ITEM REPORT
UTILITIES COMMISSION

Agenda Date: 12/4/2024
Agenda Section: Business Item

Department Origination: Public Works

Agenda Item: Approve the True North Controls Quote in the Not-to-Exceed Amount of $13,000 for Onsite Communication Controls

Approval Required: Simple Majority Vote

BACKGROUND

The City of Baxter lift stations utilize the Baxter Supervisory Control and Data Acquisition (SCADA) system for monitoring and control. The lift stations alarms are read by the SCADA system which then notifies the on-call operator of any active alarms (i.e. Utility Power Failure, Pump Failure, Wetwell High Level, etc.). There are different ways a SCADA system can communicate with the remote sites, one of which includes connectivity through a fiberoptic cable, and the more common method is through radio telemetry systems.

The City of Baxter currently has three (3) independent radio telemetry systems; one is for the lift stations to East Tower master, one is for communication from the Water Treatment Plant (WTP) to the East Tower master for SCADA lift stations data, and the other is for the water distribution sites. These three (3) radio systems do share some common sites that are equipped with antennas from each of these systems.

City staff have been battling poor communications associated with various lift stations, it is uncertain to the exact reasoning why this is happening. It could be due to poor signal strength, too powerful signal strength, structural interference (trees, buildings, etc.), deteriorating antennas/cabling at sites, or interference from the other radio systems among other things. The existing MDS radios are antiquated and do not contain onboard diagnostic tools to help troubleshoot the radio systems. Instead, testing the radio systems signal strength is more labor-intensive and manual process that requires specialized equipment. This is where True North Controls can assist the City.

Understanding Communication Fails

City staff receive communication fails on a regular basis, with the majority of the callouts on nights and weekends. The number of recorded communication fails is included in this RCA but it is important to understand how and when a communication fail is alerted from the telemetry polling first.

The sites are polled in “round-robin” sequential order. The polling goes in order from Lift Station (LS) 1 to LS 26, and then Storm Sewer LS 1 and LS2. Once the polling sequence is complete, the polling cycle starts over again. As one site’s “message” instruction is completed (either successful or unsuccessful read), the next site is polled.

When a site’s “message” instruction is unsuccessful in reading the site’s data, an ERROR bit is triggered and a communication fail timer begins to accumulate time. On the next polling cycle, if the site message instruction is successful, the ERROR bit is cleared and the communication fail timer is reset back to zero. If on this polling cycle the message is again unsuccessful, the ERROR bit remains triggered and the communication fail timer continues to accumulate time.

The Communication Failure Delay Setpoint in SCADA is simply a setpoint in minutes that is compared to the site’s communication fail timer accumulated time. If the comm fail delay is 15 minutes, then a communication failure alarm will be triggered in SCADA when the communication fail timer accumulated time reaches 15 minutes. If the

delay setpoint is 30 mins, a communication failure alarm will be triggered if the site hasn't successfully communicated in 30 mins. If there is at least one SUCCESSFUL message during this time, the communication fail timer gets reset to zero. So, with a setpoint of 30 minutes, a site has not communicated at all during that time. It is also possible a site hasn't communicated successfully for 29 minutes, but if it did communicate once between the 29 to 30 minute mark the communication fail timer would have been reset to zero and an alarm would NOT be triggered.

To help reduce the frequency of communication fails, one "work around" is to extend the Communication Failure Delay Setpoint requiring more failed communication "message" before an alarm is sent to the on-call worker. Increasing the Communication Failure Delay Setpoint to anything longer than 10 minutes is simply masking the communication failure issues. A site could be in communication failure for 10 mins, 15 mins, or even hours and not trigger a communication fail alarm if the delay setpoint has been extended

City staff requested Allen Dostall to query the communication fail alarms and review the setpoints for each of the lift stations. Keep in mind, an exceptionally long communication fail delay setpoint can become catastrophic in the event the site loses control power or experiences other operational issues in addition to poor radio communication items.

Lift Stations with **20-minute** setpoints include: 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 17, 19, 22, 24, Storm Sewer LS1.
Lift Stations with **30-Minute** setpoints: 25 & 26
Lift Stations with **40-Minute** setpoints: 8 & 21
Lift Stations with **60-Minute** setpoints: 16, 18, & 23
Lift Stations with **120-Minute** setpoint: Storm Sewer LS 2
Lift Stations with **240-Minute** setpoint: 20

Allen is estimating that 70% of the actual communication "message" failures are being masked by the long communication failure delay setpoints. On a stable telemetry system, he will tend to set the communication failure delay setpoints in the 5-10 minute range. This provides a better understanding of system performance deficiencies by not masking the communication "message" failures.

Between 9/9/2023 and 1/1/2024, there were 52 Communication Failure Alarms that were triggered when the site hadn't successfully communicated for the duration of the communication fail delay setpoint.

Between 1/1/2024 and 11/18/2024, there were 90 Communication Failure Alarms that were triggered when the site hadn't successfully communicated for the duration of the communication fail delay setpoint.

FINANCIAL IMPLICATIONS

The current telecommunication system is costing the city a lot in time and wasted resources. As mentioned above, a majority of the callouts happen overnight which requires the on-call person to address the issue after hours, which is a minimum of a two (2) hour paid callout. According to the City's fee schedule one (1) callout costs the city $128 in labor (2-hours) and $186 in equipment time (1-hour). Assuming 100% of the communication fails were after hours, since September of 2023 it would have cost the City approximately $45,000. Knowing some of the callouts happen during working hours, the actual cost is less but there is still wasted resources pulling staff off scheduled maintenance to address the communication fails.

The quote is an unbudgeted item that will need to be paid from the sanitary sewer enterprise fund or the SAC fund.

STAFF RECOMMENDATIONS

Staff recommend approving the quote. The City currently uses MDS 1710 radios which are obsolete and the MDS SD1 radios which are available to purchase but are very outdated. A complete evaluation of the City's telemetry system will provide information to help address our current issues and help with planning/designing a new telemetry system which is needed in the near future.

COUNCIL ACTION REQUESTED

MOTION to approve the True North Controls Quote in the Not-to-Exceed amount of $13,000 for Onsite Communication Controls.