



## Project Proposal

April 9, 2020

Mr. Ken Dado  
Utility Operations Manager  
Village of Orland Park  
14700 Ravinia Ave.  
Orland Park, Illinois 60462

Subject: 2020 PLC Modernization Project

Concentric Project Number: 190565.50

Dear Mr. Dado:

The Village of Orland Park currently manages a water distribution system and sanitary/storm collection system consisting of 25 sites. These sites include seven water towers, three booster stations, one main pumping station, 13 lift stations, and one storm station. Each of these sites are integrated into the Village's SCADA system to provide monitoring and some control. The hardware used at each site is a mixture of GE 90-30 series and VersaMax Series PLCs, various Consolidated Electric controllers, various Horner Electric OCS devices, as well as some other manufacturers. Each of these sites communicate utilizing GE MDS 9810 radios using the unlicensed 900MHz frequency.

The GE 90-30 PLCs reached end of life status in October of 2017. These types of PLCs are currently controlling the main pumping station and the largest booster station on 153rd Street. Since this series of PLC has reached end of life status, the manufacturer no longer supports the hardware and spare parts are only available only through third party sources and may not be available when required due to failure.

The Village experienced a failure late last year when the main component of the main pumping station PLC failed and required the Village to run the station in manual. Concentric was unable to procure a new, sealed box, replacement for the failed component which gave the Village only one option to fix the issue; second-hand remanufactured parts. After attempting to install two different components, the Village was able to continue normal, automated, operation.

Similar to the GE 90-30 PLCs, the various Consolidated Electric and Horner Electric hardware, located at the remaining sites, are no longer supplied and some are obsolete products. While researching the parts that the Village currently uses, it proved to be very difficult to find any supplier that has spare parts available for purchase. The GE MDS 9810 radios are also discontinued and may not provide the bandwidth necessary for future non-PLC based applications (eg. IP-based security cameras).





In addition to the outdated PLC hardware, a number of the lift station sites only provide some status and alarm signals to SCADA with little ability to adjust control parameters (such as pump on/off settings). These sites currently use a pump controller separate from the SCADA PLC which does not allow operators the ability to adjust all control settings from the iFix-based SCADA system. At the main pumping station, operators would like the ability to expand upon the current water pump controls to allow operation using Tower 4 and Tower 10, as a backup. Included in this proposal are provisions for allowing the operator to select which tower is to be used for control and which tower is to be used as a failover.

Concentric Integration is proposing the Village upgrade their existing control hardware at all locations with new hardware from a single manufacturer that has an “Active” lifecycle status on the product line, where spare parts can be readily ordered and procured, and that utilize the same programming and configuration software. Concentric Integration recommends the Village upgrade to Rockwell Automation’s Allen-Bradley Logix Platform to match the future main pumping station MCC PLC platform. For lift station sites that have separate stand-alone pump controllers, Concentric proposes the stand-alone pump controllers be removed, and the pump control programming be integrated with the SCADA PLC to provide operators more flexible control options. Concentric also proposes the Village upgrade its existing telemetry infrastructure with a high bandwidth cellular-based solution.

Concentric greatly appreciates the opportunity to propose a solution to improve the Village’s current system.





## Scope of Services

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### *Equipment*

Concentric will provide the following equipment:

#### 1. Main Pumping Station

Equipment	Quantity
Allen-Bradley 2715P-T15CD 15" PanelView 5510 Graphic OIT	1
Allen-Bradley 1756-L72 ControlLogix 5570 Controller 4MB	1
Allen-Bradley 1756-PA50 ControlLogix 120VAC 8A Power Supply	2
Allen-Bradley 1756-A10 ControlLogix 10 Slot Chassis	1
Allen-Bradley 1756-A7 ControlLogix 7 Slot Chassis	1
Allen-Bradley 1756-EN2T Ethernet/IP Comms Module	2
Allen-Bradley 1756-IA16I 16 Pt. Iso 120Vac Input Module	4
Allen-Bradley 1756-OW16I 16 Pt. Iso N.O. Relay Module	3
Allen-Bradley 1756-OB16I 16 Pt. Iso 24Vdc Output Module	2
Allen-Bradley 1756-IF16IH 16 Pt. Iso Analog Input HART	1
Allen-Bradley 1756-OF8I 8 Pt. Iso Analog Output	1
Allen-Bradley 1756-IF8I 8 Pt. Iso Analog Input	1
Allen-Bradley 1756-TBCH 36 Pin Screw Clamp Terminal Block	12
Allen-Bradley 1756-N2 Slot Filler	2
Allen-Bradley 1783-BMS20CA Stratix Ethernet Switch	1
Allen-Bradley 1606-XLE240E 24Vdc 10A Power Supply	2





## 2. Lift Stations

Equipment	131st St	151st St	Wedgewood	Pinewood	Parkwood	Crystal	Fairway	Catalina	Teebrook	Seton Place	Orland Pkwy	Breckenridge	Spring Creek
Allen-Bradley 1769-L30ER CompactLogix 5370 Controller 1MB	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1769-PA4 120VAC Power Supply	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1769-PA2 120VAC Power Supply	1	0	0	0	0	0	0	0	0	0	0	0	0
Allen-Bradley 1769-IQ16 24Vdc 16pt Input Module	2	2	2	2	2	2	2	2	2	2	2	2	2
Allen-Bradley 1769-IA16 120 Vac Input Module	2	2	2	2	2	2	2	2	2	2	2	2	2
Allen-Bradley 1769-OW16 16 pt Relay Output Module	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1769-IF4I 4 Channel Iso Analog Input Module	2	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1769-OF4CI 4 Channel Iso Analog Output Module	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1769-AENTR Ethernet/IP Adapter	1	0	0	0	0	0	0	0	0	0	0	0	0
Allen-Bradley 1769-ECR Right End Cap	2	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1783-US8T Stratix Unmanaged Ethernet Switch 8 Port	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 1606-XLE240E 24Vdc 10A Power Supply	2	2	2	2	2	2	2	2	2	2	2	2	2
Cisco IR1101A-K9 Cellular Router with associated licensing and hardware	1	1	1	1	1	1	1	1	1	1	1	1	1
Cisco CON-SNTP-IR1101AK Cellular Router SMARTNet 1 yr	1	1	1	1	1	1	1	1	1	1	1	1	1
Mobile Mark LTM301PM Antenna, MIMO	1	1	1	1	1	1	1	1	1	1	1	1	1
ATC Diversified ARM24AHE 24Vdc Quadraplex Controller	1	1	1	1	1	1	1	1	1	1	1	1	1
PEPPERL+FUCHS KFDO-CS-Ex1.50P ISB, Analog Input	1	1	1	1	1	1	1	1	1	1	1	1	1
APC SMT750 UPS 750VA	1	1	1	1	1	1	1	1	1	1	1	1	1
Allen-Bradley 2713P-T7WD1 Panelview 5310 7" Touchscreen w/mounting hw	1	1	1	1	1	1	1	1	1	1	1	1	1



### 3. Booster Stations

Equipment	153rd	Parkside	Hunter Point
Allen-Bradley 1769-L30ER CompactLogix 5370 Controller 1MB	0	1	1
Allen-Bradley 1769-PA4 120VAC Power Supply	0	1	1
Allen-Bradley 1769-IQ16 24Vdc 16pt Input Module	0	2	0
Allen-Bradley 1769-IA16 120 Vac Input Module	0	0	1
Allen-Bradley 1769-OW16 16 pt Relay Output Module	0	1	1
Allen-Bradley 1769-IF4I 4 Channel Iso Analog Input Module	0	2	1
Allen-Bradley 1769-OF4CI 4 Channel Iso Analog Output Module	0	1	1
Allen-Bradley 1769-ECR Right End Cap	0	1	1
Allen-Bradley 2715P-T10CD 10" PanelView 5510 Graphic OIT	1	0	0
Allen-Bradley 1756-L71 ControlLogix 5570 Controller 2MB	1	0	0
Allen-Bradley 1756-PA50 ControlLogix 120VAC 8A Power Supply	1	0	0
Allen-Bradley 1756-A10 ControlLogix 10 Slot Chassis	1	0	0
Allen-Bradley 1756-EN2T Ethernet/IP Comms Module	1	0	0
Allen-Bradley 1756-IA16I 16 Pt. Iso 120Vac Input Module	4	0	0
Allen-Bradley 1756-OW16I 16 Pt. Iso N.O. Relay Module	1	0	0
Allen-Bradley 1756-OF8I 8 Pt. Iso Analog Output	1	0	0
Allen-Bradley 1756-IF8I 8 Pt. Iso Analog Input	1	0	0
Allen-Bradley 1756-TBCH 36 Pin Screw Clamp Terminal Block	7	0	0
Allen-Bradley 1756-N2 Slot Filler	1	0	0
Allen-Bradley 1783-US8T Stratix Unmanaged Ethernet Switch 8 Port	1	1	1
Allen-Bradley 1606-XLE240E 24Vdc 10A Power Supply	2	2	2
Cisco IR1101A-K9 Cellular Router with associated licensing and hardware	1	1	1
Cisco CON-SNTP-IR1101AK Cellular Router SMARTNet 1 yr	1	1	1
Mobile Mark LTM301PM Antenna, MIMO	1	1	1
Allen-Bradley 2713P-T7WD1 Panelview 5310 7" Touchscreen w/mounting hw	0	1	1



#### 4. Towers

Equipment	Tower 1	Tower 4	Tower 5	Tower 6	Tower 7	Tower 8	Tower 10
Allen-Bradley 1783-US8T Stratix Unmanaged Ethernet Switch 8 Port	1	1	1	1	1	1	1
Allen-Bradley 1606-XLE240E 24Vdc 10A Power Supply	1	1	1	1	1	1	1
Allen-Bradley 1769-L24ER-QBFC1B CompactLogix	1	1	1	1	1	1	1
Allen-Bradley 2713P-T6CD1 PanelView 5310 6" Touchscreen	1	1	1	1	1	1	1
Cisco IR1101A-K9 Cellular Router with associated licensing and hardware	1	1	1	1	1	1	1
Cisco CON-SNTP-IR1101AK Cellular Router SMARTNet 1 yr	1	1	1	1	1	1	1
Mobile Mark LTM301PM Antenna, MIMO	1	1	1	1	1	1	1

#### 5. Villa West Storm Station

Equipment	Quantity
Allen-Bradley 1783-US8T Stratix Unmanaged Ethernet Switch 8 Port	1
Allen-Bradley 1606-XLE240E 24Vdc 10A Power Supply	2
Allen-Bradley 1769-L24ER-QBFC1B CompactLogix	1
Allen-Bradley 2713P-T6CD1 PanelView 5310 6" Touchscreen	1
Cisco IR1101A-K9 Cellular Router with associated licensing and hardware	1
Cisco CON-SNTP-IR1101AK Cellular Router SMARTNet 1 yr	1
Mobile Mark LTM301PM Antenna, MIMO	1

#### 6. Power Monitoring

One power monitor will be provided for each pump at remote sites.

Equipment	Quantity
Allen-Bradley 1420-V2-ENT PowerMonitor500	45
Allen-Bradley 1400-PM-ACC PowerMonitor500 Accessories	45
Allen-Bradley 1411-2DRL-500 Current Transformers	129

#### 7. Miscellaneous control panel components (Ethernet switch, patch cables, wire, mounting hardware, etc.) 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 onsite kickoff meeting or phone and video conference call with Microsoft Teams application.
3. The Project Manager will provide every other week project status updates via email and discuss status with the Customer's Project Manager.
4. Concentric will conduct an Installation and Startup Commencement meeting onsite or phone and video conference call with Microsoft Teams prior to equipment installation at the first site.
5. Concentric will conduct every other week project status phone and video conference calls during installation and startup.
6. Concentric will manage a punchlist upon the completion of the last task of the project
  - a. Village will be responsible for providing punchlist items to Concentric's project manager.
  - b. Punchlist will be agreed upon between Concentric's and the Village's project manager one week after the last task of the project.

### Finalize Design

1. Concentric will conduct a Final Design phone and video conference meeting with Microsoft Teams application to review the following:
  - a. New Tower level control at the Main Pumping Station to allow any tower to be selected as the controlling level.
  - b. Verify Lift Station controls for each lift station.
  - c. Verify Booster Station controls for each booster station.
  - d. Verify Storm Station controls for Villa West storm station.
  - e. Verify Tower control for each Tower.
  - f. Verify Main Pumping Station controls.
2. Provide for construction control panel wiring diagrams for all sites being modified, detailing the particulars of PLC and power monitor installations.



### PLC Modernizations: Programming, Installation, and Startup

1. Concentric will be replacing the existing PLCs and level controllers at the following locations with new PLCs as indicated in the Equipment section of the Scope of Services:
  - a. Main Pumping Station
  - b. 153<sup>rd</sup>, Hunter Point, and Parkside Booster Station
  - c. Villa West Storm Station
  - d. Towers 1, 4, 5, 6, 7, 8, and 10
  - e. Lift Stations 131<sup>st</sup>, 151<sup>st</sup>, Wedgewood, Pinewood, Parkwood, Crystal Springs, Fairway, Catalina, Teebrook, Seton Place, Orland Parkway, Breckenridge, and Spring Creek
2. Concentric will perform all PLC programming, router configuration, physical installation, startup, and testing of each of the new PLC system for the sites mentioned above.
3. Concentric will program, install, startup, and test all OITs as indicated in the Equipment section of the Scope of Services.
  - a. For each of the lift stations, a similar OIT program will be developed for consistency. The graphics of these programs will mimic the agreed upon elements in the graphics meeting mentioned in the *Modifications to SCADA graphics and HMI* section of this proposal.
4. Confirm successful program migration through testing of status and control signals and document results using a Field Device Report checkout form.
5. Replace existing GE MDS 9810 radios at each of the 25 sites with new Cisco routers as indicated in the Equipment section of the Scope of Services
6. The new PLC system will continue to utilize the Main Pumping Station as the master polling PLC for the system. At the start of the installation phase of the project, the main pumping station PLC will be temporarily installed alongside the existing GE 90-30 PLC. The temporary installation will serve as the endpoint for each of the new PLC installations to communicate once online. One by one, each site will be transitioned from the old PLC system to the new PLC system.
  - a. Upon completion of all remote sites to the main pumping station, the GE 90-30 PLC will be decommissioned and the new Allen Bradley Controllogix PLC will be installed and started up. During this time, the main pumping station will need to be operated manually until the new PLC is completely installed.



### Lift Station and Booster Station Pump Power Monitoring

1. Concentric will install, configure, and integrate Allen Bradley Power Monitor 500's for each pump at each lift station and booster station to provide energy data to the SCADA system as indicated in the Equipment section of the Scope of Services.

### Cellular Network Implementation

1. Concentric will be implementing a Verizon Wireless Private Machine-to-Machine network to replace the existing 900MHz network currently being used to communicate to each site's PLC. Concentric has included in this proposal provisions to consult with Verizon and Village IT to properly setup the administrative-side of this new network.
2. Concentric will be subcontracting Kreuger Tower (or other qualified antenna system contractor) to install exterior antennas for the Tower locations. In the past, Concentric has experienced issues with communicating cellular within a water tower structure and recommends this approach, which is included in this proposal.
3. Concentric will be providing an indoor MIMO antenna with built-in diversity at each of the remaining sites.

### Win-911 Modifications

1. Concentric will update the existing Win-911 application as necessary to accommodate the new PLC system.
2. Concentric will provide up to 100 additional alarms to the Win-911 system.

### Modifications to SCADA Graphics and HMI Application

1. The provided PLC systems will enable the Village to monitor and control more information than in the current system. Concentric will provide graphical updates to the existing iFix HMI system to visualize new monitoring KPIs and control functions.
  - a. Prior to starting software development, Concentric will provide a list of recommended KPIs and control functions to the Village to choose which of the proposed items the Village staff would like Concentric to visualize on the iFix HMI system.
  - b. Prior to completing software development, Concentric will review the modified graphics with the Village and allow up to one round of revisions to the proposed graphics, based on the comments from the Village.



2. Concentric will add the necessary device connections to the existing IGS driver on iFix to connect to the new PLC network.
3. Concentric will add the necessary PLC tags to the iFix HMI system to provide visualization and control functions of the new PLC system.
4. Concentric will not be providing additional trending in the iFix HMI application as part of this project.

#### Rockwell Historian and FactoryTalk VantagePoint Tasks

1. Concentric will update all necessary existing historian tags to point to the new PLC system.
2. Concentric will discuss with the Village, during an appropriate status meeting, the historical information the Village would like to store as part of the new PLC system that are not currently historized in their current system, as well as what trends the Village would like Concentric to create within the Village's existing VantagePoint system.
3. Concentric will not be providing any additional historian tag licenses as part of this project. Currently, the Village has a 500 tag license. If the Village would like to purchase an additional license to add more tags to the Rockwell Historian, Concentric will provide a quote outside of this proposed Contract.
4. Concentric will modify the existing reports, if necessary, to maintain the existing functionality of the current Vantagepoint reports.
5. Concentric will develop the trends identified in the meeting mentioned above.

#### Documentation

1. Provide via USB flash drive or via electronic file-share using Microsoft OneDrive or similar, electronic copies of the following:
  - a. Updated network diagram, detailing the modifications of the SCADA network as part of this proposed project
  - b. Signed Field Device Test Reports
  - c. As-Built wiring diagrams, detailing the completed installations at each site
  - d. Router configuration files
  - e. Managed switch configuration files
  - f. PLC programs
  - g. OIT programs



## Concentric Assumptions / Customer Responsibilities

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1. Customer will assign an initial project manager at the project kickoff meeting.
2. Cellular coverage inside building, in Concentric's experience, is typically suitable for cellular-based communication without the need for an external outdoor antenna. In situations where cellular coverage is not suitable, additional provisions will be quoted outside of this proposal for mounting outdoor antennas.
3. 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.
4. 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.
5. Customer will dispose of/recycle any removed equipment.
6. Customer understands that software/materials purchased outside Concentric may require regular support, and it will coordinate directly with the manufacturer to identify support costs for future budgeting purposes.
7. Customer understands that Concentric will need to be present onsite for various activities within this contract. Currently, laws require individuals to abide by social distancing directives from the CDC and local government. Concentric will comply with all local ordinances as required and maintain social distancing during work onsite while laws as such are in place.
8. Concentric assumes that the currently active main pumping station MCC project will not interfere with the proposed project.

## Project Schedule

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Our estimated project schedule will be agreed upon at the project kickoff meeting. Concentric is available to begin work after May 1, 2020 and estimates that this project will take up to one (1) year to complete.





## Warranty

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

- DOES apply
- DOES NOT apply

## Fee

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Our fee for the above scope is a lump sum of \$972,000

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

## Standard Terms and Conditions References

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**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

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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

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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 ORLAND PARK

ACCEPTED BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

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