



The Corporation of the City of Cornwall
Regular Meeting of Council
Report

Department: Financial Services
Division: Purchasing
Report Number: 2020-312-Financial Services
Prepared By: Diane Leduc, Senior Buyer
Meeting Date: July 13, 2020
Subject: Council Report 2020-312.docx

Purpose

The purpose of this report is to provide Council with information on an upcoming Non-Budgeted Expenditure pursuant to Section 4.3 of the Procurement of Goods and/or Services Policy.

Recommendation

That Council authorize a sole source purchase order in the amount of \$157,826.75 including HST (\$142,127.88 net to the Corporation) to Xylem Americas from Ottawa, Ontario for the acquisition of one submersible dry pit pump.

Financial Implications

It is recommended that funds for this expenditure be drawn from the Wastewater Works Reserve.

Strategic Priority Implications

This report addresses Council's accountability and transparency to the ratepayers of the City of Cornwall.

Background / Discussion

Currently, all of the raw sewage captured within the entire municipal wastewater collection system is accumulated by what is referred to as the interceptor trunk sewer main. The 48 inch interceptor trunk main commences at Brookdale Avenue, proceeds eastward under Water Street/Montreal Road and concludes at the raw sewage pump station. The raw sewage pump station is the structure located at the foot of the Wastewater Treatment Plant (WWTP) driveway entrance, on the south side of Montreal Road immediately adjacent to the St. Lawrence River.

All sewage collected by the interceptor is passed through a preliminary screening process and then discharged into a large wet well within the raw sewage pump station. Sewage collected in the wet well of the raw water sewage pump station is pumped through a force main up to the WWTP, following which the treatment process is commenced. There are four large sewage pumps which convey raw sewage up to the WWTP. Two of the pumps are smaller capacity (280 Horse Power each) and are known as *submersible dry pit* pumps. The remaining two pumps, which have large volume capacity (400 Horse Power each) and are known as *centrifugal* pumps. All of the previously described pumps were designed and constructed by a company called Xylem Americas (Xylem).

The two submersible dry pit pumps are designed to pump raw sewage under low flow conditions while the two centrifugal pumps are operated only if required during high flow conditions. Throughout the year, the vast majority of the incoming raw sewage flows are managed by the two submersible dry pit pumps while the centrifugal pumps are activated only to assist during high flow occurrences such as during Spring runoff season or heavy rainfall events.

The centrifugal pumps require large volumes of liquid to operate efficiently. Operation of these pumps in a low flow condition could result in major damage to the internal components and could lead to eventual total failure. Accordingly, WWTP staff are reluctant to utilize the centrifugal pumps during low flow conditions.



The submersible dry pit pumps are programed in a lead/lag configuration whereby the first pump is switched on when the sewage level in the wet well reaches a specified high-level set point while the second pump remains off. The operating pump lowers the level in the wet well to a specified low-level set point and then shuts off. When the incoming sewage reaches the high-level set point again, the second pump is switched on while the first pump remains off. This alternating process continues repeatedly except when due to higher incoming flow, one pump is unable maintain pace. At this point, both pumps are programed to operate concurrently. Likewise, if both submersible dry pit pumps are unable to maintain set point levels due to high flows, then the higher capacity centrifugal pumps are activated.

The current dry pit submersible pumps were installed as part of the WWTP upgrade project five years ago. Industry experts will attest that design of pumps for applications such as water distribution and sewage transmission is complicated and smooth pump operation and/or maximum efficiency are often difficult to achieve. The design of the existing dry pit submersible pumps was based in the best available technical information at that time (including but not limited to incoming flow, distance to discharge point, discharge pipe friction, estimated head pressure etc.). Unfortunately, the original design information was unsound and as a result the existing pumps are not performing to the optimal potential. Over the past five years, the pumps have worn prematurely resulting in full failure twice. Each time the pumps were replaced at no cost to the City by the pump manufacturer, Xylem.

Over the past five years, Xylem's technical staff have continued to examine the operation of the dry pit submersible pumps in an effort to prevent premature wear and potential full failures. In addition to other minor adjustments, the most specific recommendation to WWTP operators by Xylem was to ensure that the pumps be operated at no more than 80% capacity. These actions have resulted in much smoother pump operation and reduced pump wear. Accordingly, pump life has been substantially increased. In the meantime, Xylem's technical staff have also taken advantage of electronic pump data captured by the WWTP SCADA (Supervisory Control And Data Acquisition) program. This information as well as pump observation, intake and discharge piping review have resulted in a recommended design of a dry pit submersible pump that Xylem feels confident would operate more effectively and efficiently when compared to the current model.

Currently there is no redundancy (additional replacement pump) in the event of a failure of one of the two existing dry pit submersible pumps. Should one of these pumps fail, there is concern that there will be a need to activate a centrifugal pump in a low flow condition. As previously mentioned, this action could result in extensive damage to the centrifugal pump. Consequently, at Administration's request, Xylem has provided a quote for the supply of a new replacement dry pit submersible pump which has been re-designed to effectively and efficiently meet low flow demands. The quoted price for the pump is \$157,826.75 including HST (see attached quotation document). The City cannot approach another sewage pump manufacturer as the main piping manifold to which the pump is to be affixed has been designed specifically for a pump manufactured by Xylem. To select a similar sized pump from another company would result in an extremely long and expensive retrofit of the manifold piping within the raw sewage pump station. Accordingly, selection of a pump from another manufacturer is not recommended.

Upon Council approval of the proposed purchase of a new dry pit submersible pump, WWTP staff would immediately remove one of the two existing dry pit submersible pumps in service having the most wear. The unit selected to be removed would be replaced by the new pump. The removed pump would be overhauled and kept on site as a spare to be installed as part of preventive maintenance rotation routine or be available for installation in the event of a pump failure. Once installed, WWTP will closely monitor the operation of the new pump in order to ensure the unit meets the expectations of performance.

Considering all of the preceding, Administration is recommending that Council authorize a sole source purchase order in the amount of \$157,826.75 including HST (\$142,127.88 net to the Corporation) to Xylem Americas for the acquisition of one submersible dry pit pump.

Document Title:	Un-Budgeted Expenditure - Pump for the Waste Water Treatment Plant - 2020-312-Financial Services.docx
Attachments:	- Xylem Submersible Dry Pit Pump Proposal.pdf
Final Approval Date:	Jul 7, 2020

This report and all of its attachments were approved and signed as outlined below:

Bill de Wit - Jul 6, 2020 - 3:07 PM

Tracey Bailey - Jul 7, 2020 - 7:07 AM

Maureen Adams - Jul 7, 2020 - 11:47 AM