



At the Heart of Community

PUBLIC WORKS DEPARTMENT

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AGENDA ITEM

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MEMORANDUM

Date: July 15, 2020
To: Ray Keller, Village Manager *PK*
From: Steve Schmitt, Utilities Superintendent
Copy: Michael J. Brown, Public Works Director
Subject: **SCADA System Improvements**

Issue: The SCADA (Supervisory Control And Data Acquisition) system is critical for controlling and monitoring the Village's water and wastewater facilities. With the exception of a shared server (replaced in 2013) the SCADA system components are 16 years old (installed in 2004), are past expected useful life and need to be replaced.

Village Strategic Plan: This agenda item is consistent with the following Goals and Objectives of the Strategic Plan.

- Goal #3 – Infrastructure: Ensure a sustainable, healthy and economical water source for current and future Lake Zurich residents.
- Goal #4 – Service Sustainability: Establish a service sustainability plan.

Background: In 2004, the SCADA system was installed to replace an outdated telemetry control system. The SCADA system was custom designed and built specifically to control our wells, water towers and the Quentin and Northwest sanitary pump stations with technological standards that were current at that time.

In 2010, the SCADA system software was expanded to include control and monitoring of the Ion Exchange water treatment process. At that time, due to the high cost of using a non-local integrator (the original SCADA vendor awarded contract in 2004) for routine software maintenance and system repairs, B&W Control Systems of Crystal Lake, IL, was awarded the expansion project and became the Village's designated SCADA integrator.

In 2016/2017, as part of the Energy Performance Contracting project, Siemens Industry, Inc. evaluated the existing SCADA system and recommended a replacement/expansion project. Staff considered the proposed SCADA project cost to be too high and was confident that a more cost effective solution could be realized by evaluating and planning outdated component replacement and adding control/data improvements to our existing system.

In 2019, the Village contracted with our designated integrator, Concentric Integration (formerly B&W Control Systems) to conduct a comprehensive assessment of the existing SCADA system and related components and provide an evaluation report with recommendations and optional expansion (phases) to future improved efficiencies for Public Works management.

Analysis: The 2016/2017 proposed SCADA replacement project by Siemens Industry, Inc estimated project cost at \$684,209.04. The 2020 project proposal (a phase 1 scope revision from the 2019 assessment) fee for SCADA system improvements by Concentric Integration is \$275,400. Concentric Integration has provided the Village engineering, design, maintenance and repair of the existing SCADA system due to their qualifications specializing in automation infrastructure and staff has been pleased with their service, value, response and reliability. The FY 2020 budget includes \$300,000 for this project.

Recommendation: Accept the proposal from Concentric Integration authorizing Phase 1 SCADA improvements in the amount not to exceed \$275,400.

W/Attachments:

- Phase 1 Project Proposal from Concentric Integration dated July 6, 2020. (7 pages)



Project Proposal

July 6, 2020

Mr. Steve Schmitt
 Utilities Superintendent
 Village of Lake Zurich
 505 Telser Road
 Lake Zurich, IL 60047

Subject: Phase 1 SCADA Improvements

Concentric Project Number: 200970.50

Dear Mr. Schmitt:

Concentric Integration recently completed a Supervisory Control and Data Acquisition SCADA System Assessment that consisted of evaluating the Village's existing SCADA system and making recommendations for improvement. Based on the assessment report and discussions with the Village, this proposal will provide the first phase of the SCADA system improvements. This project will primarily include replacing the obsolete PLC equipment, providing redundancy for the master polling PLC, as well as minor programming improvements to provide additional information in SCADA.

The project also includes two additional options, one option for integrating the chemical feed scales with the SCADA system, and the second option for adding SCADA reporting.

Base Scope of Services

Equipment

Concentric will provide the following equipment:

1. PLC equipment as designated in the table below.

Description	WELL 7 Filter	WELL 7 Well	WELL 8 Filter	WELL 8 Well	WELL 9 Filter	WELL 9 Well	WELL 10 Filter	WELL 10 Well	WELL 12 Filter	WELL 12 Well	Wynstone	Master PLC IO Rack	Master PLC Processor Racks	Quentin	Northwest	TOTAL
CompactLogix L30 PLC														1	1	2



Description	WELL 7 Filter	WELL 7 Well	WELL 8 Filter	WELL 8 Well	WELL 9 Filter	WELL 9 Well	WELL 10 Filter	WELL 10 Well	WELL 12 Filter	WELL 12 Well	Wynstone	Master PLC IO Rack	Master PLC Processor Racks	Quentin	Northwest	TOTAL
CompactLogix L36 PLC		1		1		1		1		1						5
DeviceNet Scanner			1				1									2
CompactLogix Power Supply	2	1	2	1	1	1	1	1	1	1				1	1	14
8-Ch AI Current/Voltage	4	1	3	1	3	1	1	1	3	1				1	1	21
4-Ch AO Current Isolated	2		1		1				1					1	1	7
8-pt DO, VAC/VDC Indiv. Isolated Relay		1	5	1		1	1	1		1				1	1	13
16 point relay output module	3				3				3							9
16 Point 120 VAC Input Module	1		2													3
16 Point 24 VDC Sinking/Sourcing Input Module		2	1	2	2	2	1	2	2	2				2	2	20
Ethernet/IP Adaptor	1		1		1		1		1							5
ControlLogix 4-slot Chassis													2			2
ControlLogix 7-slot Chassis												1				1
ControlLogix Power Supply												1	2			3
ControlLogix L72 PLC													2			2
ControlLogix Ethernet Module												1	2			3
ControlLogix Redundancy Module													2			2
ControlLogixFiber Cable													1			1
ControlLogix 16-pt DI, DC, (8-pt/group)												1				1
ControlLogix 8-pt DI, Relay, Isolated												1				1
CompactLogix L16 PLC											1					1
L16 Series 4-ch Analog Input											1					1
PanelView Plus 7, 10"	1		1													



2. Polling master PLC panel with redundant PLC equipment (as designated in table above) installed in a steel NEMA 12 enclosure. Additional panel components include main circuit breaker, uninterruptible power supply, Ethernet switch, DC power supply, and other components as required for a complete installation.

Labor

Project Management

1. Plan, schedule, and coordinate the activities that must be performed to complete the Project.
2. Concentric will coordinate an in-person project kick-off meeting to discuss project scope and schedule prior to starting work.
3. The Project Manager will provide every other week project status updates via email and discuss status with the Customer's Project Manager.

Design

1. Provide modified control panel drawings for control panels being modified as part of this project. At a minimum, the PLC network wiring and input/output (I/O) wiring schematics will be updated.

Programming

1. For each control panel where a PLC is being replaced, the existing PLC program will be migrated from the old PLC to the new PLC using a combination of new tags and Add-On Instructions (AOIs). The PLC migration is intended to maintain existing PLC functions, no new program functions will be added as part of the migration.
2. For the Well 7 and 8 filter PLC panels, the existing Standard PanelView programs will be migrated to the new PanelView Plus.
3. For the Well 10 filter PLC panel, the existing Standard PanelView program will be migrated to the existing PanelView Plus that is installed in the well PLC panel.
4. For the existing PanelView Plus applications, the existing PanelView tag database will be updated to allow communications to the new PLCs.
5. Modify existing SCADA tag database tags to allow communication to the new master polling PLC.
6. Provide PLC and SCADA programming to calculate and display daily flow total information at SCADA for the Raw Flow, Finished Flow, Bypass Flow and Brine Flow (as available based on meter tied into the PLC) at each well site.



Installation and Testing

1. At each remote site, remove the existing PLC and associated I/O modules. Install new CompactLogix PLC controller and associated I/O modules. Re-terminate control wiring.
2. At Wells 7 and 8, remove the existing Standard PanelView mounted on the filter control panel and replace with the new PanelView Plus 7. Provide adapter plate as required.
3. At Well 10, remove the existing Standard PanelView mounted on the filter control panel and cover opening with painted steel plate.
4. At Public Works, perform the following:
 - a. Replace the existing PLC with input/output rack and re-terminate control wiring.
 - b. Mount new redundant PLC panel in network room, and connect to 120VAC power source and SCADA network.
5. Provide testing after each new PLC is installed to confirm operation.

Final Documentation

1. Provide electronic copies of the updated PLC and OIT programs, control panel drawing changes, and updated network diagram Sub Bullet.

Option 1 Scope of Services - Chemical Scale Integration

Concentric will provide the following services for Option 1:

1. Provide programming to integrate the chlorine and phosphate scales at each well site (Wells 7, 8, 9, 10 and 12) into the SCADA system. Programming will consist adding logic in the PLCs to calculate the daily usage for each chemical, as well as displaying the scale weight and daily total at SCADA.
2. Provide programming at each local PanelView to allow operations staff to indicate when refilling the tanks. This will allow for the calculated daily total to take into account when the tanks are being filled. Operations staff will be required to press the fill button each time before filling a tank.

Option 2 Scope of Services - Reporting

Concentric will provide the following for Option 2:



1. Provide one year of Waterly reporting software service. The Waterly reporting software implementation, training, and support will be solely performed by Waterly. Waterly is a "software as a service" product that will require renewal after the first year to continue usage. Future renewals will be coordinated directly with Waterly.

Concentric Assumptions / Customer Responsibilities

1. Customer will assign an initial project manager at the project kickoff meeting.
2. Customer will provide site access for installation, programming, and startup during Customer's normal business hours. Work outside of Customer's normal business hours can be agreed upon as needed, provided Concentric can secure the site(s) upon departure.
3. Customer understands that all existing equipment to remain is assumed to be in good, working order. In the event that any other equipment does not perform as-expected, Concentric will work with the Customer to repair, as-needed, under a separate contract.
4. Customer will dispose of/recycle any removed equipment.
5. Customer will provide any chemical scales, conduit, wiring, or any other physical installation work required for the chemical feed scale integration work associated with the Option 1 Scope of Services. Concentric services only consist of programming and testing.

Project Schedule

Our estimated project schedule will be agreed upon at the project kickoff meeting.

Warranty

The warranty listed in the Standard Terms and Conditions (Paragraph 12.2):

- DOES apply
- DOES NOT apply

Fee

Our fee for the above Base Scope of Services is a lump sum of \$264,900

Our additional fee for the above Option 1 Scope of Services is a lump sum of \$6,300



Our additional fee for the above Option 2 Scope of Services is a lump sum of \$4,200.

This proposal is valid for 90 days from the date issued.

Standard Terms and Conditions References

Effective Date: The Effective Date of this Proposal and the associated Standard Terms and Conditions shall be the date this Proposal is accepted as shown by Customer's dated signature below.

Third Party Materials (See Standard Terms and Conditions Paragraphs 3.2 & 8.3):

- DOES apply
- DOES NOT apply

Notices: Notices required to be provided to Customer in accordance with Paragraph 16.3 of the Standard Terms and Conditions shall be delivered to the individual and address given above, unless Customer provides updated notification information to Concentric in writing

Standard Terms and Conditions

Concentric Integration, LLC's Standard Terms and Conditions, Version 10 (V10), located at <http://goconcentric.com/standard-terms/> are hereby incorporated into this Project Proposal as though fully attached hereto. By signing below, each of the undersigned represents and warrants that Concentric Integration, LLC's Standard Terms & Conditions are legal, valid and binding obligations upon the parties for which they are the authorized representative.



Acceptance

If this proposal is acceptable, please sign one copy and return to us. Feel free to contact me if you have any questions.

Sincerely,

CONCENTRIC INTEGRATION, LLC

Michael D. Klein, PE
President
MDK

CUSTOMER:
VILLAGE OF LAKE ZURICH

ACCEPTED BY: _____

TITLE: _____

DATE: _____

Signature above is for acceptance
of the Base Scope of Services.

Check Box and initial to indicate
any accepted Options, or none.

Option 1: _____

Option 2: _____

No Options: _____

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