

**Metropolitan Domestic Water Improvement District
Board of Directors Meeting**

August 11, 2014

Approval of HMI Upgrade Project for the SCADA System

Synopsis

The Board of Directors is requested to approve the Human Machine Interface (HMI) Upgrade Project. This project includes the HMI software and computer hardware purchases, award of the integration services, and approval of the programmable logic controller hardware upgrade. This project is being done to upgrade the computer side of the District's SCADA (Supervisory Control and Data Acquisition) system.

Background

The District began installation of its SCADA System in the late 1990s. This installation included programmable logic controllers at District facilities to monitor and control site equipment such as boosters, wells, and tanks. The SCADA system also includes Human Machine Interface (HMI) software to allow District staff to view and control the site data being sent in from the District facilities. The HMI Software utilized by the District is Rockwell Automation's RS View 32. The HMI software runs on District computers utilizing Microsoft's operating systems. Over the years, Microsoft's operating system changes from one version to a newer one. The RS View 32 product version has kept up until the implementation of 64 bit operating systems and is not effectively adaptable beyond Windows XP. Due to Microsoft ending support and security updates for Windows XP in April 2014, the District needs to replace the remaining XP computers so that the HMI runs on a newer and officially supported operating system. The newer operating system requires the installation of a different HMI software.

Issues

HMI Software - The HMI software being proposed is FactoryTalk View Site Edition, which is also developed by Rockwell Automation. FactoryTalk View Site Edition is built on a different platform to allow it to be compatible with Windows 7 and later versions. It is currently certified to Windows 7 64 Bit. There are no known issues with Windows 8x and it is anticipated to be certified to Windows 8x this fall. The FactoryTalk View Site Edition software has multiple software packages. For the District's needs, there are six different software packages that will need to be purchased. Rockwell Automation is providing a step forward credit similar to a trade in of the old software for the new, which gives a 50 percent credit on the purchase of the new software. The cost before the credit is \$38,835.00 plus tax. After the step forward credit, the cost to the District is \$20,215.00 plus tax. The total with tax for the software is \$23,231.44. Border States Electric is the Arizona Distributor for Rockwell Automation products and is the sole source for this software.

Computer Hardware - The basis for this upgrade is the end of support and security vulnerabilities related to Windows XP. The existing Windows XP computers cannot support an upgrade in the operating system. New computer hardware is required to replace the existing computers and operating systems. The computers that need to be replaced are a Telemetry server and three desktop computers. The Telemetry Server runs the HMI application and allows multiple clients to connect and utilize the software. One of the desktop computers will be for the Electrical/Instrumentation Supervisor for the development and maintenance of the HMI application as well as provide an alternate location to run the HMI in the event that the server fails. The second desktop computer will be used to replace the existing crew room computer that field staff utilizes to monitor the District's facilities and alarms. The third computer will replace the Utility Superintendent's computer that is being moved to allow monitoring of the Avra Valley Recharge Project flows and alarms. The Utility Superintendent's computer will also have the software to make changes to the HMI as well as act as a client to monitor the system.

The District received quotes from Dell on the server and three desktop computers. Dell is one of the vendors on the State of Arizona contract for computers and is often utilized by the District for acquiring computers. The cost for the server and three desktop computers is \$10,633.61.

System Integration - The District utilized the City of Tucson Cooperative Purchasing Contract Services for Instrumentation and Controls to request proposals from the two vendors listed on the City contract: Conestoga-Rovers & Associates (CRA) and Ripple Industries. Both vendors were provided information on the District's existing HMI software and configuration. The vendors were asked to provide proposals to install, configure, and test the new HMI software on the new computers, which exceeds staff's capabilities. The vendors were also asked to provide hardware recommendations and proposals for modifications that may be needed to allow for communication between the Master PLC and the new computers.

CRA provided a proposal for the labor to perform the software work ranging from \$65,280.00 to \$77,300.00. The range was based on the different hardware options they provided.

Ripple Industries' proposal for the labor and training is \$34,255. Ripple Industries' lower proposal is in line with the District's budget for the project. Ripple also provided reference for similar work they performed. Within the last year, Ripple Industries completed the same software upgrade to Tucson Electric Power on two different occasions. Staff contacted TEP regarding their experience with Ripple Industries and TEP noted they have been using Ripple Industries for the past two years and are satisfied with their work. Both vendors provided hardware options that either exceed the budget or are not desirable to staff. Staff is recommending that the vendors only be used for the System Integration and the hardware modification be handled separately by staff.

Programmable Logic Controller Upgrade - The Programmable Logic Controller (PLC) master stations at Metro-Main and Hub communicate with the PLCs located at each well site, and thereby, allows for the communication to occur within the overall SCADA system. The current PLC configuration and communication protocol to the XP computers uses communication cards installed that will no longer be supported. Since the PLC master stations are still reliable but the communication methodology is no longer supported, staff is recommending that a more current

communication protocol be installed. The cost of each processor is \$4,834.02, totaling \$9,668.04. The PLC hardware is also a Rockwell Automation product, which Border States Electric is the sole source provider.

The Fiscal Year 2015 budget has allocated \$70,000 for this project. All of the above components to this HMI Upgrade project total \$77,788.09. The project's final costs may end up lower as it is possible that Ripple Industries will not use all the hours they have proposed. In the event the \$70,000 budget is exceeded, other items of lower priority may need to be delayed to ensure funding for this critical upgrade.

Staff Recommendation

Staff is recommending that the Board of Directors approve this project to upgrade the Human Machine Interface (HMI) component of the District's SCADA system at a cost of \$77,788.09. This includes the HMI software purchase from Borders States Electric in the amount of \$23,231.44; the computer purchases from Dell in the amount of \$10,633.61; approve the PLC hardware from Border States Electric in the amount of \$9,668.04; and have Ripple Industries do the integration services in the amount not to exceed \$34,255. This project would ensure the District's SCADA system is compatible with newer Microsoft Operating Systems and gives the District further reliability to monitor and maintain its water system.

Suggested Motion

I move to approve the HMI Upgrade project that includes the purchase of the software and the PLC hardware from Border States Electric in the amount of \$32,899.15; the computer hardware purchases from Dell in the amount of \$10,633.61; and Integration Services from Ripple Industries in the amount of \$34,255, for the total amount of \$77,788.09.

Respectfully submitted,

Steven D. Shepard,
Utility Superintendent

I concur with the above-noted recommendation.

Respectfully submitted,

Joseph Olsen, P.E.
General Manager