

MEMORANDUM

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TO: The Honorable Mayor & City Council

FROM: Lacey G. Simpson, Assistant City Manager Initials: 

DATE: March 27, 2023 File #: MGR23-146

RE: **Approving Amendment No. 1 to Contract No. 21-10, Programmable Logic Controller Upgrade - Phase II, UV Disinfection Facility – Jacobs Engineering Group**

At its meeting of July 15, 2021, the City Council approved the award of Contract No. 21-10, Programmable Logic Controller Upgrade – Phase II, UV Disinfection Facility to Jacobs Engineering Group in the amount of \$246,500. The motion detailed below was prepared at the request of Assistant Water Division Manager Seth Brakke, who asked that it be placed before the City Council for consideration at its meeting of April 6, 2023. If adopted, the motion provides for approval of Amendment No. 1 to Contract No. 21-10. As detailed in the attached memorandum from Mr. Brakke, full upgrade to the division’s Programmable Logic Controllers (PLCs) has not been able to be completed as planned due to the continued effects extended from the COVID-19 pandemic, including rising materials costs and availability. Amendment No. 1 will allow for Phase III of this project and will upgrade one of the two remaining PLCs for the division. As highlighted in Mr. Brakke’s memorandum, sufficient funding was allocated to the Water Division’s SCADA PLC Controllers capital improvement project account adopting the 2023 KPU Operating and Capital Budget.

Water Division Manager John Kleinegger will be attending the City Council meeting of April 6, 2023, in order to address any questions and/or concerns that Councilmembers may have.

A motion has been prepared for City Council consideration.

**Recommended Motion:** I move that the City Council approve Amendment No. 1 to Contract No. 21-10, Programmable Logic Controller Upgrade – Phase II, UV Disinfection Facility between the City of Ketchikan d/b/a Ketchikan Public Utilities and Jacobs Engineering Group in an amount not to exceed \$340,000; authorize funding from the Water Division’s 2023 SCADA PLC Controllers capital improvement project account; and direct the KPU General Manager to execute the contract amendment documents on behalf of the City Council.



**Water**  
2930 Tongass Avenue  
Ketchikan, AK 99901

Phone (907) 225-1000  
Fax (907) 247-3232

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**TO:** Delilah A. Walsh, KPU General Manager

**FROM:** Seth A. Brakke, Assistant Water Division Manager/Project Engineer

**DATE:** March 24, 2023

**SUBJECT: Award of Amendment #1 to Contract No. 21-10 – Programmable Logic Controller Upgrade – Adding Phase 3 PLC-300 Upgrade**

The Jacobs Engineering Group are intimately familiar with all facets of our Supervisory Control And Data Acquisition (SCADA) system since they have also designed each of the subsequent disinfection additions and have maintained the intricate operating programming that has allowed Ketchikan to continue meeting the EPA's unfiltered system regulations. Any other firm, no matter how qualified, would first have to spend a great deal of time and expense to learn and understand why various lines of programming are present and also how they interact with the Trojan Technologies' UV control programs which are entirely separate and are strictly proprietary in nature.

Jacobs Engineering has completed earlier Contracts which made the initial upgrades to our SCADA server and program software. However, there still remain a number of outstanding automation and cybersecurity risks existing within the disinfection system that also need to be addressed. Contract 21-03 – Water Cyber Security Evaluation identified areas in urgent need of cybersecurity improvements including the planned multi-year project to replace all three of our present Allen-Bradley Programmable Logic Controllers (PLCs) which have reached the end of their useful service life.

It should be noted that Allen-Bradley has ceased offering any further factory support for the older models, which includes no longer maintaining any inventory of spare parts or the necessary input/ output (I/O) modules. Our present PLC's began operation in October 2010. At this point we have an adequate but dwindling stock of spares including discrete I/O modules. Nonetheless, once those are exhausted, it will be very difficult for the UV Disinfection Facility to continue delivering thoroughly disinfected water without functioning PLCs.

Their replacements will be the new Allen-Bradley ControlLogix PLCs which have long-term manufacturer and industry support. They use a modern control system infrastructure that

offers several improvements for communications, stability, ease of maintenance, and reliability. This is the reason when the Two-Point Chlorination Facility was being designed in 2015, the latest ControlLogix PLC's were chosen instead to operate the two new ClorTec sodium hypochlorite generators.

Phase 2 of this project was approved in 2021, it is currently underway replacing CP-100 in the UV Facility, and will be completed by mid-year. This additional PLC-300 phase has been approved for construction in the division's 2023 CIP program with the third and final PLC in the Ammonia Building (CP-400) scheduled for replacement in 2024.

Recommendation:

It is recommended that the City Council adopt a motion approving Amendment #1 to Professional Services Contract 21-10 with Jacobs Engineering Group adding the Phase 3 Water System Programmable Logic Controller PLC-300 Upgrade; authorizing \$340,000 in funding from the 2023 Water Division's Capital Improvement Account (Account 5400 2020 006); and directing the KPU General Manager to execute the contract documents on behalf of the City Council.

**Exhibit A**

Jacobs Engineering Group

Amended Additional Scope of Work entitled "Phase 3 Water System Programmable Logic Controller Upgrade Proposal", dated February 27, 2023 (9 pages)

**AMENDMENT #1**

**TO**

**AGREEMENT FOR PROFESSIONAL SERVICES**

**CONTRACT 21-10**

**PROGRAMMABLE LOGIC CONTROLLER UPGRADE –  
PHASE II - UV Disinfection Facility CP-100**

**ADDING PHASE 3 – PLC-CP-300 UPGRADE**

THIS AMENDMENT made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between **CITY OF KETCHIKAN d/b/a KETCHIKAN PUBLIC UTILITIES**, a municipal corporation whose address is: 334 Front Street, Ketchikan, Alaska 99901, hereinafter called "**Owner**" and **Jacobs Engineering Group, 949E. 36<sup>th</sup> Avenue, Suite 500, Anchorage, Alaska 99508**, licensed and qualified to do business within the State of Alaska, hereinafter called "**Contractor**."

**RECITALS**

- (a) The **Owner** desires the performance, provision, and accomplishment of the work, services and materials described and set forth in Section 1.
- (b) **Contractor** represents that it is ready, able and qualified to perform, and will perform, in all respects, all of the work, services, and materials, and to otherwise perform all of the terms, covenants, conditions and provisions of the agreement in the manner, at the times, and for the consideration hereafter provided.

**NOW, THEREFORE**, for and in consideration of the terms, covenants, conditions, and provisions contained herein, and/or attached and incorporated herein and made a part hereof, the parties hereto agree as follows:

**Section 1: Additional Scope of work.** The **Contractor** shall perform, supply, and provide all of the additional work, services and materials [hereinafter collectively referred to as "work"] as follows:

As set forth and described on Exhibit A attached hereto and incorporated herein by this reference.

**Section 2: Additional Time for Commencement and for Completion of Work.**

(a) **Commencement.** **Contractor** shall commence the additional work called for in this Amendment upon the giving of a Notice to Proceed by the **Owner**.

(b) **Completion.** Upon giving of Notice to Proceed, the additional work called for in this Amendment shall be performed and completed as follows: As set forth and described on Exhibit A attached hereto and incorporated herein by this reference.

**Section 3: Additional Compensation and Payment.** For and in consideration of the timely and proper performance of additional work authorized as provided herein, the **Owner** shall pay the **Contractor** as follows: As set forth and described on Exhibit A attached hereto and incorporated herein by this reference. The Owner shall make monthly progress payments based upon the percentage of work actually performed.

**WHEREFORE** the parties have entered into this Amendment the date and year first above written at the City of Ketchikan, Alaska.

**Owner:**

**CITY OF KETCHIKAN, ALASKA**

By: \_\_\_\_\_  
Delilah A. Walsh  
KPU General Manager

ATTEST:

\_\_\_\_\_  
Kim Stanker  
City Clerk

Reviewed and Approved as  
to Content

By: \_\_\_\_\_  
\_\_\_\_\_

Certified Funds Available

By: \_\_\_\_\_  
\_\_\_\_\_

**Contractor: Jacobs Engineering Group**

\_\_\_\_\_  
(type in name)

By: \_\_\_\_\_  
(signature of authorized officer)

\_\_\_\_\_  
(title of person signing)

(Corporate Seal)

**CITY ACKNOWLEDGMENT**

STATE OF ALASKA                    )  
  ) **ss.**  
FIRST JUDICIAL DISTRICT        )

**THIS IS TO CERTIFY** that on this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, before me, the undersigned, a notary public in and for the State of Alaska, duly commissioned and sworn, personally appeared **DELILAH A. WALSH** and **KIM STANKER**, to me known to be the **KPU GENERAL MANAGER** and the **CITY CLERK** of the **CITY OF KETCHIKAN**, a municipal corporation, the corporation which executed the above and foregoing instrument; who on oath stated that they were duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said corporation; who acknowledged to me that they signed and sealed the same freely and voluntarily on behalf of said corporation for the uses and purposes therein mentioned.

**WITNESS** my hand and official seal the day and year in the certificate first above written.

\_\_\_\_\_  
**NOTARY PUBLIC FOR ALASKA**  
My Commission Expires: \_\_\_\_\_

**CORPORATE CERTIFICATE**

I, \_\_\_\_\_, certify that I am the Secretary of the Corporation named as Contractor in the foregoing instrument; that \_\_\_\_\_, who signed said instrument on behalf of the Contractor, was then \_\_\_\_\_ of said Corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

\_\_\_\_\_ (Corporate Seal)

**CORPORATE ACKNOWLEDGMENT**

STATE OF ALASKA                    )  
  ) ss.  
FIRST JUDICIAL DISTRICT        )

**THIS IS TO CERTIFY** that on this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, before me, the undersigned, a Notary Public in and for the State of \_\_\_\_\_, duly commissioned and sworn, personally appeared \_\_\_\_\_ known to be the Secretary of \_\_\_\_\_, the corporation which executed the above and foregoing instrument, and who on oath stated he/she was duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said corporation, and that the seal affixed thereto is the corporate seal thereof, and acknowledged that he/she signed the same freely and voluntarily on behalf of said corporation for the purposes therein mentioned.

**WITNESS** my hand and official seal the day and year in this certificate above written.

\_\_\_\_\_  
**NOTARY PUBLIC FOR** \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



JACOBS  
949 E. 36th Avenue Suite 500  
Anchorage, AK 99508  
(907) 227-3071  
www.jacobs.com

February 27, 2023

Mr. John Kleinegger  
Water Division Manager  
Seth Brakke, P.E.  
Assistant Water Division Manager  
Ketchikan Public Utilities  
2930 Tongass Ave.  
Ketchikan, AK 99901

Subject: Phase 3 Water System Programmable Logic Controller Upgrade Proposal

Dear Mr. Kleinegger and Brakke:

Thank you for contacting Jacobs Engineering Group (Jacobs) and requesting our proposal to upgraded Programmable Logic Controller (PLC) located at the CT and Ammonia Building known as PLC-300.

In 2019 we recommended replacing the discontinued Allen-Bradley Model SLC-500 PLCs in the KPU water treatment control system with the newer and supported Allen-Bradley ControlLogix platform, which is being implemented in phases. Phase 1 involved a detailed assessment to determine the best upgrade path and detailed cost estimates, while Phase 2, the first stage of PLC replacement, is scheduled to be completed late in spring 2023 at the UV Facility in control panel CP-100.

This proposal is for Phase 3, which involves replacing the end-of-life PLC in Control Panel CP-300 at the CT and Ammonia Building. The upgrade will improve the communication, stability, and reliability of the control system infrastructure. It will also provide long-term support and ease of maintenance for the control system. To achieve this, we propose the following tasks:

## **PROPOSED SCOPE OF WORK**

### **Task No. 1 – Project Management and Procurement**

Our project manager, Floyd Damron, P.E., will be the day-to-day contact point for KPU. He will oversee and direct design staff activities, implement compliance procedures for our QA/QC requirements, develop field safety requirements that are to be followed for any Jacobs field activities, work with our project accountant for monthly invoices to KPU, prepare brief monthly progress reports to accompany each invoice, and oversee project closeout at project completion.

Jacobs will procure the industrial PLC hardware and software as itemized in Attachment 1. Due to global shortages, lead time for certain parts are upwards of 9-12 months. To account for possible lead time issues, the proposed schedule will allow for those lead times. Additionally, the procurement process will begin shortly after notice to proceed is received.

**Task 1 Deliverables:**

- Invoices.
- Coordination calls.
- Procurement and delivery of industrial hardware in Attachment 1.

**Task No. 2 – Controls System Final Design**

In this task, we will leverage the insights gained from Phase 1 and the lessons learned in Phase 2 to complete the final design for Phase 3 of the PLC replacement project. To ensure compatibility with the new hardware and I/O wiring, modifications will be made to the CP-300 panel. Additionally, the design documentation will be updated to reflect the new PLC system installation.

**Task No. 2.1 – Controls System Narrative Development**

Jacobs will review the existing PLC and HMI programs to create control system narratives that describe the treatment processes functions at the CT & Ammonia Building. A coordinated review process step with KPU will be established to verify the narratives are up to date with existing field conditions. These narratives will be the basis for the programming of the new PLCs.

**Task No. 2.2 – Electrical Requirement Design**

Jacobs will design and coordinate the control panel integration to replace the existing PLC. Modifications to CP-300 will include changes to: PLC processor, I/O Modules, 24VDC Power Supplies, Circuit Breakers, Communications Equipment, I/O Wiring, and various other changes where applicable to facilitate the PLC replacement.

**Task No. 2.3 – Design Documentation**

Jacobs will update the existing CP-300 panel drawings, loop diagram, P&ID diagrams and network diagrams to reflect the design changes for this project. Jacobs will also create demolition drawings for the electrical contractor or in house electrician. The electrical contractor or in-house electrician is to be provided by KPU as the physical electrician type work is not part of this professional services contract.

**Task 2 Deliverables:**

- Control Narratives.
- Updated CP-300 panel drawings: Demolition, Elevation, Loop Diagram, P&ID.
- Updated Network Diagram.

**Task No. 3 – PLC and HMI Programming**

After the design documentation and control narratives are complete, PLC and HMI software programming will occur in our instrumentation and control laboratory, located in Bellevue Washington.

### **Task No. 3.1 – Programmable Logic Controllers (PLC)**

Jacobs will use the control narratives and legacy programming to develop the control logic in the new Allen-Bradley ControlLogix format using Rockwell Studio 5000 programming software. The new programming code uses standardized logic blocks and techniques to achieve high quality, easy to maintain, well documented code.

Jacobs will modify the programs in the existing Allen-Bradley SLC-500 PLCs found in CP-400 to receive the updated register addresses for cross facility controls communication with the new CP-300 PLC.

### **Task No. 3.2 – Human Machine Interface (HMI)**

Jacobs will update the SCADA server FactoryTalk View SE HMI graphics to illustrate the new data points programmed in the new PLC replacement. New graphical objects will be developed for alignment to the new standardized programming techniques being implemented. KPU will review all graphical changes, additions, and display layouts as part of the process.

Review process milestones:

1. 60% - Jacobs proposed overview and detail screen layouts.
  - KPU review and comments.
2. 90% - Jacobs to address comments and include fixes for updated proposal.
  - KPU approval.
3. 100% - Jacobs issues finalized graphics for programming.

The legacy graphical elements associated with Phase 4 replacements will remain the same until the time of their upgrade.

### **Task No. 3.3 – FactoryTalk Alarm & Events Structure, Historian Configuration**

Jacobs will update the FactoryTalk Alarm and Events Structure to include the newly programmed points. A review process will occur with KPU for to make sure all alarms included and prioritized to the levels desired.

Jacobs will update the long-term Historian and short-term data log databases to include newly programmed PLC points. A review process will occur with KPU to establish that all the historical points are included, and trends provided capture the needed data.

Review process milestones:

1. 60% - Jacobs proposed Alarm, Events and Historical Points.
  - KPU review and comments.
2. 90% - Jacobs to address comments and include fixes for update proposal.
  - KPU approval.

3. 100% - Jacobs issues finalized Alarms, Events and Historical Points for programming.

**Task 3 Deliverables:**

- PLC code for the new PLC-300 processor.
- HMI Graphics for review at the various milestones.
- Alarms & Events, Historical points for review at the various milestones.

**Task No. 4 – Factory Acceptance Testing and Implementation Planning**

A programming and testing environment will be set-up at the Jacobs instrumentation and controls laboratory in Bellevue, WA to simulate the existing drinking water treatment system. A coordinated implementation plan will be established in preparation of start-up activities.

**Task No 4.1 - Factory Acceptance Testing (FAT)**

Upon completing the PLC and HMI programming, Factory Acceptance testing will be conducted to thoroughly test all programs before field installation. The new programming and multi-PLC integration will be carefully tested and debugged.

**Task No 4.2 – Implementation Planning and Coordination**

Jacobs will work with KPU to create an implementation plan that includes cutover time frames, manual operation protocols, required staff roles and contingency plans. The memo will be published prior to system cutover. The implementation plan will be reviewed by KPU before system cutover.

**Task No. 4 Deliverables:**

- Signed Factory Acceptance Testing document.
- Implementation Plan Memo (Draft and Final).

**Task No. 5 – Commissioning, Startup and Cutover**

Following the implementation plan and scheduling, a coordinated effort will replace the PLC at CP-300 with the new model. The system will be brought back online, and site acceptance testing will begin immediately to restore SCADA controls. Once all testing is completed, operator training will occur, and the new system will be fully ready for operation.

**Task No 5.1 – PLC Startup and Cutover**

KPU must retain and provide an electrical contractor or in-house electrician to remove the existing PLC equipment, install the new PLC hardware and land the I/O wiring onto the modules based on the Jacobs design documentation.

The system cutover will be executed per the requirements of the Implementation Plan developed under Task 4. Once the field equipment is installed and wiring is complete, the PLC will be powered on to establish network communications, and the PLC will be put online to finalize the cutover. The implementation plan will define the schedule, roles and responsibilities, manual operations of equipment by KPU operators, general plan of action, and goals for each day of the cutover effort.

### **Task No 5.2 – Site Acceptance Testing (SAT)**

Site Acceptance Testing will occur as soon as the PLC is cutover and communications between the offsite location PLCs and SCADA servers are established. I/O testing and loop testing will commence in an organized sequence to bring the equipment online. The testing documentation will serve as a guide to test each aspect of the control system to verify proper functionality including graphical animation, historical datalogging, trending, alarms, loop automation, equipment manual and automatic controls, network communications, PLC to PLC messaging for coordinated controls between facilities, etc.

### **Task No 5.3 – Operator Training**

Jacobs will create operator training documentation for the modified control system. A PowerPoint presentation and printed operator’s manual will describe the functions and user interface to the modified control system. The user manual will also include the control narratives.

Once the SAT is finished, Jacobs will hold one scheduled training session with operations and maintenance staff to review all the functions of the new ControlLogix and HMI programming.

#### **Task No. 5 Deliverables:**

- Signed SAT Testing Document.
- Operator training PowerPoint and printed operators manual (Draft and Final).

### **Task No. 6 – Project Closeout**

Upon construction completion, we will perform the Project closeout activities including conducting the final inspection of the work, prepare the project Record Drawings from the Contractor red-lined as-built drawings for record, and perform warranty phase services, as needed.

#### **Task No. 6 Deliverables:**

- As-Built Drawings.
- Project Turn-Over Package.

### **PROPOSED PROJECT TEAM**

Project Manager	Floyd Damron, P.E.
Project Instrumentation and Controls Quality Control	Steve Bakken
Project Electrical Engineer	Don Wagner, P.E.
Project Instrumentation and Controls Engineer	Josh Thompson, P.E.
Project Lead Process Engineer	Enoch Nicholson, P.E.
Project Systems Integrator	Jared Tatro

### **PROPOSED PROJECT SCHEDULE**

Notice to Proceed	May 1, 2023
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Task 1 – Project Management and Procurement	May 1, 2023 – Completion
Task 2 - Controls System Final Design	May 1, 2023 – July 31, 2023
Task 3 - PLC and HMI Programming	August 1, 2023 – August 31, 2024  <i>*This includes the additional time needed for PLC parts lead times. Schedule may change depending on parts availability.</i>
Task 4 - Factory Acceptance Testing and Implementation Planning	September 1, 2024 – September 31, 2024
Task 5 – Commissioning, Startup and Cutover	October 1, 2024 – November 15, 2024
Task 6 – Project Closeout	November 16, 2024 – December 31, 2024

**PROPOSED BUDGET**

The following table provides Jacobs proposed \$340,000 Lump Sum Budget for the 9 major scope of work tasks, assuming a NTP no later than May 1, 2023, and Project Completion December 31, 2024.

<b>TASK NO.</b>	<b>SCOPE</b>	<b>LUMP SUM AMOUNT</b>
1	Project Management	\$40,000
2	Controls System Final Design	\$40,000
3	PLC and HMI Programming	\$76,000
4	Factory Acceptance Testing and Implementation Planning	\$31,000
5	Commissioning, Startup and Cutover	\$37,000
6	Project Closeout	\$21,000
7	Travel Expenses	\$15,000
8	Contingency	\$20,000
9	CP-300 Hardware and Software <i>(see Attachment 1)</i>	\$60,000
<b>TOTAL*</b>	<b>LUMP SUM AMOUNT</b>	<b>\$340,000</b>

**\*Cost assumes KPU will retain and provide an electrical contractor or in house electrician independently for CP-300 modifications.**

**METHOD OF CONTRACTING**

Based on our recent project discussions we assume the Phase 3 Water System PLC Upgrade project work will be accomplished as a contract amendment to our existing PLC upgrade contract: Contract 21-10 - PROGRAMMABLE LOGIC CONTROLLER UPGRADE – PHASE II - UV Disinfection Facility.

We very much look forward to working with you and your staff on this most interesting project that will help support a safe and reliable water supply system for the residents of Ketchikan. We are available to immediately begin work.

Please let me know if you have any questions about this letter proposal.

Sincerely,

Jacobs Engineering Group, Inc.

A handwritten signature in blue ink, appearing to read "Floyd J. Damron".

Floyd J. Damron, P.E.  
VP and Senior Project Manager

A handwritten signature in blue ink, appearing to read "Michael Reibold".

Michael Reibold, P.E.  
Manager of Projects

Attachment 1 – Phase 3 Bill of Materials to be Provided to KPU by Jacobs Under the Phase 3 Contract

<b>Attachment 1 – Phase 3 Bill of Materials</b>			
<b>Slot Number</b>	<b>Catalog #</b>	<b>MFG</b>	<b>Description</b>
<b>CP-300 Main Panel</b>			
N/A	1756-A7	Allen-Bradley	1756 Chassis 7 slots
N/A	1756-PA75	Allen-Bradley	85-265V AC Power Supply (5V @ 13 Amp)
000	1756-L82E	Allen-Bradley	Logix5580E Controller With 5 Mbytes Memory
001	1756-IF8	Allen-Bradley	Analog Input - Current/Voltage 8 Pts (36 Pin)
	1756-TBCH	Allen-Bradley	36 Pin Screw Clamp Block With Standard Housing
002	1756-IF8	Allen-Bradley	Analog Input - Current/Voltage 8 Pts (36 Pin)
	1756-TBCH	Allen-Bradley	36 Pin Screw Clamp Block With Standard Housing
003	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
004	1756-OF8	Allen-Bradley	Analog Output - Current/Voltage 8 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
005	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
006	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
<b>CP-300 Remote I/O Panel</b>			
N/A	1756-A10	Allen-Bradley	1756 Chassis 10 slots
N/A	1756-PA75	Allen-Bradley	85-265V AC Power Supply (5V @ 13 Amp)
000	1756-EN2T	Allen-Bradley	EtherNet 10-100M Bridge Module
001	1756-IF8	Allen-Bradley	Analog Input - Current/Voltage 8 Pts (36 Pin)
	1756-TBCH	Allen-Bradley	36 Pin Screw Clamp Block With Standard Housing
002	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
003	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
004	1756-OA16	Allen-Bradley	74-265 VAC Output 16 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
005	1756-IA16	Allen-Bradley	79-132 VAC Input 16 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
006	1756-IA16	Allen-Bradley	79-132 VAC Input 16 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
007	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
008	1756-OF8	Allen-Bradley	Analog Output - Current/Voltage 8 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
009	1756-N2	Allen-Bradley	Empty Slot Filler for 1756 Chassis
<b>Spare PLC Parts</b>			
N/A	1756-PA75	Allen-Bradley	85-265V AC Power Supply (5V @ 13 Amp)
001	1756-IA16	Allen-Bradley	79-132 VAC Input 16 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
002	1756-IF8	Allen-Bradley	Analog Input - Current/Voltage 8 Pts (36 Pin)

	1756-TBCH	Allen-Bradley	36 Pin Screw Clamp Block With Standard Housing
003	1756-OF8	Allen-Bradley	Analog Output - Current/Voltage 8 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
004	1756-OA16	Allen-Bradley	74-265 VAC Output 16 Pts (20 Pin)
	1756-TBNH	Allen-Bradley	20 Position Nema Screw Clamp Block
<b>Qty</b>	<b>Catalog #</b>	<b>MFG</b>	<b>Description</b>
<b>Panel Hardware</b>			
004	SDN5-24-100P	SolaHD	Power Supply; 24V; 5A Enclosed; SDN Series
002	SDN2.5/20RED	SolaHD	Redundancy Module for SDN Series; 24VDC
002	PC1316BP	Maple Systems	15.6" Intel Gen 7 Core Panel PC with Windows, 1080p Resolution, 8gb ram, 256gb SSD storage drive.

<b>Division:</b> Water			<b>Project Priority:</b> 12			<b>Project Number:</b> 5400 2020 006				
<b>Project Title:</b> SCADA PLC Controllers			<b>Start Date:</b> 01/21 <b>End Date:</b> 12/24			<b>Estimated Project Cost:</b>				
<b>Description:</b> Collectively, KPU has three Allen-Bradley Programmable Logic Controllers (PLCs) installed at the UV Facility, the Chlorination Plant, and the Ammonia Addition Facility. They are each providing continuous supervisory control over specific critical components within KPU's complex, computer-controlled, disinfection process. As identified in Contract 21-03 - Cyber Security Evaluation, this version of Allen Bradley PLCs, which were introduced in 2005, have ceased receiving any further factory support. This includes no longer maintaining any inventory of spare parts or the necessary input/output (I/O) modules. All of these critical PLC's must quickly migrate to the modern Allen-Bradley ControlLogix PLC platform before KPU's supply of replacement modules and spare parts is exhausted.						Design Land/Right-of-Way Construction Management Construction 941,500 Equipment Other Project Total 941,500				
Due to the world-wide effect of the coronavirus pandemic on material deliveries, the 2022 upgrade to the Water Treatment UV Facility's (CP-100) PLC has also been delayed and may not be completed before the end of 2022. In addition, there have also been significant material cost increases during 2022 which are now reflected in the increased estimated costs to upgrade the two remaining PLCs that are located in the Old Chlorination Building (CP-300) in 2023, and upgrade the third and final PLC in the Ammonia Building (CP-400) in 2024.										
Source of Funds	Fund No.	Prior Years	Adopted 2023			Projected Requirements				Total Project
			Reappro- riated	New Funding	Total	2024	2025	2026	2027	
Revenue Generating Fund		256,500		340,000	340,000	345,000				941,500
<b>Total</b>		256,500		340,000	340,000	345,000				941,500