (Drawings: I-009, 9I-601, 9DD101, 9D-101, 9D-301, E-605, E-609, 9E-101, 9E-102 and Specification Section: 26 29 23, 43 24 13)

4. Additive Alternate Bid Item 4 – Washwater Equalization Basin Seismic Improvements: Slabs at Washwater Equalization Basin; Ladder relocation; Railing modifications (Drawings: 8S-101, 8S-301, 8S-302 and Specification Section: N/A)

5. Additive Alternate Bid Item 5 – Washwater Equalization Basin Pumps: Demolition of Existing Washwater Equalization Pumps 1 (8-P-1), 2 (8-P-2), 3 (8-P-3) and VFDs; New Washwater Equalization Pumps 1, 2, and 3 and VFDs (Drawings: I-009, 8I-601, 8DD101, 8D-101, 8D-301, ED-603, E-604, E-608, 8ED101, 8E-101 and Specification Section: 26 29 23, 43 24 13)

6. Additive Alternate Bid Item 6 – Shelf Spare Solids Mixing Pump: Purchase of shelf spare solids mixing pump (Drawings: N/A, Specification Section: 43 23 36)

7. Additive Alternate Bid Item 7 – Chemical Room Curb Removal: Demolition of curbs and associated restoration in Chemical Room as indicated on the drawings (Drawings: 13SD101, Specification Section: N/A)

8. Additive Alternate Bid Item 8 – Seismic Bracing for Pipe Hangers in Chemical and Ozone Rooms: Seismic bracing for piping hangers in Chemical and Ozone Room (Drawings: 13S-102, 13S-301, 13S-302, 19S-102, 19S-301, Specification Section: N/A)

9. Additive Alternate Bid Item 9 – Standby Generator, Diesel Fuel Tank, and Fuel Tank Canopy: Installation of Standby Generator, Diesel Fuel Tank, associated piping, appurtenances, and Fuel Tank Canopy; Demolition of Existing Generator; Concrete infill walls at FWPS; Does not include foundation slabs or electrical conduit stub ups (Drawings: 9S-102, 22S-101, 22S-301, I-009, I-604, I-605, 22I-601, 22I-602, 22D-101, 22D-301, 22D-501, 22D-502, ED-101, ED-602, E-101, E-602, E-607, E-613, 9ED101 Specification Section: 13 34 21, 26 32 14, 33 52 10, 33 56 13, 33 56 16)

10. Additive Alternate Bid Item 10 – Finished Water Pump Station Cable Tray Bracing and Roof Seismic Improvements (Drawings: 9S-103, 9S-302, 9S-303, 9S-304 and Specification Section: NA)

11. Additive Alternate Bid Item 11 – Procurement only of Raw Water Pump #4 and VFD (2-P-4 VFD) (Drawings: I-009, 2I-601, 2DD101, 2D-101, 2D-301, 2D-501, ED-602, E-606, E-608, 2ED101, 2E-101; Specification Section: 26 29 23, 43 24 13)

12. Additive Alternate Bid Item 12 – Procurement only of Finished Water Pump #5 and VFD (9-P-5 VFD) (Drawings: I-009, 9I-601, 9DD101, 9D-101, 9D-301, E-605, E-609, 9E-101, 9E-102; Specification Section: 26 29 23, 43 24 13)

1.7 CONTRACTOR USE OF SITE

A. The CONTRACTOR's use of the Site shall be limited to its construction operations, including on-Site storage of materials, on-Site fabrication facilities, and field offices.

B. The CONTRACTOR'S work shall be limited to the hours of 7:00 am to 5:00 pm on Monday through Friday excluding legal holidays including New Year's Day; Martin Luther King Jr.'s Birthday; President's Day; Memorial Day; Independence Day; Labor Day; Veterans Day; Thanksgiving; and Christmas. Other WORK shall be coordinated and authorized by the OWNER.

1.8 OUTAGE PLAN AND REQUESTS

A. The CONTRACTOR shall not remove from service, de-energize, or modify settings for any existing operating tank pipeline, valve, channel, equipment, structure, road, or any other facility without permission from the ENGINEER.

1. Outages and service connections shall be performed during the low flow season (September 15 to June 15), unless specifically allowed by the OWNER to occur during the high flow season.

2. Outage duration to be coordinated with the OWNER.

3. Plant outages may be permitted on successive days provided they are limited to one 10-1/2 hour no-flow period as defined below; so that the WRWTP can recover the Wilsonville treated water storage volume overnight.

4. Allowable "No-Flow" Period: each daily plant outage consists of a work shift of 8 hours plus 2-1/2 hours of plant shutdown and restart time = total no-flow "outage" period of 10-1/2 hours.

5. Any work on the Washwater Equalization Basin shall be performed during the low flow season as defined above.

B. Where the WORK requires modifications to existing facilities or construction of new facilities and connection of new facilities to existing facilities, the CONTRACTOR shall submit a detailed outage plan and schedule for the OWNER'S approval a minimum of 2 weeks in advance of the time that such outage is planned.

C. A completed System Outage Request form (blank furnished by the OWNER) shall accompany each outage plan. The outage plans shall be coordinated with the construction schedule and shall meet the restrictions and conditions of the Contract Documents. The outage plan shall describe the CONTRACTOR's method for preventing bypassing of other treatment units; the length of time required to complete said operation; any necessary temporary power, controls, instrumentation or alarms required to maintain control, monitoring, and alarms for the treatment plant processes; and the manpower, plant, and equipment which the CONTRACTOR will furnish for proper operation of associated treatment units. All costs for preparing and implementing the outage plans shall be at no increase in cost to the OWNER.

D. The OWNER shall be notified in writing at least one week in advance of the required outage if the schedule for performing the work has changed or if revisions to the outage plan are required.

E. The CONTRACTOR shall provide written confirmation of the shutdown date and time 2 working days prior to the actual shutdown.

1.9 OWNER USE OF THE SITE

A. The OWNER may utilize all or part of the existing Site and facilities during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate and coordinate with the OWNER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operations at the same time. In any event, the OWNER shall be allowed access to the Site during the period of construction.

1.10 PARTIAL UTILIZATION OF THE WORK BY OWNER

A. The OWNER will take partial utilization of the WORK prior to the award of Substantial Completion.

1. If the warranty period begins at an earlier date, then the warranty period shall be automatically extended to 1-year following Substantial Completion.

1.11 PROJECT MEETINGS

A. Preconstruction Conference

1. Prior to the commencement of WORK at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by the CONTRACTOR'S Project Manager, its superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

a. ENGINEER and the Resident Project Representative.

b. Representatives of OWNER.

c. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

d. The CONTRACTOR shall bring the preconstruction conference submittals in accordance with Section 01 33 00 - Contractor Submittals.

e. Key Subcontractors – Electrical Contractor or others as requested by the Owner.

2. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss all of the items listed below.

a. Status of CONTRACTOR's insurance and bonds.

b. CONTRACTOR's tentative schedules.

c. Transmittal, review, and distribution of CONTRACTOR's submittals.

d. Processing applications for payment.

e. Maintaining record documents.

f. Critical work sequencing.

g. Field decisions and Change Orders.

h. Use of Site, office and storage areas, security, housekeeping, and OWNER's needs.

i. Major equipment deliveries and priorities.

j. CONTRACTOR's assignments for safety and first aid.

k. Daily Report Form which the OWNER will furnish.

l. Submittal Transmittal Form which the ENGINEER will furnish.

3. The OWNER will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.

4. The CONTRACTOR and its subcontractors should plan on the conference taking no less than 1 full working days.

B. Progress Meetings

1. The OWNER will schedule and hold regular on-Site progress meetings at least weekly and at other times as requested by CONTRACTOR or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all subcontractors active on the Site shall attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

2. The OWNER will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR shall present any issues that may impact its progress with a view to resolve these issues expeditiously.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

1. BASIS OF ESTIMATE

The 100% Design Cost Estimate is based on the following documents:

1. Willamette River Water Treatment Plant Expansion Project – Issued for Construction March 2022 Project Number 2002003112 (2022.03.04) – made available on the Stantec SharePoint on March 11, 2022
2. Willamette River Water Treatment Plant Expansion Project – Issued for Construction Specifications and Drawings dated March 4, 2022 – made available on the Stantec SharePoint on March 11, 2022
3. WRWTP 90% Estimate Request for Information (RFI Log) – dated February 23, 2022

2. GENERAL ASSUMPTIONS

The 100% Design Cost Estimate is based on the following general assumptions:

1. Work is performed on an 8-hour per day, 5-day per week basis unless otherwise noted within this document.
2. Work is planned to be performed in accordance with the Construction Schedule included in this Deliverable.
3. Construction Schedule assumes a Notice to Proceed (NTP) of June 7, 2022.
4. All Permits required for construction to be on-hand no later than June 7, 2022.
5. No hazardous materials (i.e. Regulated Site Conditions) present on site.
6. No impact or lost time due to Willamette River Water Treatment Plant (WRWTP) operations beyond what has been included in the Specifications.
7. No Pre-Construction Services cost has been included in the Cost Estimate.
8. AIS is not required for the Project.
9. OWNER to apply and pay for the Public Works Construction Permit
10. Alternate plant access to be provided during Summer 2022 shutdown of Arrowhead Creek Lane

3. BASE PRICING CONDITIONS

The 100% Design Cost Estimate is based on the following base pricing assumptions:

1. Craft wages have been based on current local trade agreements unless specialized craft noted.
2. Construction equipment cost has been based on rates determined or developed from the Equipment Watch Rental Rate Bluebook.
3. Where applicable, subcontractor and supplier pricing has been included in the cost estimate.

4. Escalation of labor and construction equipment have been included in the Cost Estimate through March 2024. Escalation of subcontractors and materials are identified in the CM/GC risk and contingency matrix.

5. Cost of bonding and tax have been included in the cost estimate as noted. Performance and Payment Bond Rate of 0.60%, General Liability Insurance Rate of 0.15%, Builder's Risk Insurance Rate of 0.59%, and Gross Receipts Tax Rate of 0.57%

6. No impact or discrete cost associated with COVID-19 has been included in the cost estimate beyond Exhibit 1 of the CM/GC Contract.

7. CM/GC risk and contingency has been evaluated separately and is included in this Deliverable – (Attachment 5).

8. CM/GC's price includes contingency for reasonable efforts to recover lost time resulting from Avoidable Delays as defined in the City of Wilsonville General Conditions D.2.2. CM/GC may be entitled to additional Contract Time or compensation in the event of Unavoidable Delays as defined in the City of Wilsonville General Conditions Section D.2.3. Unavoidable Delays to be handled by the Owner's Contingency.

9. CM/GC's contingency covers the items included in the attached risk and contingency matrix – Attachment 5. Unforeseen conditions, changes in commodities above the levels listed in the risk and contingency matrix, or Unavoidable Delays remain part of the Owner's Contingency.

10. Groundwater to be handled and/or disposed of is considered non-contaminated with conventional treatment methods for suspended solids and discharge to the WRWTP.

11. All usage, without limitation, and consumption cost associated with electrical power, water, and sewer will be provided to the CM/GC at no cost.

12. CM/GCs Cost Estimate only includes the work shown in the 100% Design Documents. The Designer is solely responsible for designing a fully functional plant, capable of being legally occupied and fully used to its intended purposes.

13. Cost Estimate assumes all required consumables as part of start-up including chemicals, polymer, nitrogen, etc., are provided by the Owner. An estimated cost of $70,000 has been included in the Cost Estimate for the fuel required as part of the initial fill.

14. An estimated cost of $52,224 has been included in the Cost Estimate for the services of a security guard at the main gate.

15. An estimated cost of $20,000 has been included in the Cost Estimate for the seismic design of pipe supports.

16. No cost has been included in the Cost Estimate for Permits.

17. No cost has been assumed for the relocation of existing utilities in the Cost Estimate beyond what has been specified in the 100% Design Drawings.

18. No cost has been included for the project-specific supplemental pollution liability Policy

4. SCOPE AREA ASSUMPTIONS AND CLARIFICATONS (Area 1 through 10)

The 100% Design Cost Estimate is based on the following assumptions and clarifications for each scope area:

1. Underground expansion joints as shown in Detail E-908 to be type PVC only, metallic specified to be provided for Detail E-905 installation only
2. Network switches are provided by the City of Wilsonville.
3. Removal of Transformer T2 and Substation 17-SWBD-A to occur after new Transformers, and 480V equipment are powered up in new SWGR Building. New 480V equipment will take over power in Raw Water Pump Station and Finished Water Pump Station prior to swap out of T2 & 17-SWBD-A with new Marshalling cabinet. This is to minimize the amount of time the spliced circuits are on temporary power.
4. All conduits in existing Chemical Building are to be PVC/CTD GRC with Stainless Steel supports per Specifications. All other above ground conduits are GRC or Liquid Tight as needed for flexibility.
5. No additional cost has been included for piping for the future storage tanks.
6. No additional fire protection is included in the Cost Estimate.
7. The Ozone Equipment System pricing, schedule and start-up procedures are based on amounts from Amendment 2 issued by the City of Wilsonville.
8. No additional cost has been included for sealants of existing utility trench covers
9. No additional cost has been included for replacing the unistrut within the utility trench
10. KIWC assumes there is no concrete cap required over the direct buried chemical piping

General Conditions

GC.1 Cost of the performance and payment bond and two-year warranty bond are included in the cost estimate.

GC.2 Staffing costs are based on Construction Schedule included in this Deliverable using escalated 2021 rates established in the CM/GC Proposal.

GC.3 Cost estimate includes quality control staff only. All 3rd party inspection and testing for Quality Control and Quality Assurance is by others.

ATTACHMENT D

Cost Breakdown Structure (CBS) Register
KIEWIT CORPORATION
Wilsonville WRWTP Expansion - 100% Design
4/25/2022

Pay Item	Description	Quantity	UOM	Manhours	Total Cost
	Wilsonville Willamette River Water Treatment Plant (100% Design)	**1.00**	**Lump Sum**	**27,158**	**25,118,960**
1	**Raw Water Pump Station**	**1.00**	**Lump Sum**	**0**	**213,881**
1.2	MECHANICAL	1.00	**Lump Sum**	0	213,881
1.2.2	Mechanical Equipment	1.00	**Lump Sum**	0	213,881
2	**Finished Water Pump Station**	**1.00**	**Lump Sum**	**0**	**248,881**
2.2	MECHANICAL	1.00	**Lump Sum**	0	248,881
2.2.2	Mechanical Equipment	1.00	**Lump Sum**	0	248,881
3	**Ozone Contactors/ Ozone Generators**	**1.00**	**Lump Sum**	**3,661**	**763,030**
3.1	STRUCTURES	1.00	**Lump Sum**	626	110,214
3.1.1	Ozone Contactors/ Generators Structures Demo	1.00	**Lump Sum**	142	8,002
3.1.2	Ozone Contactors/ Generators Concrete	13.00	**Lump Sum**	252	26,912
3.1.3	Structures Duration Based Equipment	4.00	**Lump Sum**	0	22,512
3.1.4	Roof Hatch	1.00	**Lump Sum**	232	52,788
3.2	MECHANICAL	1.00	**Lump Sum**	3,035	619,987
3.2.1	Mechanical Pipe	1.00	**Lump Sum**	2,443	483,514
3.2.2	Mechanical Equipment	1.00	**Lump Sum**	593	41,995
3.2.3	Mechanical Duration Based Equipment	1.00	**Lump Sum**	0	94,478
3.3	Man-hour ST&S by Discipline/D-Group	3,661.00	**Lump Sum**	0	32,829
3.3.1	50 - Structures Demolition Man-hour ST&S	294.00	**Lump Sum**	0	1,764
3.3.2	50 - Mechanical Demolition Man-hour ST&S	269.00	**Lump Sum**	0	1,345
3.3.3	61 - Concrete Work Man-hour ST&S	332.00	**Lump Sum**	0	2,822
3.3.4	70 - Piping Man-hour ST&S	2,352.00	**Lump Sum**	0	22,344
3.3.5	71 - Mechanical Equipment Man-hour ST&S	414.00	**Lump Sum**	0	4,554
4	**Clearwell**	**1.00**	**Lump Sum**	**858**	**489,784**
4.1	CIVIL	1.00	**Lump Sum**	797	128,688
4.1.1	Concrete Sidewalk Removal	3.00	**Lump Sum**	5	432
4.1.2	Structure Excavation (2' down wall)	39.00	**Lump Sum**	12	1,244
4.1.3	Structure Backfill (2' down wall)	39.00	**Lump Sum**	21	2,684
4.1.4	Topsoil Strip to Stockpile (2' Thick)	973.00	**Lump Sum**	243	23,352
4.1.5	Topsoil Stockpile to Place (18" Thick)	798.00	**Lump Sum**	239	25,645
4.1.6	Topsoil Loadout	175.00	**Lump Sum**	40	7,558
4.1.7	Install EPS Foam (6" Thick)	13,133.00	**Lump Sum**	105	7,701
4.1.8	Install Geofabric Liner	13,133.00	**Lump Sum**	131	9,627
4.1.9	PM's	1.00	**Lump Sum**	0	39,817
4.1.10	SUB- Haul & Dispose (9CY/LD,1.5 Hr RT)	243.00	**Lump Sum**	0	10,627
4.2	STRUCTURES	1.00	**Lump Sum**	61	358,269
4.2.1	Demo Curb	1.00	**Lump Sum**	33	1,860
4.2.2	Pourback Sidewalk and Curb	4.00	**Lump Sum**	28	191,652
4.2.3	Structures Duration Based Equipment	4.00	**Lump Sum**	0	14,726
4.2.4	SUB- Diver	1.00	**Lump Sum**	0	150,032
4.4	Man-hour ST&S by Discipline/D-Group	844.00	**Lump Sum**	0	2,827
4.4.1	50 - Structures Demolition Man-hour ST&S	33.00	**Lump Sum**	0	198
4.4.2	51 - Excavation and Grading Work Man-hour ST&S	797.00	**Lump Sum**	0	2,391
4.4.3	61 - Concrete Work Man-hour ST&S	28.00	**Lump Sum**	0	238
5	**Filters & Washwater EQ Basin**	**1.00**	**Lump Sum**	**1,380**	**532,897**
5.2	MECHANICAL	1.00	**Lump Sum**	1,380	525,327
5.2.1	Mechanical Pipe	1.00	**Lump Sum**	1,380	467,148
5.2.3	Direct Estimated STS	1.00	**Lump Sum**	0	26,686
5.2.4	Mechanical Duration Based Equipment	1.00	**Lump Sum**	0	31,493
5.3	Man-hour ST&S by Discipline/D-Group	1,380.00	**Lump Sum**	0	7,571
5.3.1	50 - Mechanical Demolition Man-hour ST&S	1,231.00	**Lump Sum**	0	6,155
5.3.4	70 - Piping Man-hour ST&S	149.00	**Lump Sum**	0	1,416
6	**Solids Holding Tank and Dewatering Building**	**1.00**	**Lump Sum**	**686**	**161,232**
6.2	STRUCTURES	1.00	**Lump Sum**	617	112,398

6.2.1	Solids Dewatering BLDG Structures Demo	1.00	**Lump Sum**	254	14,313
6.2.2	Solids Dewatering BLDG Concrete	22.00	**Lump Sum**	363	67,762
6.2.3	Solids Dewatering Architectural	1.00	**Lump Sum**	0	2,000
6.2.4	Structures Duration Based Equipment	10.00	**Lump Sum**	0	28,323
6.3	MECHANICAL	1.00	**Lump Sum**	69	43,568
6.3.1	Mechanical Pipe	1.00	**Lump Sum**	69	32,877
6.3.2	Mechanical Duration Based Equipment	1.00	**Lump Sum**	0	10,691
6.4	Man-hour ST&S by Discipline/D-Group	513.00	**Lump Sum**	0	5,265
6.4.1	50 - Structures Demolition Man-hour ST&S	254.00	**Lump Sum**	0	1,524
6.4.2	61 - Concrete Work Man-hour ST&S	363.00	**Lump Sum**	0	3,086
6.4.3	70 - Piping Man-hour ST&S	69.00	**Lump Sum**	0	656
7	**Chemical Systems**	**1.00**	**Lump Sum**	**5,443**	**1,190,593**
7.1	CIVIL	1.00	**Lump Sum**	699	163,569
7.1.1	Direct Bury Containment Pipe Trench (430 LF of Trench)	430.00	**Lump Sum**	528	77,325
7.1.2	Pre-Cast Chemical Pullbox (4 EA)	4.00	**Lump Sum**	171	86,244
7.2	STRUCTURES	1.00	**Lump Sum**	108	19,663
7.2.1	Chemical Storage/ Metering Structures Demo	1.00	**Lump Sum**	61	3,409
7.2.2	Chemical Storage/ Metering Concrete	2.00	**Lump Sum**	47	4,997
7.2.4	Structures Duration Based Equipment	3.00	**Lump Sum**	0	11,256
7.3	MECHANICAL	1.00	**Lump Sum**	4,637	963,282
7.3.1	Mechanical Pipe	1.00	**Lump Sum**	4,592	674,965
7.3.2	Mechanical Equipment	1.00	**Lump Sum**	45	137,292
7.3.3	Direct Estimated STS	1.00	**Lump Sum**	0	12,149
7.3.4	Mechanical Duration Based Equipment	1.00	**Lump Sum**	0	138,876
7.4	Man-hour ST&S by Discipline/D-Group	5,655.00	**Lump Sum**	0	44,079
7.4.1	50 - Structures Demolition Man-hour ST&S	61.00	**Lump Sum**	0	366
7.4.2	50 - Mechanical Demolition Man-hour ST&S	589.00	**Lump Sum**	0	2,936
7.4.3	51 - Excavation and Grading Work Man-hour ST&S	742.00	**Lump Sum**	0	2,226
7.4.4	61 - Concrete Work Man-hour ST&S	47.00	**Lump Sum**	0	400
7.4.6	70 - Piping Man-hour ST&S	4,016.00	**Lump Sum**	0	38,152
8	**Electrical**	**1.00**	**Lump Sum**	**1,080**	**9,079,233**
8.1	CIVIL	1.00	**Lump Sum**	396	74,558
8.1.1	Transformer Pad (2 ea, Including Substation Extension)	1.00	**Lump Sum**	39	6,839
8.1.2	Generator/ Fuel Tank Pad	1.00	**Lump Sum**	197	37,550
8.1.4	Switchgear Building	1.00	**Lump Sum**	149	28,724
8.1.5	Light Poles (4 EA, 15' Tall)	4.00	**Lump Sum**	12	1,445
8.2	STRUCTURES	1.00	**Lump Sum**	684	839,991
8.2.1	Existing Generator Room Structures Demo	1.00	**Lump Sum**	20	1,136
8.2.2	Concrete	208.00	**Lump Sum**	653	130,928
8.2.4	Building/ Architectural	1.00	**Lump Sum**	11	688,287
8.2.5	Structures Duration Based Equipment	10.00	**Lump Sum**	0	19,639
8.3	ELECTRICAL	1.00	**Lump Sum**	0	8,157,546
8.4	Man-hour ST&S by Discipline/D-Group	1,553.00	**Lump Sum**	0	7,139
8.4.1	50 - Structures Demolition Man-hour ST&S	20.00	**Lump Sum**	0	120
8.4.2	51 - Excavation and Grading Work Man-hour ST&S	396.00	**Lump Sum**	0	1,188
8.4.3	61 - Concrete Work Man-hour ST&S	686.00	**Lump Sum**	0	5,831
9	**I&C**	**1.00**	**Lump Sum**	**0**	**928,382**
9.1	ELECTRICAL	1.00	**Lump Sum**	0	928,382
10	**Sitework**	**1.00**	**Lump Sum**	**5,050**	**2,020,933**
10.1	CIVIL	1.00	**Lump Sum**	2,249	736,483
10.1.1	Contractor Staging Area	1.00	**Lump Sum**	128	37,439
10.1.2	Temporary Site Environmental (Total Job Weeks)	40.00	**Lump Sum**	764	79,839
10.1.3	Removals/Demolition	1.00	**Lump Sum**	337	121,517
10.1.4	Lox Area	1.00	**Lump Sum**	57	8,479
10.1.5	Rain Garden	1.00	**Lump Sum**	83	20,901
10.1.6	Site Drainage	1.00	**Lump Sum**	30	11,241
10.1.7	Subgrade Prep / Finish	2,249.00	**Lump Sum**	269	30,174
10.1.8	L/R/F Agg Base	684.00	**Lump Sum**	396	106,031
10.1.9	Subcontracts	1.00	**Lump Sum**	0	292,454

10.1.10	Chemical Feed Line (Relocate)	230.00	**Lump Sum**	186	28,407
10.2	STRUCTURES	1.00	**Lump Sum**	110	31,448
10.2.1	LOX Fill Station Slab	33.00	**Lump Sum**	108	7,142
10.2.2	Rebar Installation Sub Support	2.24	**Lump Sum**	2	171
10.2.3	Concrete Direct Estimated ST&S	33.00	**Lump Sum**	0	2,239
10.2.4	Concrete Bulk Commodities	33.00	**Lump Sum**	0	4,861
10.2.5	Concrete Subcontracts	33.00	**Lump Sum**	0	7,216
10.2.6	Structures Duration Based Equipment	2.00	**Lump Sum**	0	9,820
10.3	MECHANICAL	1.00	**Lump Sum**	691	448,928
10.3.1	Mechanical Pipe	1.00	**Lump Sum**	610	70,881
10.3.2	Mechanical Equipment	1.00	**Lump Sum**	81	343,058
10.3.3	Direct Estimated STS	1.00	**Lump Sum**	0	11,833
10.3.4	Mechanical Duration Based Equipment	1.00	**Lump Sum**	0	23,156
10.4	SITE SUPPORT	1.00	**Lump Sum**	2,000	789,687
10.4.1	60kW Generator	104.00	**Lump Sum**	0	149,094
10.4.2	Security Guard (40hr/wk x $32/hr = $1,280/wk)	40.00	**Lump Sum**	0	52,224
10.4.3	Craft Labor Support	1.00	**Lump Sum**	0	215,750
10.4.5	Site Services Crew	25.00	**Lump Sum**	2,000	372,619
10.5	Man-hour ST&S by Discipline/D-Group	3,052.00	**Lump Sum**	0	14,387
10.5.1	51 - Excavation and Grading Work Man-hour ST&S	2,249.00	**Lump Sum**	0	6,747
10.5.2	61 - Concrete Work Man-hour ST&S	110.00	**Lump Sum**	0	935
10.5.3	70 - Piping Man-hour ST&S	612.00	**Lump Sum**	0	5,814
10.5.4	71 - Mechanical Equipment Man-hour ST&S	81.00	**Lump Sum**	0	891
11	**CMGC Contingency**	**1.00**	**Allowance**	**0**	**1,390,705**
11.1	Contingency	1.00	**Allowance**	0	1,390,705
11.1.1	Project Risk	1.00	**Allowance**	0	1,390,705
12	**Article 8 - Additional Cost of Work**	**1.00**	**Lump Sum**	**9,000**	**2,428,085**
12.1	Commercial Cost	1.00	**Lump Sum**	0	342,300
12.1.3	Bonds	1.00	**Lump Sum**	0	148,800
12.1.4	Insurance	1.00	**Lump Sum**	0	183,500
12.1.10	Legal Expense	1.00	**Lump Sum**	0	10,000
12.2	Job Related Overhead	283.00	**Lump Sum**	7,800	1,507,656
12.2.1	Project Management	283.00	**Lump Sum**	7,800	1,482,768
12.2.2	Staff Expenses	408.00	**Lump Sum**	0	24,888
12.3	Operational Support	1.00	**Lump Sum**	1,200	396,829
12.3.1	Operational Support and Compliance	72.00	**Lump Sum**	1,200	312,908
12.3.2	Temporary Work	1.00	**Lump Sum**	0	92,225
12.4	Engineering	1.00	**Lump Sum**	0	40,000
12.4.1	SUB-Temp. Construction Design	1.00	**Lump Sum**	0	20,000
12.4.2	Specialty Third Party Consultants	1.00	**Lump Sum**	0	20,000
12.5	Gross Receipt Tax (0.57%)	141.30	**Lump Sum**	0	141,300
14	**GC Work Fee**	**1.00**	**Lump Sum**	**0**	**2,069,477**
15	**Fee**	**1.00**	**Lump Sum**	**0**	**1,302,764**
16	**Amendment to Ozone Procurement**	**1.00**	**Lump Sum**	**0**	**2,299,083**
16.1	Ozone Generation System (All components)	1.00	PLS	0.00	$2,299,083.39

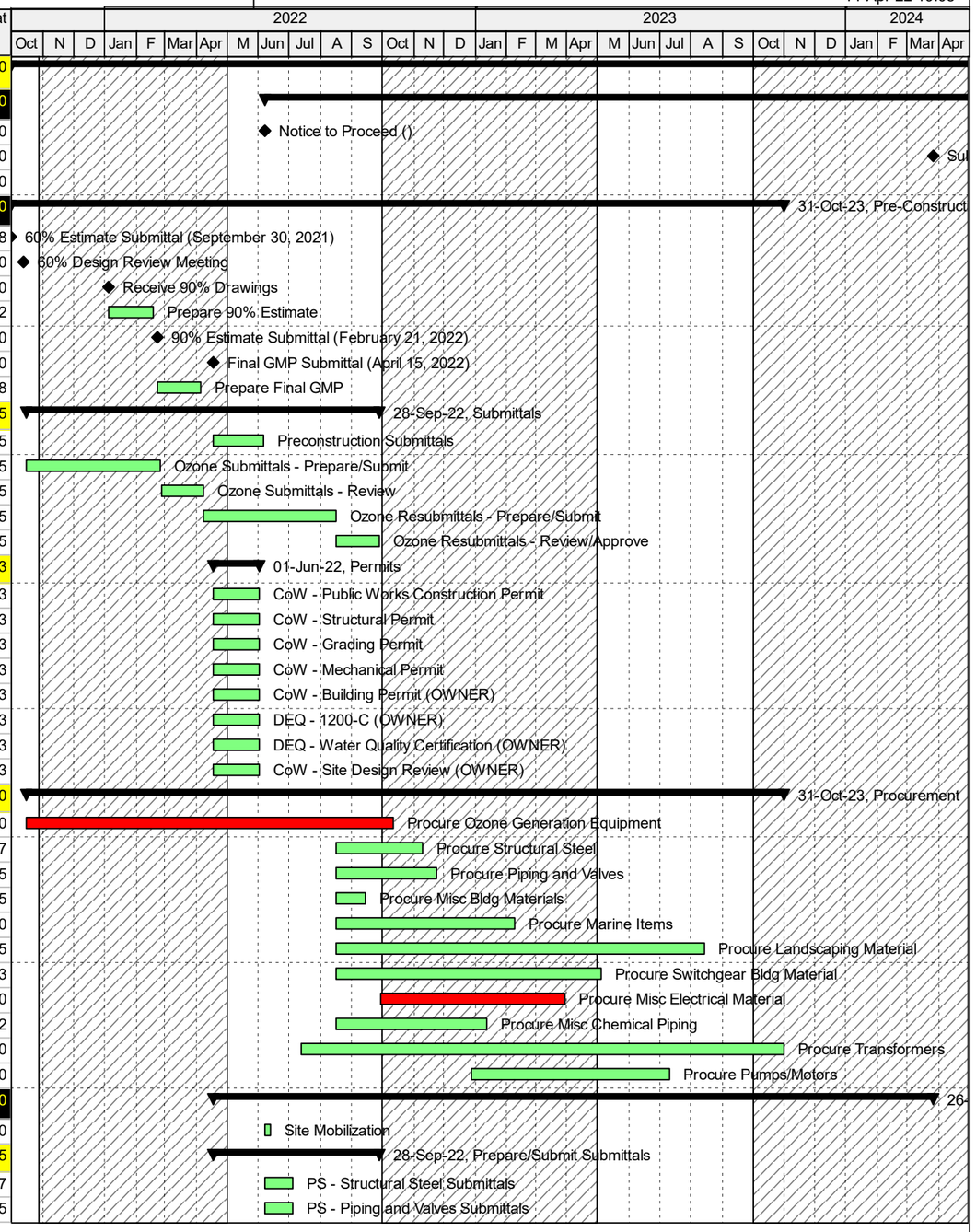
NOTES:

- Cost of Work = Item 1 - Item 10, and 12

ATTACHMENT E

Wilsonville - WRWTP 100% Estimate | Kiewit Basic Layout | 14-Apr-22 19:08

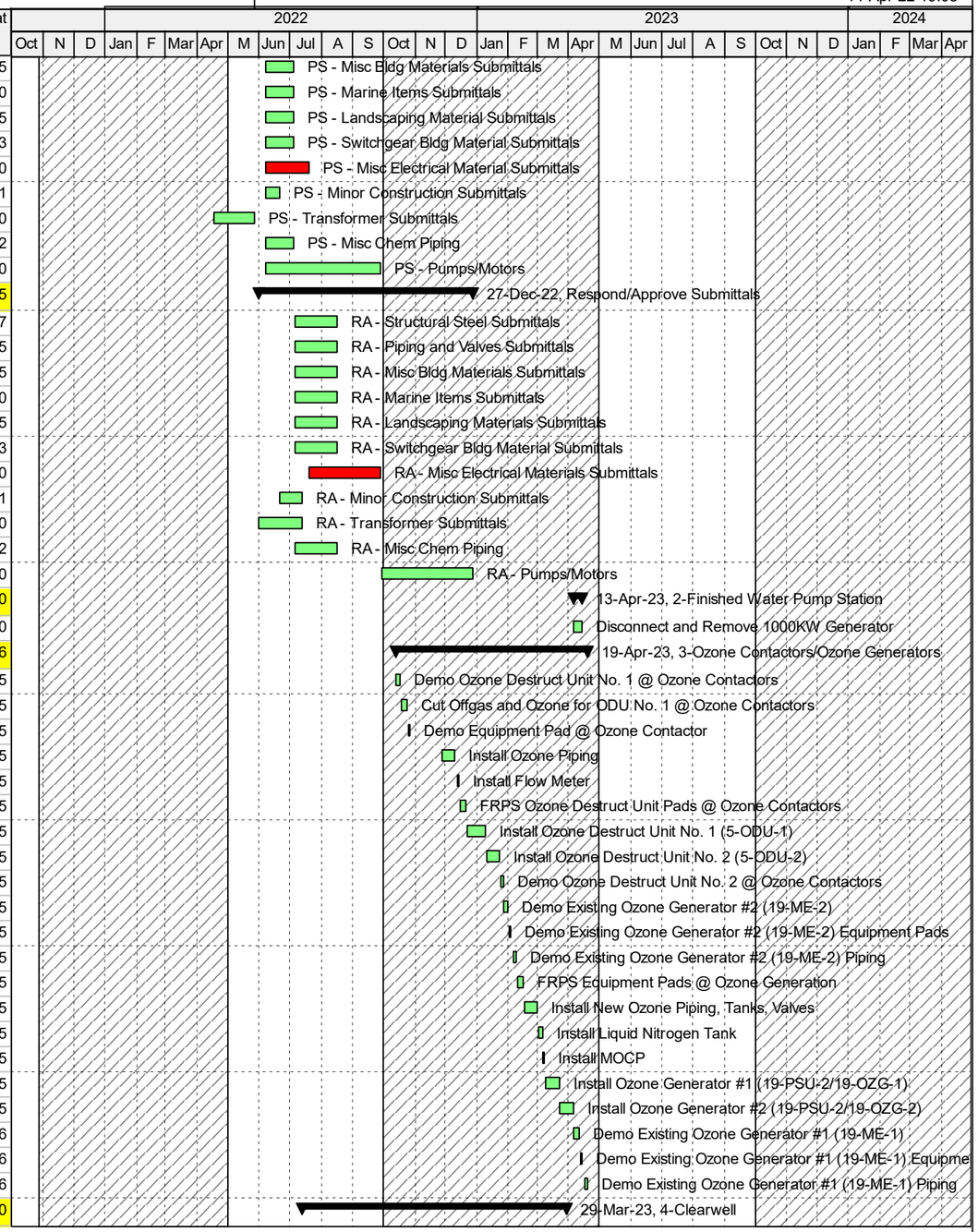
Activity ID	Activity Name	Start	Finish	Original Duration	Free Float	Total Float
Wilsonville - WRWTP 100% Estimate		30-Sep-21	08-May-24	656	0	0
Contract Milestones		07-Jun-22	08-May-24	485	0	0
M1000	Notice to Proceed ()	07-Jun-22*		0	0	0
M1010	Substantial Completion()		26-Mar-24	0	30	30
M1020	Final Completion ()		08-May-24	0	0	0
Pre-Construction		30-Sep-21	31-Oct-23	526	0	130
M1030	60% Estimate Submittal (September 30, 2021)	30-Sep-21*		0	8	8
M1040	60% Design Review Meeting		12-Oct-21*	0	648	0
M1050	Receive 90% Drawings	04-Jan-22*		0	0	0
M1060	Prepare 90% Estimate	04-Jan-22	17-Feb-22	33	2	2
M1070	90% Estimate Submittal (February 21, 2022)		21-Feb-22*	0	0	0
M1080	Final GMP Submittal (April 15, 2022)		18-Apr-22*	0	0	0
M1090	Prepare Final GMP	22-Feb-22	04-Apr-22	30	8	8
Submittals		15-Oct-21	28-Sep-22	240	0	405
P1100	Preconstruction Submittals	18-Apr-22	06-Jun-22	35	485	485
P1110	Ozone Submittals - Prepare/Submit	15-Oct-21	24-Feb-22	90	0	245
P1120	Ozone Submittals - Review	25-Feb-22	07-Apr-22	30	0	245
P1130	Ozone Resubmittals - Prepare/Submit	08-Apr-22	16-Aug-22	90	0	245
P1150	Ozone Resubmittals - Review/Approve	17-Aug-22	28-Sep-22	30	10	245
Permits		18-Apr-22	01-Jun-22	32	0	3
P1000	CoW - Public Works Construction Permit	18-Apr-22	01-Jun-22	32	3	3
P1010	CoW - Structural Permit	18-Apr-22	01-Jun-22	32	3	3
P1020	CoW - Grading Permit	18-Apr-22	01-Jun-22	32	3	3
P1030	CoW - Mechanical Permit	18-Apr-22	01-Jun-22	32	3	3
P1040	CoW - Building Permit (OWNER)	18-Apr-22	01-Jun-22	32	3	3
P1050	DEQ - 1200-C (OWNER)	18-Apr-22	01-Jun-22	32	3	3
P1060	DEQ - Water Quality Certification (OWNER)	18-Apr-22	01-Jun-22	32	3	3
P1070	CoW - Site Design Review (OWNER)	18-Apr-22	01-Jun-22	32	3	3
Procurement		15-Oct-21	31-Oct-23	515	0	130
Pr1000	Procure Ozone Generation Equipment	15-Oct-21*	12-Oct-22	250	0	0
Pr1020	Procure Structural Steel	17-Aug-22	09-Nov-22	60	0	247
Pr1030	Procure Piping and Valves	17-Aug-22	23-Nov-22	70	0	215
Pr1040	Procure Misc Bldg Materials	17-Aug-22	14-Sep-22	20	415	415
Pr1050	Procure Marine Items	17-Aug-22	08-Feb-23	120	0	280
Pr1060	Procure Landscaping Material	17-Aug-22	14-Aug-23	250	0	155
Pr1080	Procure Switchgear Bldg Material	17-Aug-22	04-May-23	180	0	173
Pr1090	Procure Misc Electrical Material	29-Sep-22	29-Mar-23	125	0	0
Pr1110	Procure Misc Chemical Piping	17-Aug-22	11-Jan-23	100	0	192
Pr1120	Procure Transformers	13-Jul-22	31-Oct-23	330	0	40
Pr1130	Procure Pumps/Motors	28-Dec-22	10-Jul-23	135	210	210
Construction		18-Apr-22	26-Mar-24	490	0	30
A1000	Site Mobilization	07-Jun-22	13-Jun-22	5	20	320
Prepare/Submit Submittals		18-Apr-22	28-Sep-22	115	0	355
PS1180	PS - Structural Steel Submittals	07-Jun-22	05-Jul-22	20	0	247
PS1190	PS - Piping and Valves Submittals	07-Jun-22	05-Jul-22	20	0	215



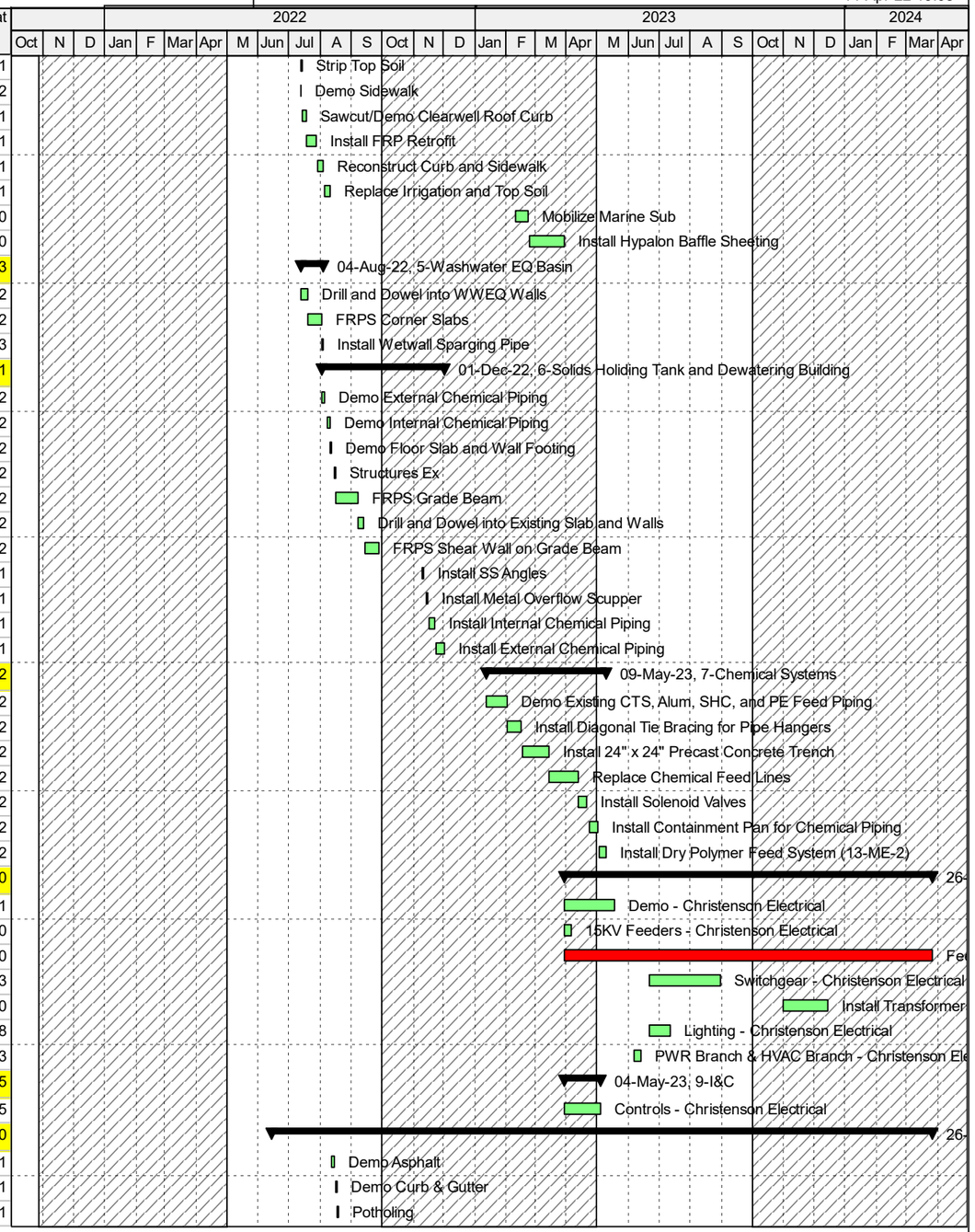
Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

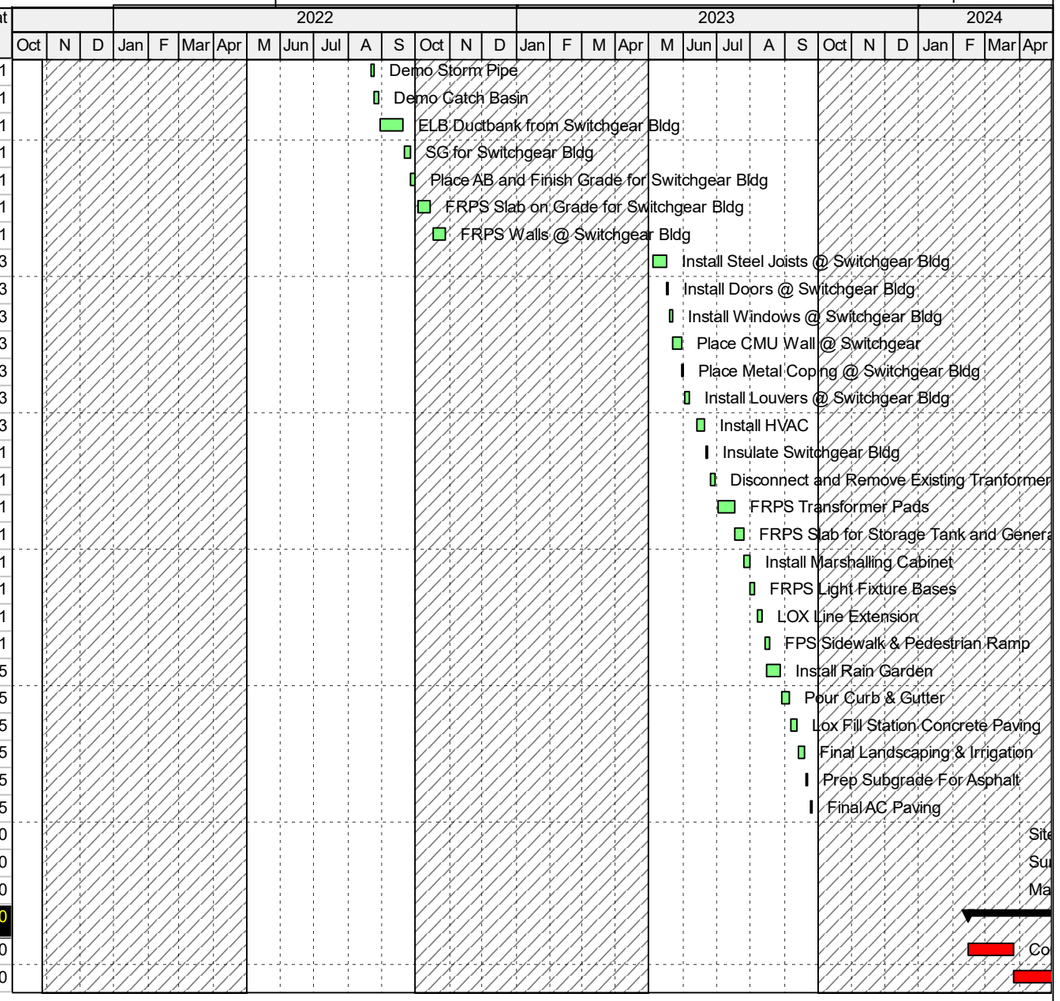
Activity ID	Activity Name	Start	Finish	Original Duration	Free Float	Total Float
PS1200	PS - Misc Bldg Materials Submittals	07-Jun-22	05-Jul-22	20	0	415
PS1210	PS - Marine Items Submittals	07-Jun-22	05-Jul-22	20	0	280
PS1220	PS - Landscaping Material Submittals	07-Jun-22	05-Jul-22	20	0	155
PS1230	PS - Switchgear Bldg Material Submittals	07-Jun-22	05-Jul-22	20	0	173
PS1240	PS - Misc Electrical Material Submittals	07-Jun-22	19-Jul-22	30	0	0
PS1250	PS - Minor Construction Submittals	07-Jun-22	20-Jun-22	10	0	301
PS1260	PS - Transformer Submittals	18-Apr-22	27-May-22	30	0	40
PS1270	PS - Misc Chem Piping	07-Jun-22	05-Jul-22	20	0	192
PS1280	PS - Pumps/Motors	07-Jun-22	28-Sep-22	80	0	210
Respond/Approve Submittals		31-May-22	27-Dec-22	145	0	325
RA1270	RA - Structural Steel Submittals	06-Jul-22	16-Aug-22	30	0	247
RA1280	RA - Piping and Valves Submittals	06-Jul-22	16-Aug-22	30	0	215
RA1290	RA - Misc Bldg Materials Submittals	06-Jul-22	16-Aug-22	30	0	415
RA1300	RA - Marine Items Submittals	06-Jul-22	16-Aug-22	30	0	280
RA1310	RA - Landscaping Materials Submittals	06-Jul-22	16-Aug-22	30	0	155
RA1320	RA - Switchgear Bldg Material Submittals	06-Jul-22	16-Aug-22	30	0	173
RA1330	RA - Misc Electrical Materials Submittals	20-Jul-22	28-Sep-22	50	0	0
RA1340	RA - Minor Construction Submittals	21-Jun-22	12-Jul-22	15	0	301
RA1350	RA - Transformer Submittals	31-May-22	12-Jul-22	30	0	40
RA1360	RA - Misc Chem Piping	06-Jul-22	16-Aug-22	30	0	192
RA1370	RA - Pumps/Motors	29-Sep-22	27-Dec-22	60	0	210
2-Finished Water Pump Station		06-Apr-23	13-Apr-23	5	0	210
A2-1050	Disconnect and Remove 1000KW Generator	06-Apr-23	13-Apr-23	5	210	210
3-Ozone Contactors/Ozone Generators		13-Oct-22	19-Apr-23	129	0	266
A3-1000	Demo Ozone Destruct Unit No. 1 @ Ozone Contactors	13-Oct-22	17-Oct-22	3	0	235
A3-1010	Cut Offgas and Ozone for ODU No. 1 @ Ozone Contactors	18-Oct-22	24-Oct-22	5	0	235
A3-1020	Demo Equipment Pad @ Ozone Contactor	25-Oct-22	26-Oct-22	2	20	235
A3-1030	Install Ozone Piping	28-Nov-22	09-Dec-22	10	0	215
A3-1040	Install Flow Meter	12-Dec-22	14-Dec-22	3	0	215
A3-1050	FRPS Ozone Destruct Unit Pads @ Ozone Contactors	15-Dec-22	21-Dec-22	5	0	215
A3-1060	Install Ozone Destruct Unit No. 1 (5-ODU-1)	22-Dec-22	09-Jan-23	10	0	215
A3-1070	Install Ozone Destruct Unit No. 2 (5-ODU-2)	10-Jan-23	23-Jan-23	10	0	215
A3-1080	Demo Ozone Destruct Unit No. 2 @ Ozone Contactors	24-Jan-23	26-Jan-23	3	0	215
A3-1110	Demo Existing Ozone Generator #2 (19-ME-2)	27-Jan-23	31-Jan-23	3	0	215
A3-1120	Demo Existing Ozone Generator #2 (19-ME-2) Equipment Pads	01-Feb-23	03-Feb-23	3	0	215
A3-1130	Demo Existing Ozone Generator #2 (19-ME-2) Piping	06-Feb-23	08-Feb-23	3	0	215
A3-1140	FRPS Equipment Pads @ Ozone Generation	09-Feb-23	15-Feb-23	5	0	215
A3-1150	Install New Ozone Piping, Tanks, Valves	16-Feb-23	01-Mar-23	10	0	215
A3-1160	Install Liquid Nitrogen Tank	02-Mar-23	06-Mar-23	3	0	215
A3-1170	Install MOCP	07-Mar-23	08-Mar-23	2	0	215
A3-1180	Install Ozone Generator #1 (19-PSU-2/19-OZG-1)	09-Mar-23	22-Mar-23	10	0	215
A3-1190	Install Ozone Generator #2 (19-PSU-2/19-OZG-2)	23-Mar-23	05-Apr-23	10	0	215
A3-1200	Demo Existing Ozone Generator #1 (19-ME-1)	06-Apr-23	11-Apr-23	3	0	266
A3-1210	Demo Existing Ozone Generator #1 (19-ME-1) Equipment Pad	12-Apr-23	14-Apr-23	3	0	266
A3-1220	Demo Existing Ozone Generator #1 (19-ME-1) Piping	17-Apr-23	19-Apr-23	3	236	266
4-Clearwell		13-Jul-22	29-Mar-23	180	0	280



Activity ID	Activity Name	Start	Finish	Original Duration	Free Float	Total Float
A4-1020	Strip Top Soil	13-Jul-22	14-Jul-22	2	0	301
A4-1030	Demo Sidewalk	13-Jul-22	13-Jul-22	1	1	302
A4-1040	Sawcut/Demo Clearwell Roof Curb	15-Jul-22	18-Jul-22	2	0	301
A4-1060	Install FRP Retrofit	19-Jul-22	28-Jul-22	8	0	301
A4-1070	Reconstruct Curb and Sidewalk	29-Jul-22	04-Aug-22	5	0	301
A4-1080	Replace Irrigation and Top Soil	05-Aug-22	11-Aug-22	5	0	301
A4-1100	Mobilize Marine Sub	09-Feb-23	22-Feb-23	10	0	280
A4-1110	Install Hypalon Baffle Sheeting	23-Feb-23	29-Mar-23	25	280	280
5-Washwater EQ Basin		13-Jul-22	04-Aug-22	17	0	443
A5-1000	Drill and Dowel into WWEQ Walls	13-Jul-22	19-Jul-22	5	0	392
A5-1010	FRPS Corner Slabs	20-Jul-22	02-Aug-22	10	0	392
A5-1080	Install Wetwall Sparging Pipe	03-Aug-22	04-Aug-22	2	413	443
6-Solids Holiding Tank and Dewatering Building		03-Aug-22	01-Dec-22	84	0	361
A6-1000	Demo External Chemical Piping	03-Aug-22	05-Aug-22	3	0	392
A6-1010	Demo Internal Chemical Piping	08-Aug-22	10-Aug-22	3	0	392
A6-1020	Demo Floor Slab and Wall Footing	11-Aug-22	12-Aug-22	2	0	392
A6-1030	Structures Ex	15-Aug-22	16-Aug-22	2	0	392
A6-1040	FRPS Grade Beam	17-Aug-22	07-Sep-22	15	0	392
A6-1050	Drill and Dowel into Existing Slab and Walls	08-Sep-22	13-Sep-22	4	0	392
A6-1060	FRPS Shear Wall on Grade Beam	14-Sep-22	27-Sep-22	10	31	392
A6-1070	Install SS Angles	10-Nov-22	11-Nov-22	2	0	361
A6-1080	Install Metal Overflow Scupper	14-Nov-22	15-Nov-22	2	0	361
A6-1090	Install Internal Chemical Piping	16-Nov-22	22-Nov-22	5	0	361
A6-1100	Install External Chemical Piping	23-Nov-22	01-Dec-22	5	331	361
7-Chemical Systems		12-Jan-23	09-May-23	83	0	192
A7-1000	Demo Existing CTS, Alum, SHC, and PE Feed Piping	12-Jan-23	01-Feb-23	15	0	192
A7-1050	Install Diagonal Tie Bracing for Pipe Hangers	02-Feb-23	15-Feb-23	10	0	192
A7-1060	Install 24" x 24" Precast Concrete Trench	16-Feb-23	14-Mar-23	19	0	192
A7-1070	Replace Chemical Feed Lines	15-Mar-23	12-Apr-23	20	0	192
A7-1080	Install Solenoid Valves	13-Apr-23	21-Apr-23	7	0	192
A7-1090	Install Containment Pan for Chemical Piping	24-Apr-23	02-May-23	7	0	192
A7-1100	Install Dry Polymer Feed System (13-ME-2)	03-May-23	09-May-23	5	192	192
8-Electrical		30-Mar-23	26-Mar-24	250	0	30
A8-1000	Demo - Christenson Electrical	30-Mar-23	18-May-23	35	30	211
A8-1010	15KV Feeders - Christenson Electrical	30-Mar-23	05-Apr-23	5	0	210
A8-1020	Feeders & Process CKTS - Christenson Electrical	30-Mar-23	26-Mar-24	250	0	0
A8-1030	Switchgear - Christenson Electrical	21-Jun-23	30-Aug-23	50	143	173
A8-1050	Install Transformers - Christenson	01-Nov-23	14-Dec-23	30	40	40
A8-1060	Lighting - Christenson Electrical	21-Jun-23	12-Jul-23	15	178	208
A8-1070	PWR Branch & HVAC Branch - Christenson Electrical	07-Jun-23	13-Jun-23	5	0	173
9-I&C		30-Mar-23	04-May-23	25	0	255
A8-1040	Controls - Christenson Electrical	30-Mar-23	04-May-23	25	225	255
10-Sitework		14-Jun-22	26-Mar-24	450	0	30
A10-1000	Demo Asphalt	12-Aug-22	15-Aug-22	2	0	301
A10-1010	Demo Curb & Gutter	16-Aug-22	17-Aug-22	2	0	301
A10-1020	Potholing	18-Aug-22	19-Aug-22	2	0	301



Activity ID	Activity Name	Start	Finish	Original Duration	Free Float	Total Float
A10-1030	Demo Storm Pipe	22-Aug-22	24-Aug-22	3	0	301
A10-1040	Demo Catch Basin	25-Aug-22	29-Aug-22	3	0	301
A10-1129	ELB Ductbank from Switchgear Bldg	30-Aug-22	20-Sep-22	15	0	301
A10-1130	SG for Switchgear Bldg	21-Sep-22	26-Sep-22	4	0	301
A10-1140	Place AB and Finish Grade for Switchgear Bldg	27-Sep-22	30-Sep-22	4	0	301
A10-1150	FRPS Slab on Grade for Switchgear Bldg	03-Oct-22	14-Oct-22	10	0	301
A10-1160	FRPS Walls @ Switchgear Bldg	17-Oct-22	28-Oct-22	10	128	301
A10-1170	Install Steel Joists @ Switchgear Bldg	05-May-23	16-May-23	8	0	173
A10-1180	Install Doors @ Switchgear Bldg	17-May-23	18-May-23	2	0	173
A10-1190	Install Windows @ Switchgear Bldg	19-May-23	22-May-23	2	0	173
A10-1200	Place CMU Wall @ Switchgear	23-May-23	30-May-23	5	0	173
A10-1210	Place Metal Coping @ Switchgear Bldg	31-May-23	01-Jun-23	2	0	173
A10-1220	Install Louvers @ Switchgear Bldg	02-Jun-23	06-Jun-23	3	0	173
A10-1221	Install HVAC	14-Jun-23	20-Jun-23	5	0	173
A10-1230	Insulate Switchgear Bldg	21-Jun-23	23-Jun-23	3	0	181
A10-1250	Disconnect and Remove Existing Tranformer	26-Jun-23	30-Jun-23	5	0	181
A10-1251	FRPS Transformer Pads	03-Jul-23	17-Jul-23	10	0	181
A10-1252	FRPS Slab for Storage Tank and Generator (and future)	18-Jul-23	25-Jul-23	6	0	181
A10-1270	Install Marshalling Cabinet	26-Jul-23	31-Jul-23	4	0	181
A10-1280	FRPS Light Fixture Bases	01-Aug-23	04-Aug-23	4	0	181
A10-1281	LOX Line Extension	07-Aug-23	11-Aug-23	5	0	181
A10-1282	FPS Sidewalk & Pedestrian Ramp	14-Aug-23	18-Aug-23	5	181	181
A10-1284	Install Rain Garden	15-Aug-23	28-Aug-23	10	0	155
A10-1285	Pour Curb & Gutter	29-Aug-23	05-Sep-23	5	0	155
A10-1286	Lox Fill Station Concrete Paving	06-Sep-23	12-Sep-23	5	0	155
A10-1320	Final Landscaping & Irrigation	13-Sep-23	19-Sep-23	5	0	155
A10-1500	Prep Subgrade For Asphalt	20-Sep-23	22-Sep-23	3	0	155
A10-1700	Final AC Paving	25-Sep-23	26-Sep-23	2	125	155
A10-1800	Site Security	14-Jun-22	26-Mar-24	450	0	30
A10-1810	Survey	14-Jun-22	26-Mar-24	450	0	30
A10-1820	Maintain SWPPP	14-Jun-22	26-Mar-24	450	0	30
Project Closeout		14-Feb-24	08-May-24	60	0	0
C1000	Commissioning & Start Up	14-Feb-24	26-Mar-24	30	0	0
C1010	Final Punchlist and Demobilization	27-Mar-24	08-May-24	30	0	0



Item #	Basis	Risk Description	Impact Calculation	Notes	Total Risk ($)	Probability	Contingency ($)
	Basis of Risk and Contingency						
	1	Labor and equipment productivity rates	4 Bidding climate for subcontract work				
	2	Labor, equipment, and material cost and pricing data	5 Occurrence of events likely to impact the cost of work performed				
	3	Commodity prices					
Area 1 - Raw Water Pump Station					**$ 40,082**		**$ 24,062**
1.1	1	Productivity	Total labor and equipment cost $25K. Productivity impact at 20%.	Productivity loss.	$ 5,000	0%	$ -
1.2	4	Subcontract Pricing	Total subcontract cost $12K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 3,000	0%	$ -
1.3	3	Commodity Pricing	Total material cost $213K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 32,082	75%	$ 24,062
Area 2 - Finished Water Pump Station					**$ 52,732**		**$ 27,999**
2.1	1	Productivity	Total labor and equipment cost $77K. Productivity impact at 20%.	Productivity loss.	$ 15,400	0%	$ -
2.2	3	Commodity Pricing	Total material cost $248K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 37,332	75%	$ 27,999
Area 3 - Ozone Contractors / Ozone Generators					**$ 130,828**		**$ 48,280**
3.1	1	Productivity	Total labor and equipment cost $439K. Productivity impact at 20%.	Productivity loss.	$ 87,784	25%	$ 21,946
3.2	4	Subcontract Pricing	Total subcontract cost $47K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 11,899	25%	$ 2,975
3.2	3	Commodity Pricing	Total material cost $208k. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 31,145	75%	$ 23,359
Area 4 - Clearwell					**$ 92,068**		**$ 26,055**
4.1	1	Productivity	Total labor and equipment cost $96K. Productivity impact at 20%.	Actual pricing based on GMP design and market conditions.	$ 24,160	25%	$ 6,040
4.2	4	Subcontract Pricing	Total subcontract cost $344K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 85,991	25%	$ 21,498
4.3	3	Commodity Pricing	Total material cost $41K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 6,077	75%	$ 4,558
Area 5 - Washwater EQ Basin					**$ 85,880**		**$ 45,584**
5.1	1	Productivity	Total labor and equipment cost $173K. Productivity impact at 20%.	Productivity loss.	$ 34,652	25%	$ 8,663
5.2	4	Subcontract Pricing	Total subcontract cost $12K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 3,000	25%	$ 750
5.3	3	Commodity Pricing	Total material cost $321K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 48,227	75%	$ 36,171
Area 6 - Solids Holding Tank and Dewatering Building					**$ 41,162**		**$ 18,711**
6.1	1	Productivity	Total labor and equipment cost $84K. Productivity impact at 20%.	Productivity loss.	$ 16,828	25%	$ 4,207
6.2	4	Subcontract Pricing	Total subcontract cost $17K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 4,250	25%	$ 1,063
6.3	3	Commodity Pricing	Total material cost $43K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 6,484	50%	$ 3,242
6.4	5	Relocation of Existing Utilities	Relocation of existing utilities off the walls to allow access to perform the work.	2 days x 3 workers x 8 hours/day + $10,000 Equipment/Access	$ 13,600	75%	$ 10,200
Area 7 - Chemical Systems					**$ 221,453**		**$ 75,500**
7.1	1	Productivity	Total labor and equipment cost 679K. Productivity impact at 20%.	Productivity loss.	$ 135,930	25%	$ 33,982
7.2	4	Subcontract Pricing	Total subcontract cost $181K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 45,250	25%	$ 11,313

Item #	Basis	Risk Description	Impact Calculation	Notes	Total Risk ($)	Probability	Contingency ($)
	Basis of Risk and Contingency						
	1	Labor and equipment productivity rates	4 Bidding climate for subcontract work				
	2	Labor, equipment, and material cost and pricing data	5 Occurrence of events likely to impact the cost of work performed				
	3	Commodity prices					
7.3	3	Commodity Pricing	Total material cost $268K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 40,274	75%	$ 30,205
Area 8 - Electrical					**$ 919,022**		**$ 99,482**
8.1	1	Productivity	Total labor and equipment cost $109K. Productivity impact at 20%.	Productivity loss.	$ 21,933	25%	$ 5,483
8.2	4	Subcontract Pricing	Total subcontract cost $8.9M. Cost impact at 10%.	Actual pricing based on GMP design and market conditions.	$ 890,489	10%	$ 89,049
8.3	3	Commodity Pricing	Total material cost $44K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 6,600	75%	$ 4,950
Area 9 - I&C					**$ 92,838**		**$ 9,284**
9.1	4	Subcontract Pricing	Total subcontract cost $928K. Cost impact at 10%.	Actual pricing based on GMP design and market conditions.	$ 92,838	10%	$ 9,284
Area 10 - Sitework					**$ 345,041**		**$ 118,708**
10.1	1	Productivity	Total labor and equipment cost $886K. Productivity impact at 20%.	Productivity loss.	$ 177,291	25%	$ 44,323
10.2	4	Subcontract Pricing	Total subcontract cost $411K. Cost impact at 25%.	Actual pricing based on GMP design and market conditions.	$ 102,853	25%	$ 25,713
10.3	3	Commodity Pricing	Total material cost $432K. Cost impact at 15%.	Actual pricing based on GMP design and market conditions.	$ 64,896	75%	$ 48,672
General					**$ 811,000**		**$ 759,223**
G.1	5	Relocation of Existing Utilities	Relocation of existing above ground utilities around site to allow access to the work	Carry $100,000 for the duration of the Project	$ 100,000	50%	$ 50,000
G.2	5	Cancellation of RWF 1.0 Phase 2 Project	Cancellation of the next phase of the Raw Water Facilities Project	KIWC unable to take advantage of cost savings due to concurrent Projects (staff, equipment, site services)	$ -	0%	$ -
G.3	5	100% Design Development	Development of Design from 90% to 100%	Cost increases associated with the development of design from 90% to 100%. Costs above 150k would be owner contingency.	$ 300,000	0%	$ -
G.4	3	Electrical Switchgear Escalation	Escalation if PO not issued by 5/18	Gear cost will increase by $361k if not released by 5/18	$ 361,000	100%	$ 361,000
G.5	5	Insurance Loss Deductible	Potential Deductible for Insurance Claim	Potential for losses that do not meet deductible threshold.	$ 50,000	50%	$ 25,000
G.6	5	Supervision for additive alternate scopes of work	N/A	Reduction of Article 8 staff markup and escalation	$ 323,223	100%	$ 323,223
		SUBTOTAL			**$ 2,832,106**		**$ 1,252,887**
General Conditions					**$ 84,963**		**$ 37,587**
GC.1		GC - Lump Sum			$ 84,963		$ 37,587
GC.2		GC - Reimbursable GCs			$ -		$ -
Fee					**$ 226,568**		**$ 100,231**
		Fee			$ 226,568		$ 100,231

Item #	Basis	Risk Description	Impact Calculation	Notes	Total Risk ($)	Probability	Contingency ($)
	Basis of Risk and Contingency						
	1	Labor and equipment productivity rates	4 Bidding climate for subcontract work				
	2	Labor, equipment, and material cost and pricing data	5 Occurrence of events likely to impact the cost of work performed				
	3	Commodity prices					
		TOTAL			**$ 3,143,637**		**$ 1,390,705**

*While the CM/GC Contingency was determined based upon certain CM/GC assumed risks and the probability of such risks occurring, use of the CM/GC Contingency is not limited to such risks or to the amounts associated with such risks.

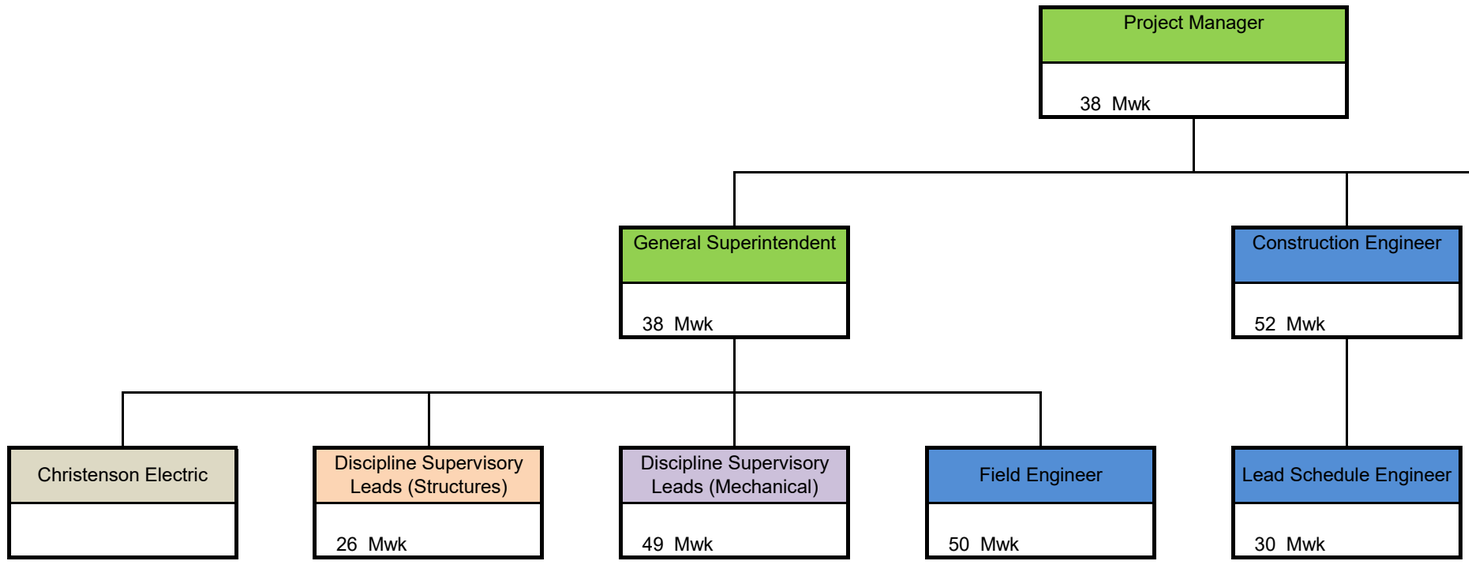
ATTACHMENT G

Wilsonville WRWTP Organization Chart - 100% Design

Article 8.8 and 9

General Conditions - Offsite Staff

Matt Scott
Rob Farrell
Mark Bertolero
Ryan Yanosh
Kyle Ostergard



NOTES:
1) Key Personnel have been utilized part-time and shared with the Raw Water Project in order to provide cost savings to the City

Required CMGC Key Personnel

Exhibit 5
CM/GC KEY PERSONNEL

The following shall be considered Key Personnel and shall not be replaced during the project without the written permission of Owner, which shall not be unreasonably withheld according to Article 4.6.of the CM/GC Contract.

1. Construction Manager
2. General Superintendent,
3. Construction Engineer
4. Field Engineer
5. Accountant
6. Chief Engineer
7. Lead Estimator
8. Lead Scheduler
9. Procurement Lead
10. Area or Discipline Construction Supervisory Leads

Key personnel shall be defined as those with roles similar to those described above regardless of specific title.

Kiewit

Willamette River Water Treatment Plant Expansion - 100% Design
Craft Labor Rates

Labor Classification	Hourly Rate (Straight Time)				
	Base Rate	Insurance	Payroll Taxes	Contributions (Union benefits)	Total
Laborer Foreman	$35.73	$2.18	$3.66	$16.53	**$58.10**
Laborer Journeyman Group 1	$33.48	$2.04	$3.43	$16.53	**$55.48**
Operator Foreman (Group 3)	$51.02	$3.11	$5.23	$16.38	**$75.73**
Operator 1 (Crane < 200-Tn & > 200' Boom)	$51.65	$3.15	$5.29	$16.38	**$76.47**
Operator 2 (Excavator>65-Tn, Loader>60-Tn)	$49.74	$3.03	$5.10	$16.38	**$74.24**
Operator 3 (Dozer>35-Tn, Excavator>40-Tn, Loader>30-Tn)	$48.59	$2.96	$4.98	$16.38	**$72.91**
Operator 4 (Backhoe, Excavator>10-Tn)	$45.26	$2.76	$4.64	$16.38	**$69.03**
Cement Mason Foreman	$40.66	$2.48	$4.16	$20.12	**$67.42**
Cement Mason Journeyman	$38.72	$2.36	$3.97	$20.12	**$65.16**
Cement Mason Apprentice 4	$30.36	$1.85	$3.11	$18.59	**$53.91**
Ironworker Foreman	$43.56	$2.65	$4.46	$30.05	**$80.72**
Ironworker Journeyman	$40.56	$2.47	$4.15	$30.05	**$77.23**
Ironworker Apprentice 80%	$34.48	$2.10	$3.53	$30.05	**$70.16**
Carpenter Foreman	$47.30	$2.88	$4.85	$18.61	**$73.64**
Carpenter Journeyman	$43.80	$2.67	$4.49	$18.61	**$69.56**
Carpenter Apprentice 80%	$37.23	$2.27	$3.81	$18.61	**$61.92**
Pipe Foreman	$59.28	$3.61	$6.07	$35.30	**$104.26**
Pipe Journeyman	$50.68	$3.09	$5.19	$35.30	**$94.26**
Pipe Apprentice 6	$45.61	$2.78	$4.67	$33.68	**$86.74**
Millwright Foreman	$51.58	$3.14	$5.28	$19.01	**$79.01**
Millwright Journeyman	$46.89	$2.86	$4.80	$19.01	**$73.56**

Kiewit

Willamette River Water Treatment Plant Expansion - 100% Design
Equipment Rates

See Note (1)

Equipment Classification	Blue Book Equipment Classification	Monthly Base Rate	Hours Per Month	Hourly Ownership Rate (based on Monthly Rate)	Hourly Operating Rate	Total Blue Book Hourly Rate (FHWA)	Add 7.7% Escalation (2023)
Sedan	FORD FUSION	$ 747.64	176	$ 4.25	$ 14.43	$ 18.68	**$ 20.12**
1/2 Ton Pickup	FORD F-150	$ 1,207.70	176	$ 6.86	$ 30.34	$ 37.20	**$ 40.06**
3/4 Ton Pickup	4X2 3/4 430 CREW GAS	$ 1,170.00	176	$ 6.65	$ 40.56	$ 47.21	**$ 50.85**
Small Mechanic Truck	4X2 35KGVW DSL	$ 2,690.00	176	$ 15.28	$ 53.50	$ 68.78	**$ 74.08**
Water Buffalo	1200-3000 Gallon	$ 1,290.00	176	$ 7.33	$ 6.12	$ 13.45	**$ 14.49**
JD-210, Case 580 - Box Blades	Deere 210L	$ 6,980.00	176	$ 39.66	$ 33.95	$ 73.61	**$ 79.28**
Mid Size Loader Backhoe (Cat 446D 4X4)	Caterpillar 446D	$ 9,490.00	176	$ 53.92	$ 52.74	$ 106.66	**$ 114.87**
36-39 Metric Ton (CAT 330, 336) Excavator (Dirt)	Caterpillar 335F L CR	$ 20,825.00	176	$ 118.32	$ 71.48	$ 189.80	**$ 204.41**
40 - 48" Single Drum / Smooth / Vibro	Caterpillar CS34	$ 6,175.00	176	$ 35.09	$ 37.99	$ 73.08	**$ 78.71**
Walk Behind Roller (2-Drum) (RAMMEX)	BOMAG BMP8500	$ 8,515.00	176	$ 48.38	$ 21.43	$ 69.81	**$ 75.19**
185 CFM Air Compressor - Diesel	Ingersoll Rand P185WJD	$ 1,895.00	176	$ 10.77	$ 22.57	$ 33.34	**$ 35.91**
400 - 450 Amp Diesel Welder	Miller BIG BLUE 400 CC/CV	$ 805.00	176	$ 4.57	$ 9.05	$ 13.62	**$ 14.67**
50 - 74 KW Generator	Multiquip DCA 70SSIU2	$ 875.00	176	$ 4.97	$ 28.31	$ 33.28	**$ 35.84**
Skid Steer - Track	Caterpillar 259D3	$ 6,770.00	176	$ 38.47	$ 29.82	$ 68.29	**$ 73.55**
Electric Scissor Lift	Genie GS-3232	$ 2,005.00	176	$ 11.39	$ 8.84	$ 20.23	**$ 21.79**
60' Manlift	JLG 600AJ	$ 8,705.00	176	$ 49.46	$ 27.73	$ 77.19	**$ 83.13**
>10,000 lb. Extendable	Caterpillar TL1255D	$ 18,470.00	176	$ 104.94	$ 75.78	$ 180.72	**$ 194.64**

(1) Utilize the escalated 2023 rates

ATTACHMENT I

MAINTENANCE AND OPERATION PLAN

Wilsonville WRWTP Expansion/Upgrade Project Design, Bidding Phase, and Services During Construction Maintenance and Operation Plan

PREPARED FOR

City of Wilsonville

WRWTP 90% MOPO – March 9, 2022

DRAFT

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LIST OF ABBREVIATIONS AND ACRONYMS

ATS	automatic transfer switch
City	City of Wilsonville
CM/GC	Construction Manager / General Contractor
COW	City of Wilsonville
DIP	ductile iron pipe
ft	feet
GAC	granular activated carbon
gpm	gallons per minute
HOA	hand-off-auto
Hp	horsepower
in	inches
IOM	installation, operation, and maintenance
Kiewit/KIWC	Kiewit Infrastructure West Co. (in the role of CM/GC)
kV	kilovolts
Kw	kilowatt
LCP	local control panel
LOR	local-off-remote
LOX	liquid oxygen
MCLs	maximum contaminant levels
MG	million gallons
MGD	million gallons per day
MW	megawatt
O&M	operation and maintenance
OSS	Ozone System Supplier
PLC	programmable logic controller
ppd	pounds per day
psf	pounds per square foot
PVC	polyvinyl chloride
rpm	revolutions per minute
RWPS	Raw Water Pump Station
SCADA	Supervisory Control and Data Acquisition
SCH	schedule
Stantec	Stantec Consulting Services Inc.
v	volt
VFD	variable frequency drive
Wilsonville	City of Wilsonville
WRWTP	Willamette River Water Treatment Plant
WTP	water treatment plant
WWSP	Willamette Water Supply Program

1.0 INTRODUCTION

Willamette River Water Treatment Plant (WRWTP) and the City of Wilsonville (City or Wilsonville), referred to as Owner, have contracted with Stantec to perform design, bidding phase services, and services during construction of the WRWTP, under the management and control of the City of Wilsonville. The WRWTP comprises the complete drinking water infrastructure system consisting of but is not limited to the following components: raw water pump station, raw water transmission pipeline, water treatment plant, finished water pump station, finished water transmission pipelines, terminal storage reservoir(s), associated controls, and appurtenances.

Stantec is providing professional engineering services for the design of the City of Wilsonville's WRWTP Expansion Upgrade. Similarly, Kiewit Infrastructure West Co. (Kiewit) is providing services under the WRWTP Expansion/Upgrade Project Construction Manager / General Contractor (CM/GC) contract.

1.1 Maintenance and Operation Plan

KIWC has prepared this draft Maintenance and Operation Plan and submitted it with the 90% design deliverables. The purpose of the Plan is to develop a plan for maintenance of interim pipe and equipment, operation of the facilities in the future, and maintaining the continuous operation of the WRWTP during construction. After the 90% design process is completed, the Plan will be updated and maintained by Kiewit upon review of comments from Stantec and the City of Wilsonville.

The Plan is organized to address the following key maintenance and operation information:

- WRWTP Expansion Upgrade Operations.
- Maintenance.
- Interim WRWTP Operations during Construction.
- Subsurface Utility Engineering.
- Existing Controls.

1.2 WRWTP Maintenance Workshops

In support of the preparation of this Maintenance and Operation Plan, a workshop will be scheduled with a focus on the construction activities involving WRWTP outages identified to-date; planned relocation of existing utilities; tie-ins; and understanding existing operations and controls at the WRWTP. The workshop meeting notes will be distributed to the attendees and incorporated herein by reference.

Subsequent workshops will focus on the review of this draft Maintenance and Operation Plan as well as additional topics of interest to the workshop participants. Ultimately, this Plan will be updated after each workshop and then finalized and carried forward to the WRWTP Expansion/Upgrade Project construction phase.

2.0 WRWTP EXPANSION/UPGRADE OPERATIONS

This section describes the method of operations for the key WRWTP operating facilities.

2.1 WRWTP Pumps, Motors, & Equipment

This WRWTP Expansion/Upgrade Project will expand the plant's maximum capacity from 15 to 20 MGD as well as make upgrades that will optimize performance and extend the useful life of the plant facilities. Long-term planning for a future expansion to 30 MGD is also being addressed. The WRWTP 2017 Water Master Plan (WMP) established a "road map" to expand plant capacity to 20 MGD to meet increasing water demand from the Cities of Wilsonville and Sherwood. The WMP also identified improvements to life-safety, seismic, electrical and operations and maintenance (O&M) at the WTP.

2.1.1 WRWTP Pump Configurations

Table 2-1 shows the design requirements for the various future pump upgrades; this information will be updated with actual nameplate information during construction.

Table 2-1 WRWTP Pump Design Requirements

PARAMETER	VERTICAL TURBINE PUMPS			DIAPHRAGM PUMP	VERTICAL SOLIDS-HANDLING PUMP
Location	RWPS	WWEQ	FWPS	Sludge Thickening	Chemical Building
Number of Units	1	3	1	1	1
Unit Designation	VFD				Constant
Control	Variable Speed				Constant Speed
Capacity, MGD	5.04	0.72	4.99	.000924	0.86
Total Head (ft)					
Design, TDH	107	25	312	-	12
Minimum Head	-	-	-	25	30
Shutoff, Maximum	-	45	475	-	19
Capacity @ rated head, gpm	3500	500	3472	0.64	600
Discharge Size, in	12	6	12	0.5	5
Efficiency, %	80	77	82	-	65
Pump Speed, rpm	1800			1750	-
Minimum NPSHA, ft	55	30	35	25	30
Elevation, MSL, ft	120	140	130	130	125
River, 100 YR Flood, EL, ft	90.1				

The listed pumps have the following designations and configurations:

Raw Water Pump Station

- Install a new 5 MGD pump and motor to replace the existing 4 MGD pump.

Finished Water Pump Station

- Install one new pump (5 MGD) and motor and new VFD, in the “empty” slot.

Residuals Handling Systems

- Replace the existing 500 gpm/5 Hp Washwater Recycle (WWR) pumps and motors with new 500 gpm pumps inside the Pump Room atop the Define Basin.

- Replace the two existing Variable Frequency Drives (VFDs) with new VFDs and install a 3rd VFD inside the Pump Room.

2.1.2 Chemical Systems

- Install second dry polymer batching system.
- Replace existing chemical feed lines from storage tanks to injection points.
- Install containment pans for chemical feed lines routed above doorways.
- Provide seismic bracing for chemical feed lines.
- Add wye and basket strainers to all pump suction lines.
- Add ventilation lines back to tank on sodium hypochlorite system.
- Add solenoid valves to prevent chemical dosing after power interruption.

2.1.3 Filter Valve Actuators

There are four carbon filters in the plant. Each filter has five motor operated valves for controlling water flow through the filter. Three of the five valves on each filter have high utilization and are being replaced. The existing filter valve actuators are controlled via a Modbus serial network. The valve/actuators that are being replaced will be removed from the Modbus network and controlled by an Ethernet IP based control network.

2.2 Startup and Commissioning Plan

The information presented in this startup and commissioning plan is organized to discuss the following topics that are specific to the WRWTP facilities:

- Overview of the startup and commissioning process:
  - Schedules for manufacturers' equipment certifications.
  - Schedules for submitting final O&M Manuals.
  - Schedule for training the Owner's personnel.
  - Description of temporary facilities and schedule for installation and decommissioning them.
  - List of Owner and Contractor-furnished supplies.
  - Detailed schedule of operations to achieve successful pre-commissioning and commissioning.
  - Checklists and data forms for each item of equipment
  - Address coordination with the Owner's staff.
  - Designate a representative of the Contractor who has the authority to act in matters relating to startup and has experience in testing water treatment plants. The Plan shall also designate the roles and responsibilities of any Subcontractors that may be involved in startup activities.
  - Safety, startup, and testing procedures and proposed inspection and certification forms and records.
  - Interconnection of new facilities to existing facilities:

1. Date and time frame of proposed shutdown or interconnection, including sequence of events and activities to be conducted.
2. A detailed description of sequences and activities for the planned shutdown and interconnection.
3. Staff, equipment, and materials that will be at the Site before commencing the shutdown.
4. Other provisions so that interconnection, testing, and startup will be completed within the planned time.

- Hydrostatic testing of water-holding structures and pipelines and other potable water equipment.

- WRWTP-specific startup and commissioning requirements to address the following:
  - WRWTP Pumps, Motors and VFD's.
  - Electrical/Power Supply Systems (Table 2-2)
  - Ozone Equipment
  - Support Systems.

Startup and Commissioning Plans will be fully developed during the Construction Phase of the Project.

Table 2-2 Christenson Electric, Inc. WRWTP Electrical Sequencing

SEQUENCE	ACTIVITY
1.)	ALL SITE EXCAVATION COMPLETED – including site light pole bases and conduits (exception of Line side of T3 to stop outside of PGE substation "MS" for future connection after removal of existing "17-SWGR-A")
2.)	New Switchgear building, new pads for 3MVA xfmrs, new generator, and new generator fuel tank installed
3.)	Receive and set the new switchgear "23-SWGR-B" 5,000amp 480v in the new switchgear building
4.)	Receive and set the (2) new 3MVA transformers "XFMR T3" & "XFMR T4"
5.)	Receive and set the new "GEN A" 2,000KW 480V generator and fuel tank
6.)	Pull feeders for line and load of XFMR T4, and load of XFMR T3.
7.)	Schedule & shutdown of PGE main breaker for installation of new 15KV switch. Lockout new switch.

8.)	Prep and energize XFMR T4 to single end feed new switchgear 23-SWGR-B in new switchgear building. Lockout main in 23-SWGR-B.
9.)	Install Distribution panels in Raw Water Pump Station
10.)	Install Distribution panels in Finished Water Pump Station
11.)	Finish overhead conduits to Finish Water Pump Station and pull feeders to new distribution panels
12.)	Pull feeders to new distribution panels in Raw Water Pump Station
13.)	Energize and test new distribution panels in both Raw Water Pump Station and Finished Water Pump Stations
14.)	Extend new loads to existing equipment per drawings in both Pump Stations.
15.)	Schedule/coordinate and complete swap over of individual loads in both pump stations from existing feeds to new distribution panels per drawings. Shutdown of most loads are redundant equipment and will not affect plant capacity.
16.)	Extend loads from new distribution in Finished Water Pump Stations to existing MCC "15-MCC-A" and switchboard "15-SWBD-B".
17.)	Coordinate/schedule and complete shutdown and swap over of these loads to new distribution panel in Finished Water Pump Station.
18.)	All other power and controls for all locations in plant can progress towards completion, including setting of light poles and energize lights. Ozone generation timeline will depend upon ozone generator skid installation schedule, by others
19.)	Schedule shutdown of 17-SWGR-A & 4MCC-A, disconnect feed from "17-SWGR-A", and temporarily power 4-MCC-A via portable generator.
20.)	Pull out and dispose of feeders between 4-MCC-A and 17-SWGR-A. Reroute empty conduit near 17-SWGR-A into new 30x60x30 Handhole per drawing E-101 Note D. Re-energize 17-SWGR-A. Pull in new feeders – unspliced – from new 23-SWGR-A to existing 4-MCC-A.
21.)	Schedule shutdown of 14-MCC-A. Disconnect temporary generator, terminate new feeders at 4-MCC-A. Test, and energize through 23-SWGR-A. Relocate temporary generator to 6-MCC-A
22.)	Schedule shutdown of 17-SWGR-A & 6MCC-A, disconnect feed from "17-SWGR-A", and temporarily power 6-MCC-A via portable generator.
23.)	Pull out and dispose of feeders between 6-MCC-A and 17-SWGR-A. Reroute empty conduit near 17-SWGR-A into new 30x60x30 Handhole per drawing E-101 Note D. Re-energize 17-SWGR-A. Pull in new feeders – unspliced – from new 23-SWGR-A to existing 6-MCC-A.

24.)	Schedule shutdown of 6-MCC-A. Disconnect temporary generator, terminate new feeders at 6-MCC-A. Test, and energize through 23-SWGR-A. Relocate temporary generator to 8-MCC-A
25.)	Schedule shutdown of 17-SWGR-A & 8MCC-A, disconnect feed from "17-SWGR-A", and temporarily power 8-MCC-A via portable generator.
26.)	Pull out and dispose of feeders between 8-MCC-A and 17-SWGR-A. Reroute empty conduit near 17-SWGR-A into new 30x60x30 Handhole per drawing E-101 Note D. Re-energize 17-SWGR-A. Pull in new feeders – unspliced – from new 23-SWGR-B to existing 8-MCC-A.
27.)	Schedule shutdown of 8-MCC-A. Disconnect temporary generator, terminate new feeders at 8-MCC-A. Test, and energize through 23-SWGR-B. Relocate temporary generator to 13-DP-A
28.)	Schedule shutdown of 17-SWGR-A & 13-DP-A, disconnect feed from "17-SWGR-A", and temporarily power 13-DP-A via portable generator.
29.)	Pull out and dispose of feeders between 13-DP-A and 17-SWGR-A. Reroute empty conduits near 17-SWGR-A into new 30x60x30 Handhole per drawing E-101 Note D. Pull in new feeders – unspliced – from new 23-SWGR-B to existing 13-DP-A.
30.)	Schedule shutdown of 13-DP-A. Disconnect temporary generator, terminate new feeders at 13-DP-A. Test, and energize through 23-SWGR-B. Remove temporary generator from site.
31.)	Schedule shutdown of switch at Utility Substation MS for 17-SWGR-A
32.)	Remove existing 15kv feeders between PGE substation MS and 17-SWGR-A.
33.)	Coordinate/schedule removal of existing outdoor gear "17-SWGR-A"
34.)	Tie in underground conduit for line side of XFMR T3 to 15KV switch #2 outside new 15kv switch. Pull in new 15KV feeders to XFMR T3 from PGE Switch #2. This will not require shutdown as switch will be/can be locked out.
35.)	Prep/test/energize XFMR T3 through to side A of switchgear "23-SWGR-B" in new switchgear building. Isolate Tie in switchgear and energize 23-SWGR-B via both transformers as double end fed per drawings.

3.0 MAINTENANCE

This section discusses maintenance activities associated with the WRWTP Expansion/Upgrade Project.

3.1 Coordination with WRWTP

Routine preventative maintenance activities, including specific details on lubrication and maintenance of corrosion protection of the equipment and ancillary components, and other considerations are discussed in the sub-sections below. Operation and maintenance (O&M) manuals will be submitted alongside each equipment installation prior to start-up.

3.1.1 Raw/Finished Water Pumps and Motors

The raw/finished water pumps and motors are maintained by plant staff with outside assistance if corrective maintenance is required. Coordination to replace the pumps/motors is required so the pumping capacity can always meet the design capacity at the plant.

3.1.2 Washwater Pumps

All the existing washwater pumps will be replaced. To complete this work, two pumps with VFDs must be operational. To initiate the construction sequence, it is recommended to replace the fixed-speed pump with a VFD-controlled pump first.

3.1.3 Ozone Systems

A minimum of one ozone generator shall always be operational. The Master Ozone Control Panel and Ozone Generator shall be installed, tested, and started up prior to the demolition of the existing ozone generators. Shutdown of the ozone contactors shall be limited to twelve hours and shall be used to provide the necessary isolation to complete the work. A minimum of one ozone destruct unit shall be always operational. Furthermore, the LOX tank shutoff valve replacement will require a short duration shutdown.

The Ozone System Supplier (OSS) will provide training for designated Owner personnel in the operation and maintenance of the ozone system, including all components provided under this Contract.

3.1.4 Electrical

A new diesel-powered generator, fuel storage tank and switchgear will be installed. The switchgear will have dual utility power feeds and a tie breaker to allow feeding the entire plant via one utility feed. Additionally, the diesel generator can feed the entire system. The coordination of the feeders, tie breaker, and generator feed shall be controlled by the power control panel located in the switchgear building. This control panel shall be provided and programmed by the switchgear/generator equipment vendor.

3.1.5 Chemical Systems

A new caustic soda pump (13-FD-2) is being added to the chemical delivery area. Pumps 1 and 3 are existing pumps, so there will be three total pumps in the caustic soda delivery system. When the plant was built, a spare caustic soda pump was built into the system, because of this there are existing controls and programming to accommodate the new pump.

A new solenoid valve is being added to the discharge line of each caustic soda pump. These modifications will allow positive shutoff of chemical delivery. The integrator shall program the SCADA and control system to open each solenoid valve when the associated pump is running.

Kiewit will submit printed instructions relating to proper maintenance, including lubrication, and parts lists indicating the various parts by name, number, and diagram where necessary.

3.2 Long Term Maintenance

The long-term maintenance activities associated with the vertical turbine pumps and key mechanical and electrical equipment are presented below.

3.2.1 Vertical Turbine Pumps

The WRWTP vertical turbine pumps are designed for river water systems and the design includes an enclosing tube so that any sand or silt in the pumped media does not interact with the lineshaft bearings. All routine inspections and maintenance tasks as recommended by the pump manufacturer shall be followed per the recommended schedule. Typical maintenance for these pumps is outlined below.

- For the vertical pumps, it is recommended that a maintenance plan and schedule is adopted, in line with these user instructions, to include the following:
  - Auxiliary systems like the bearing lubrication system installed to provide potable quality water to lubricate the lineshaft bearings must be monitored to ensure they function correctly. Bearing lubrication system discharge pressure and flow should be checked weekly to ensure adequate pressure and flow are provided to the enclosed lineshaft bearings. The quality of the water also needs to be monitored weekly.
  - At the stuffing box, the gland packings must be adjusted correctly to give visible leakage and concentric alignment of the gland follower to prevent excessive temperature of the packing or follower.
  - Check for any leaks from gaskets and seals. The correct functioning of the shaft seal must be checked regularly.
  - Check that the duty condition is in the safe operating range for the pump.
  - Check vibration, noise level and surface temperature at the bearings to confirm satisfactory operation.
  - Check dirt and dust is removed from areas around close clearances, bearing housings and motors.
  - Check coupling alignment and re-align if necessary.
- Routine daily/weekly inspections and maintenance include, but not limited to, the following:
  - Operating behavior like noise, vibration and bearing temperatures are to be checked.
  - Observe for any abnormal fluid or lubricant leaks (static and dynamic seals).
  - Check that shaft seal leaks are within acceptable limits.

- Inspection every 6 months includes checking of: the foundation bolts for security of attachment and corrosion; pump operation hours to determine if motor bearing lubricant needs replacement; shaft coupling for correct alignment and worn driving elements.
- Once properly set at initial installation, impellers typically will not require re-adjustment.

3.2.2 Electrical Facilities

The design of the WRWTP electrical distribution system is such that no single point of failure can completely disable the electrical system. This design feature also means that any electrical component can be effectively de-energized and isolated to perform maintenance while the operation of the facility is not substantially affected. The maintenance of the major pieces of electrical equipment are broken down as follows:

- 2 MW 480 Volt generator – Maintenance on this equipment will require monthly testing at full load.
- Two 12 kV/480 Volt Transformers – Maintenance on this equipment will require switching of the appropriate circuit breakers to isolate the specific piece of equipment to undergo maintenance. Each of the two transformers are 100% redundant and can be isolated so that no effective pumping operational capacity is lost.
- 480 Volt Switchgear – Maintenance on this equipment will require switching of the appropriate circuit breakers to isolate the specific piece of equipment to undergo maintenance.
- 4,160 Volt Switchgear – Maintenance on this equipment will require switching of the appropriate circuit breakers to isolate the specific piece of equipment to undergo maintenance. Each bus and device in the switchgear can be isolated, however isolation of one of the switchgear busses will result in a reduction of effective pumping operational capacity by 50%.

For the smaller non-critical and/or non-redundant electrical or electro-mechanical equipment, the maintenance of such equipment can be done at any time with minimal impact. If there is an impact to the operation of the facility, maintenance activity will be executed at a time so the impact to the facility operation is minimized.

3.2.3 Other Facilities/Systems

SUEZ Water Technologies was selected as the Ozone System Supplier (OSS). The OSS shall furnish materials, equipment, and engineering services necessary for a complete ozone system. The furnished and installed ozone system improvements, as provided by the OSS, shall be warranted against defects in work quality and material for a minimum period of five years from the date of Substantial Completion. The Ozone System Warranty shall cover all parts, labor, and services to correct the defect, and shall cover all items provided by the OSS.

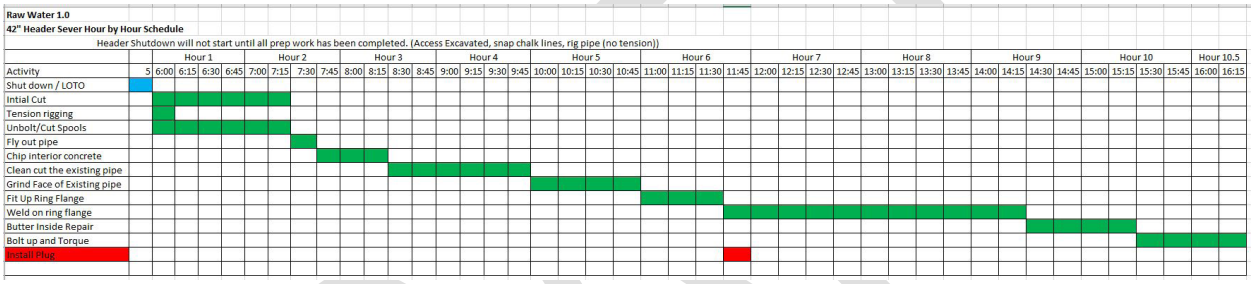
4.0 INTERIM WRWTP OPERATIONS DURING CONSTRUCTION

This section discusses the WRWTP outage requirements involving operational shutdowns; interconnections to existing WRWTP utilities (tie-ins); and utility relocations required for WRWTP Expansion/Upgrade Project construction.

4.1 Outage Management

Kiewit understands the importance of having the Plant operators and maintenance teams involved throughout the Project. Kiewit also understands that uninterrupted plant operations is the key factor of the Project. Plant outages may be permitted on successive days provided they are limited to one 10-1/2 hour no-flow period; so that the WRWTP can recover the Wilsonville treated water storage volume overnight. Any plant shutdown requires an hour-by-hour plan and execution. An example of this is in Table 4-1. It is integral to the success of the Project to take a team approach on the Maintenance of the Plant Operations (MOPO).

Table 4-1 Hour-by-Hour Schedule Example of Shutdown



All outage requests will be communicated to the entire team, including the Plant operations, well-ahead of the scheduled milestone. Pre-activity meetings will be held prior to any major operation requiring a plant shutdown. These meeting will be held to communicate the schedule, operation, quality/environmental concerns, and further details pertinent to the scope of work. This will allow Veolia and the City of Wilsonville time for questions and concerns related to the Work.

The advantage of starting this process early with all parties involved is that all inquiries will be addressed and incorporated into the final work plan prior to the start of the operations. This will also allow necessary contingencies to be prepared and be readily available during the shutdowns in case of an emergency. Through the Preconstruction phase, it will be important to identify any systems that could potentially be constructed independent of the existing system (i.e., on top of or parallel to the existing) to mitigate interruptions to the Plant operations and keeping shutdowns to a minimum.

Outage Management represents general information that applies to the proposed WRWTP outages applicable to all WRWTP construction, including:

- Discussion of outage durations.
- Discussion of outage scheduling.
- WRWTP outage administration.

Christenson Electric Inc, a licensed Electrical Subcontractor, has provided a sequencing list based on the 90% submittal in Table 2-2.

Detailed Outage Plans and Schedules will be developed during Construction Phase.

4.1.1 Outage Considerations

KIWC anticipates several construction interferences which would impact the operation of the WRWTP, and a list of potentially impacted areas and their activities is documented below.

Clearwell

- The clearwell cannot be drained for this work, so installation must be completed with divers and while the FW pumps are not operating – multiple plant shutdowns will be required.

Electrical/Power Supply System

- Install a new 2 MW/480v standby generator with belly fuel tank.
- Install a new electrical bldg. equipped with 480v switchgear for future 30 MGD buildout.
- Remove existing 1 MW backup generator and turn this room into a workshop.
- Remove/demo the existing 480v switchgear and enclosure.
- Numerous plant shutdowns will be required to complete this work, and careful coordination with plant staff is required.

Ozonation System

- Replace the two existing 300 ppd generators with two new 300 ppd generators.
- Provide/install a new ozone generation control system to allow variable gas flow or constant gas flow.
- Install a new cooling water system.
- Install a new nitrogen boost system.
- Replace the existing ozone off-gas destruct units with new units.
- Add new Gaseous Oxygen (GOX) auto-shutoff valves.
- Numerous plant shutdowns will be required to complete this work, and careful coordination with plant staff is required.

Filter Valve Actuators

- Replace existing highly utilized filter valves with new valves.
- Remove filter valve actuators from Modbus serial network and control by Ethernet IP based control network.

Chemical Systems

- Various upgrades including seismic.

- Extension of chemical piping utilidor system.

Table 4-2 addresses the following activities rated as High-Risk Level and a more developed construction sequencing plan will be provided in the future.

Table 4-2 High-Risk Level Construction Activities

AREA	DESIGN ELEMENTS
Raw Water Pump Station	▪ Replace Raw Water Pump 4 with larger pump and new variable frequency drive (VFD).
Finished Water Pump Station	▪ Install one new finished water pump with VFD.
Ozone Contactors / Ozone Generators	▪ Replace and resize existing ozone destruct unit skids. ▪ Install new emergency liquid oxygen (LOX) shutoff valve. ▪ Replace nitrogen boost compressed sir system with liquid nitrogen system. ▪ Replace dewpoint instrument with actual dewpoint sensor arrangement. ▪ Replace manual valve on nitrogen boost system with mass flow controller. ▪ Replace two existing ozone generators, replace open-loop cooling water system with closed-loop system, and replace pneumatic valve actuators with electric actuators. ▪ Install emergency shutoff at two exits.
Clearwell	▪ Install flexible baffle system in clearwell.
Solids Dewatering Building	▪ Seismic retrofits
Electrical	▪ New 480v switchgear housed in new CMU block building. Demolish existing 480v switchgear and enclosure. ▪ New 4,160v switchgear ▪ Two 12Kv/480v outdoor transformer ▪ 2 MW 480v generator installed in weatherproof, noise attenuating enclosure coupled with an automatic transfer switch and horizontal above ground diesel storage tank. ▪ Arcflash study

Instrumentation & Control	▪ SCADA upgrades to support other improvements.
Civil	▪ Extend chemical piping utilidor to southern end of plant.

4.2 Relocation of Existing Utilities

Relocation of utilities may be required where there are conflicts between new construction and existing utilities. Currently, the utilities listed in Table 4-3 are planned for relocation.

Table 4-3 Relocation of Existing Utilities

UTILITY	DESCRIPTION OF RELOCATION	REMARKS
Existing Streetlights	Relocate 2 streetlights at the upper site.	Wilsonville will eventually replace the existing streetlights.
WWSP Chemical/Fiber Optic Line	Relocate/replace chemical piping utilidor system	Potentially tie-into previous contract's work
Existing Irrigation System(s)	Relocate/replace irrigation where encountered.	Existing irrigation at Clearwell area

As the WRWTP Expansion/Upgrade design progresses, the need to relocate additional existing utilities may be identified and, if so, will be listed in Table 4-3 above and identified in Table 5-1.

4.3 Parts and Materials Needed in Advance of Plant Shutdowns

Partial and full shutdowns are critical and, as such, having the material on-site that is required for the outage work will be imperative. During the outage planning, the materials will be identified and ordered. No outage will start without the Contractor, Owner and Plant going through the parts on-site and verifying that all the parts are accounted for. A surplus of critical parts (bolts, nuts, gaskets, etc.) will also be on-site to limit the potential of not being able to complete the outage work.

5.0 SUBSURFACE UTILITY ENGINEERING

The subsurface utility locates were performed during preconstruction. Table 5-1 displays all identified utilities in the WRWTP plant and offsite areas where potential construction exists. Twenty (20) potholes were selected for subsurface utility engineering (SUE) to be performed.

Any additional recommend utilities to be potholed or surveyed will be identified for the CM/GC team to perform during construction.

Table 5-1 Pothole Results of Existing Utilities

WRWTP Expansion/Upgrade Project			
Existing Utilities - Pothole Results			
Pothole Number	**Utility/Pipe Material**	**Size (in)**	**Top Elevation (ft)**
1	DIP		137.85
2	SCH 40 PVC	2	137.8
	SCH 40 PVC	1.5	137.75
3	Concrete Encased	6	138.1
4	DIP	12	136.9
	Chem Lines		137.2
5	Chem Lines		137.2
6	Chem Lines	1.5	136.8
	Gas Line	2	136.8
7	Gas Line	2	136.6
	PVC	6	136.6
	SCH 40 PVC	1.5	136.6
	SCH 40 PVC	2	136.6
8	Plant Overflow	24	136.6
9	SCH 40 PVC	1.25	137.6
	SCH 40 PVC	1	136.8
	SCH 40 PVC	1.25	136.75
10	SCH 40 PVC	1	137.6
11	Concrete Encased Water Line		135.7
	Storm	10	135.4
12	SCH 40 PVC	1.5	137
	Concrete Encased Water Line		136.5
13	x6 Chem Lines	1	137.8
	SCH 40 PVC	2	137.8
14	PVC	6	137.9
15	Plant Overflow	24	128.4
16	DIP	12	130.4
17	Plant Overflow	24	136.6
18	Electrical Conduit	8	120.8
19	Storm	10	123.25
20	DIP		121.6

6.0 EXISTING CONTROLS

This section provides a summary of operation and control of the WRWTP for reference purposes.

6.1 Overview

The WRWTP has a permitted capacity of 15 million gallons per day (MGD). The process units include:

- Raw water intake screens with air burst system.
- Raw water intake piping.
- Caisson / wetwell and pumping station.
- Two Actiflo process trains.
- Two parallel ozone contract chambers with destruct units.
- Four deep bed granular activated carbon (GAC) / sand filters with backwash pumps (2) and air scour.
- An equalization basin.
- Solids thickener basin.
- Two sludge processing centrifuges with screw conveyors.
- High service pumping.
- The active chemical feed systems include the following:
  - Caustic soda for pH adjustment
  - Cationic polymer as a coagulant aid
  - Anionic polymer for sludge processing
  - Filter aid polymer
  - Liquid aluminum sulfate (alum) as a primary coagulant
  - Polyphosphate for corrosion control
  - Calcium thiosulfate for deozonation
  - Sodium hypochlorite for algae control and disinfection.

Since 2013, plant staffing has been a 24/7 operation. Six days per week one operator is on duty per shift. One day per week there is an overlap with two operators per shift which provides flexibility with plant performance and maintenance activities. One staff person is also designated as an O&M Tech-III Lead and monitors the plant operations and performs a variety of maintenance tasks; but also fills in as an operator when needed.

The storage capacity at the treatment plant is designed with a 2.9 million-gallon (MG) clearwell. The Wilsonville distribution system is composed of three pressure zones with storage tanks. Tank B1 has a storage capacity of 2.2 MG, Tank B2 is 3.0 MG, and Tank C1 is 2.0 MG. These storage volumes will be needed when calculating shutdown durations, along with input from the City/plant staff for anticipated distribution demands. Additionally, the system water demands also includes the City of Sherwood. Daily, Sherwood provides plant staff with a water demand request and re-notifies if a change is required. Plant staff is not able to monitor Sherwood's system. The contract conditions allow for a maximum delivery rate of up to 5.0 MGD.

6.2 Existing Control Strategy

The process controls at the WRWTP have several control options available; however, most of the equipment and chemical feed systems are controlled in the Remote Manual and/or Remote Auto modes. A brief description of each type of control mode is provided below.

- **Local Manual** – Control in this mode provides a means to operate the equipment by manual selection at the local control panel (LCP). This control feature normally includes an **On/Off**, **Start/Stop**, or **Open/Close** selector switch. In most cases, this mode is only used to test the equipment.
- **Local Automatic** – Control in this mode provides a means to operate the equipment by automatic selection at the LCP. This control feature normally includes a **Hand-Off-Auto** (HOA) selector switch. Equipment operated in this mode is normally programmed by the equipment manufacturer and SCADA is used to monitor the process.
- **Remote Manual** – Control in this mode provides a means to adjust the equipment status or set-point, through the SCADA system, using manually initiated commands. The equipment control feature normally includes a **Local-Off-Remote** (LOR) selector switch at the LCP and the switch is set in the Remote position.
- **Remote Automatic** – Control in this mode provides a means for automatically changing equipment status or set-point based on measured process parameters, calculated values, or operator set-points through the SCADA system. The equipment control feature normally includes a **Local-Off-Remote** (LOR) selector switch at the LCP and the switch is set in the Remote position.

6.3 WRWTP Operations Staff Interviews

The plant staffing and system storage was discussed earlier in this section. Veolia staff provided Kiewit with the daily production amounts for 2017 and 2018. Figure 6-1 represents the 2017 minimum, maximum, and average daily production per month while Figure 6-2 shows the same values for 2018 but only from January through August. As the figures illustrate, the 2018 production values are slightly higher because of the dry conditions. Understanding these figures provides insight to the system water demands and will assist with the coordination of the construction activities and the preparation of contingency plans for unexpected outages during these activities.

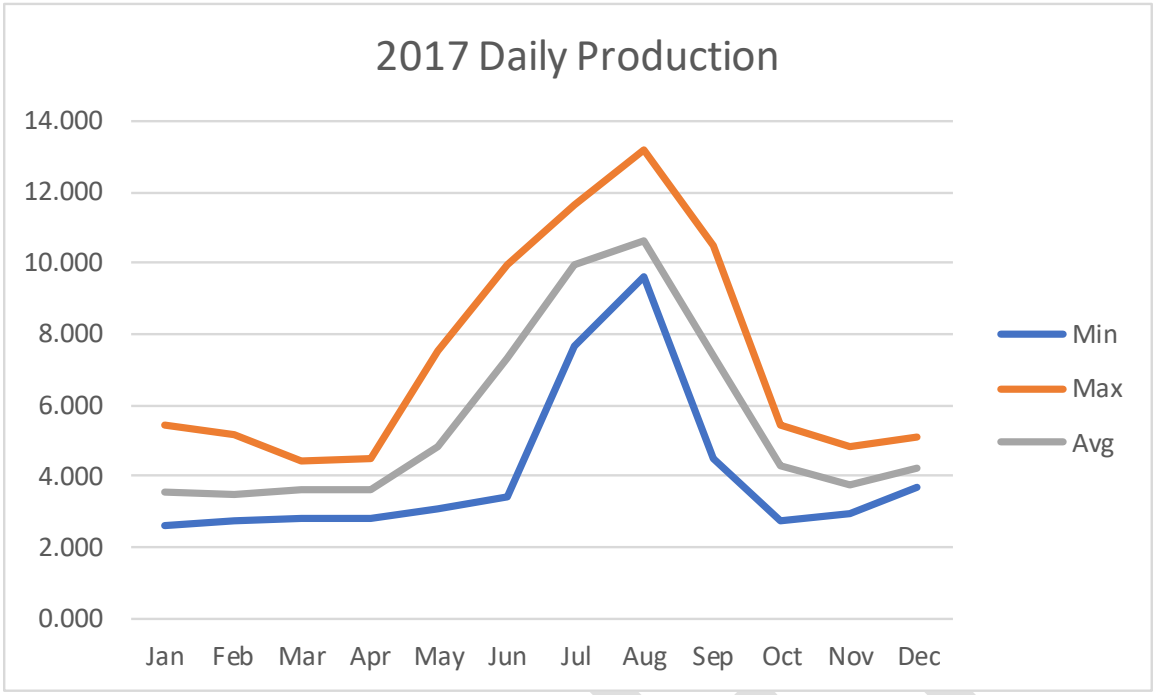


Figure 6-1 2017 WRWTP Daily Production

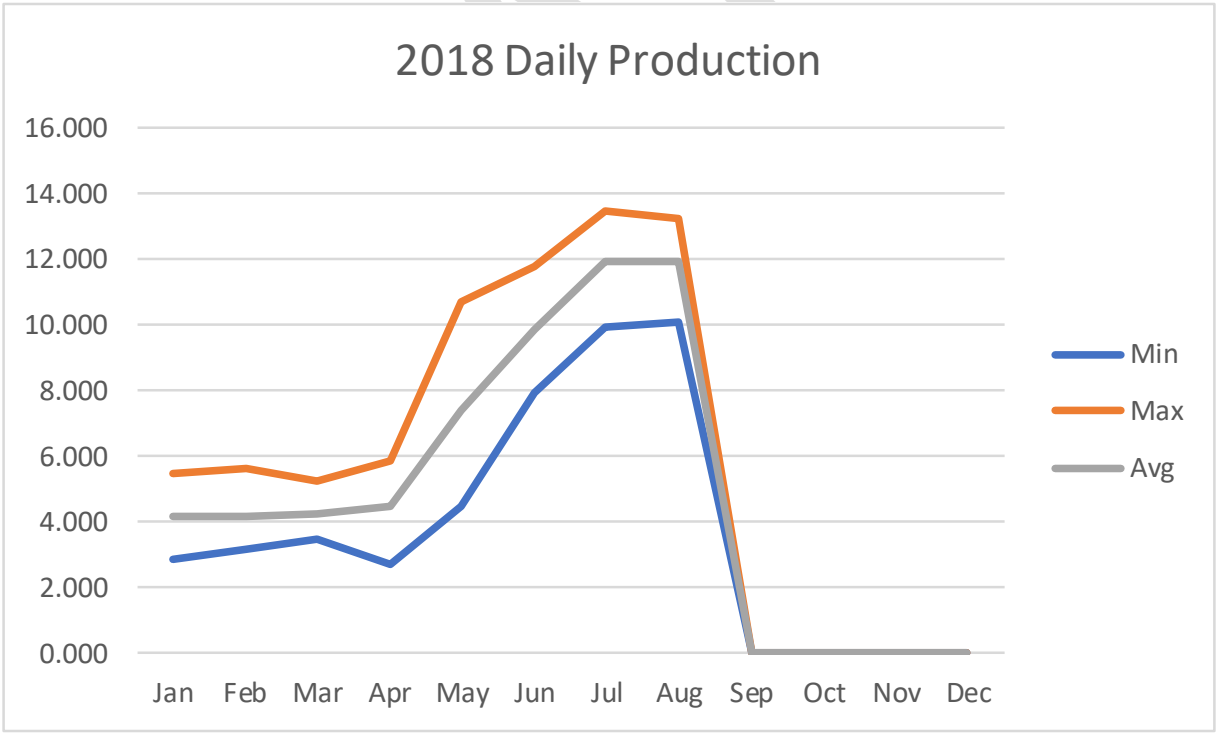


Figure 6-2 2018 WRWTP Partial Daily Production

6.3.1 Lessons Learned

- Kiewit would like to collaborate with COW and Veolia to determine how we can continuously improve from previous lessons learned.

6.3.2 Level of Redundancy

The WRWTP is designed with redundant pumps and motors and chemical feed metering pumps. The plant operator controls these systems by setting the appropriate Lead/Lag and/or Duty/Standby selections. Table 6-1 shows the number of process units per system. The Actiflo and ozone trains are designed at capacity flow rates but if a train is out of service the plant capacity is reduced in half, approximately 7.5 MGD but based on loading rates and disinfection contact time. Additionally, the filters are permitted at 6 gpm/ft^2 (approximately 4 MGD) which requires all filters to be online at capacity flow rates. Some examples of single points of failure at the plant include the raw water intake piping, raw water discharge/influent piping, high service pump discharge piping, chemical injection piping, and ethernet conduits. A failure of one or more of these systems could result in a plant shutdown. The SCADA system does include redundant programmable logic controllers (PLCs).

6.3.3 Plant Shutdown / Startup

The plant shutdown and startup durations were previously reviewed with Veolia staff. A summary of the durations is highlighted below.

- **Plant Shutdown**. Plant staff indicated that it would take 10 minutes or so to shut down the plant flow which also includes increment adjustments when at the higher production rates. After the raw water flow is offline, it will take another 30 minutes or so to verify the plant processes, chemical feed systems, and water flow to process instruments. The ozone generator will purge for approximately 5 minutes, the operator will shut down the ozone destruct system after the purge process or later, and the high service pumps can be taken offline or continue to run for an operator-controlled duration.

- **Plant Startup**. Plant staff indicated that it could take from 1 to 2 hours to restart the system. If the shutdown duration is less than 4 hours, the restart could be quicker than 1 hour. Shutdown durations in the 4 to 8-hour range will take around 1 hour. Shutdown durations longer than 8 hours is usually around the 2-hour range. Pumping finished water into the distribution system does not start until all water quality parameters meet the contract conditions. Startup may also require incremental flow increases after acceptable water quality. The plant operator sets the plant flow rates based on storage levels and system demands.

6.3.4 Backup Power

The WRWTP is equipped with a 1-megawatt backup generator. The generator can operate one 4 MGD raw water pump, one 4 MGD finished water pump, and one ozone generator. When backup power is used at the plant, the Actiflo treatment process is reduced to one treatment train, one ozone contactor, one or two filters and the chemical/ancillary systems. The generator has an open loop transition with an automatic transfer switch (ATS). Backup power is not available to the centrifuge dewatering process. The backup generator is tested under load monthly.

7.0 CONTACT LIST

Table 7-1 List of Contacts

Affiliation	Position	Name	Number	Email
Kiewit	Project Executive	Mark Bertolero	(707) 439-7300	Mark.Bertolero@kiewit.com
	Project Manager	Matthew Gardner	(916) 240-1667	Matthew.Gardner@kiewit.com
	General Superintendent	Brent Simmons	(707) 207-1015	Brent.Simmons@kiewit.com
	Senior Project Engineer	Christopher Walsh	(925) 200-5232	ChristopherT.Walsh@kiewit.com
	Civil Site Engineer	Austin Meartz	(971) 710-2483	Austin.Meartz@kiewit.com
	Health & Safety Manager	William Lewis	(707) 416-6682	William.Lewis2@kiewit.com
	QA/QC Lead	Ahmed Mouada	(707) 372-4288	Ahmed.Mouada@kiewit.com
	Mechanical Superintendent	*	*	*
	Startup/Commissioning Superintendent	*	*	*
	Field Engineer	*	*	*
City of Wilsonville	Senior Civil Engineer	Mike Nacrelli, P.E.	*	*
Christenson Electric, Inc.	Electrical Superintendent	Chad Privratsky, C.E.I.	*	*
	Electrical Foreman	Garland Dotson, C.E.I.	*	*
Veolia	WRWTP Manager	Kim Reid	(503) 826-2633	*

* - denotes positions/details that will be updated as the Construction Phase progresses

ATTACHMENT J

	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24
Submittals	X	X	X	X	X	X	X																	
Permits	X	X																						
Procurement	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Area 1 - Raw Water Pump Station																								
Area 2 - Finished Water Pump Station												X	X											
Area 3 - Ozone Contractors/Ozone Generators							X	X	X	X	X	X												
Area 4 - Clearwell										X	X													
Area 5 - Washwater EQ Basin				X	X	X	X	X	X	X	X	X	X	X										
Area 6 - Solids Handling Tank and Dewatering Building				X	X	X	X	X																
Area 7 - Chemical Systems																			X	X	X	X		
Area 8/9 - Electrical and I&C					X	X	X	X	X	X	X	X	X	X	X	X	X	X						
Area 10 - Sitework	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Project Closeout and Commissioning																						X	X	X
Total Work Areas per Month	**4**	**4**	**3**	**5**	**6**	**7**	**8**	**7**	**6**	**7**	**7**	**6**	**6**	**4**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**1**

	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	2022 MWKs	2023 MWKs	2024 MWKs	Total MWKs	Total % of Duration	C.O.W. %	GC %	GC $
Project Manager	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	30%	20%	20%	20%	20%	20%	20%	20%	20%	20%	10%	17	17	3	38	**36%**	**0%**	**100%**	$ 398,823
General Superintendent	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	30%	20%	20%	20%	20%	20%	20%	20%	20%	20%	10%	17	17	3	38	**36%**	**50%**	**50%**	$ 176,751
Construction Engineer	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	40%	30%	30%	30%	30%	30%	30%	50%	50%	50%	50%	21	23	9	52	**50%**	**25%**	**75%**	$ 339,049
Safety Manager	30%	30%	30%	30%	30%	30%	30%	50%	50%	50%	50%	50%	50%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	11	20	5	36	**35%**	**40%**	**60%**	$ 179,706
Quality Manager	30%	30%	30%	30%	30%	30%	30%	50%	50%	50%	50%	50%	50%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	11	20	5	36	**35%**	**40%**	**60%**	$ 179,706
Discipline Supervisory Lead - Structures	10%	10%	10%	25%	25%	50%	50%	50%	50%	50%	40%	40%	40%	30%	30%	20%	20%	20%	20%	10%	5%	5%	0%	0%	10	16	0	26	**25%**	**80%**	**20%**	$ 45,777
Discipline Supervisory Lead - Mechanical	30%	30%	30%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	15	26	9	49	**47%**	**80%**	**20%**	$ 86,168
Central Engineering	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	17	26	9	52	**50%**	**100%**	**0%**	$ -
Field Engineer	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	0%	50%	50%	50%	50%	50%	50%	50%	50%	17	24	9	50	**48%**	**100%**	**0%**	$ -
Lead Schedule Engineer	100%	100%	50%	50%	50%	50%	25%	25%	25%	25%	25%	25%	25%	25%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	19	9	2	30	**29%**	**0%**	**100%**	$ 173,461
Total Staff	**4.60**	**4.60**	**4.10**	**4.45**	**4.45**	**4.70**	**4.45**	**4.85**	**4.85**	**4.85**	**4.75**	**4.75**	**4.75**	**3.65**	**3.20**	**2.60**	**3.10**	**3.10**	**3.10**	**3.00**	**3.15**	**3.15**	**3.10**	**2.90**	157	198	53	408		**51.5%**	**48.5%**	**$ 1,579,440**

		60% Design	90% Design	100% Design Reduced Scope
1	Raw Water Pump Station	$ 183,903	$ 367,682	$ 213,881
2	Finished Water Pump Station	$ 525,657	$ 409,227	$ 248,881
3	Ozone Contactors / Generators	$ 2,822,983	$ 2,982,409	$ 3,062,113
4	Clearwell	$ 161,476	$ 482,207	$ 489,784
5	Washwater EQ Basin	$ 264,428	$ 898,384	$ 532,897
6	SHT and DW Building	$ 214,116	$ 155,242	$ 161,232
7	Chemical Systems	$ 887,234	$ 1,533,262	$ 1,190,593
8	Electrical	$ 7,741,256	$ 9,281,951	$ 9,079,233
9	I&C	$ 382,152	$ 799,152	$ 928,382
10	Sitework	$ 1,649,986	$ 2,074,926	$ 2,020,933
11	CMGC Contingency	$ 1,073,425	$ 749,617	$ 1,390,705
12	Article 8 - Additional Cost of Work	$ 3,070,333	$ 3,108,858	$ 2,428,085
13	GC Work Fee	$ 2,238,000	$ 2,378,926	$ 2,069,477
14	Fee	$ 1,518,000	$ 1,644,000	$ 1,302,764
		$ 22,732,949	**$ 26,865,843**	**$ 25,118,960**