

Minutes - Standing Policy Committee on Finance - April 9, 2015

REPORTS

**Item No. 4 Water Supervisory Control and Data Acquisition (SCADA) Upgrade
Financial Status Report No. 1 for the Period from November 1,
2014 to January 31, 2015**

STANDING COMMITTEE DECISION:

The Standing Policy Committee on Finance concurred in the recommendation of the Winnipeg Public Service and received the report as information.

Minutes - Standing Policy Committee on Finance - April 9, 2015

DECISION MAKING HISTORY:

Moved by Councillor Gillingham,

That the recommendation of the Winnipeg Public Service be concurred in.

Carried

ADMINISTRATIVE REPORT

Title: WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE FINANCIAL STATUS REPORT NO. 1 FOR THE PERIOD FROM NOVEMBER 1, 2014 TO JANUARY 31, 2015

Critical Path: THE STANDING POLICY COMMITTEE ON FINANCE

AUTHORIZATION

Author	Department Head	CFO	CAO
G. K. Patton, P. Eng. Manager of Engineering Services	T. Shanks, P. Eng. Acting Director, Water and Waste Department	M. Ruta	M. Jack A/CAO

RECOMMENDATIONS

That this report be received as information.

REASON FOR THE REPORT

At its meeting held on December 16, 1999, City Council adopted a policy whereby all capital projects with a total estimated cost of \$10 million or more be submitted by the associated Civic Department to the Standing Committee on Fiscal Issues (now the Standing Policy Committee on Finance) for review and recommendation prior to any bid solicitation being issued.

Administrative Directive No. FM-004 requires quarterly reporting to the Standing Committee.

IMPLICATIONS OF THE RECOMMENDATIONS

The proposed Regional Supervisory Control and Data Acquisition (SCADA) upgrade option will depend on the results of the life cycle cost analysis currently underway.

HISTORY

DISCUSSION:

1. MAJOR CAPITAL PROJECT STEERING COMMITTEE

Administrative policy for projects with capital cost exceeding \$10 million requires formation of a Major Capital Project Steering Committee. The Committee has been formed and its members are:

Diane Sacher, Director of Water and Waste
Clive Wightman, Director, Community Services
Marc Pittet, Acting Director, Planning, Property and Development
Jason Ruby, Manager of Capital Projects
Moirra Geer, Manager of Finance and Administration, Water and Waste
Geoff Patton, Manager of Engineering, Water and Waste
Alison Weiss, Project Manager, Water and Waste

2. DESCRIPTION OF PROJECT

The Water Services Division utilizes a Regional SCADA control system to operate, control and monitor processes at the Shoal Lake Intake Facility, regional pumping and booster stations, and the Deacon Chemical Feed Facility. The Regional SCADA provides automated control and visualization of the water supply and distribution system to operators on a 24/7 basis so they can control and monitor these processes. The Regional SCADA system is made up of instrumentation, remote communication equipment and specialized computer hardware with customized software, such as Programmable Logic Controllers (PLCs). The regional pumping and booster stations as well as the water supply intake at Shoal Lake are controlled locally via PLCs and are monitored remotely via the City's Regional SCADA.

The Regional SCADA is comprised of server hardware and software that are approaching end of life. Further, the PLCs at the aforementioned locations have also reached the end of their useful life and are no longer produced by their manufacturer.

The project objective is to upgrade the Regional SCADA and PLCs to ensure timely replacement of end of life hardware and software. The Regional SCADA and PLCs are essential for the supply and distribution of drinking water. The delivery method for the Regional SCADA and PLC upgrade project will likely be design-bid-build, however this will be further evaluated upon the completion of the Regional SCADA life cycle cost analysis.

3. RISKS AND RISK MITIGATION STRATEGIES

As the Regional SCADA is comprised of server hardware and software that are approaching end of life, there is a risk to system reliability and availability of critical operating information. These risks may potentially result in a reduction or loss of service or loss of historical operating information that is required under the City's Operating License. To mitigate the risk of aging server hardware and software, the existing Regional SCADA system is designed to have redundant servers whereby if one server was to fail, another server is available to allow continued operation of the system. To further mitigate risks, the upgrade of the Regional SCADA will be undertaken as soon as possible.

To mitigate potential risks to level of service during the construction and commissioning of the upgraded Regional SCADA system, the existing Regional SCADA system will be kept operational during the transition period and both the existing and upgraded Regional SCADA systems will be run simultaneously. This will allow the operation of the new Regional SCADA to be verified against the operation of the existing Regional SCADA. Once the upgraded Regional SCADA has been fully commissioned, the existing Regional SCADA system will be decommissioned.

The existing PLCs are no longer manufactured or supported by the manufacturer and as a result pose a risk to system reliability potentially resulting in reduced or loss of service. To mitigate these risks, Water Services Division has obtained an inventory of spare parts for the PLCs. Further, the construction plan for the PLC upgrades is to upgrade the stations sequentially therefore increasing the availability of spare parts as stations are upgraded.

Further, the commissioning plan for construction will include specific provisions to minimize risk at each station including:

- Station shut downs will only be permitted in low demand season,
- Station shut downs will be permitted at nighttime only,
- A minimum of one week between station shut downs will be required,
- Testing network cables for the upgraded control system communication network will be conducted prior to PLC replacement to minimize the potential of extending the required shutdown period,
- Remote manual operation and monitoring of a transitioned pump will be confirmed to be functional prior to migrating any additional pumps, and
- The number of pumps that can be taken out of service at any one time will not result in the number of pumps that remain in service being less than the number required for continuous and standby duty operation of the station.

4. CURRENT PROJECT STATUS

A preliminary design for the PLC upgrades was completed in 2013. This predesign was undertaken in conjunction with the predesign of power reliability upgrades required at the pumping stations.

The existing Regional SCADA system is a Telvent system whereas the Water Treatment Plant utilizes a Wonderware SCADA system. Two upgrade options for the Regional SCADA system are currently being evaluated as part of the ongoing Regional SCADA Life Cycle Cost Analysis. The first upgrade option would maintain the separate Telvent and Wonderware systems with the Regional SCADA being upgraded to the latest Telvent offering. The second upgrade option being evaluated involves the migration of the existing Regional SCADA Telvent system into the Water Treatment Plant's Wonderware SCADA system. This evaluation will include analysis of support agreements and hardware and software costs over a 25 year period and will recommend an upgrade option. This analysis is anticipated to be complete by April 2015.

5. ISSUES/RISKS REQUIRING FURTHER ATTENTION

Cost Risk

The cost estimate of \$9 million for engineering and construction for the PLC upgrade work is based on a Class 3 estimate prepared as part of the preliminary design with an expected accuracy range of between -20% to +30%.

The cost estimate of \$3.3 million for the Regional SCADA upgrade is based on a Class 5 cost estimate with an expected accuracy range of between -50% and +100%. The cost estimate for the Regional SCADA upgrade will be refined as part of the life cycle cost analysis currently underway.

It is AACE International accepted practice that cost estimates are adjusted as design progresses.

Schedule

The PLC upgrades will be undertaken in conjunction with power reliability upgrades required at the pumping stations in order to reduce pumping station shut-down times and potentially reduce design and construction costs. Any design or construction delays related to the power reliability upgrades have the potential to affect the schedule of the PLC upgrades. As station shut downs will only be permitted during periods of low demand and as no more than two stations will be upgraded at one time (to minimize potential risk to the distribution system), design issues can be dealt with in advance of or between station upgrades. Construction issues will be minimized through careful construction planning. Further, lessons learned through the sequential station upgrading will be applied to succeeding upgrades.

6. FINANCIAL ANALYSIS

The status of current Requests for Proposal and Bid Opportunities are as follows:

Request for Proposal or Bid Opportunity	Description	Current Status	Contract Value (GST and MRST extra as applicable)
Consultant assignment under \$35,000	Regional SCADA Life Cycle Cost Analysis	Awarded, Ongoing	\$35,000.00

Future major Requests for Proposal and Bid Opportunities are:

- Request for Proposal – Detailed Design, Programming and Contract Administration for PLC, Regional SCADA and Power Reliability Upgrades
- Bid Opportunity – Regional SCADA Upgrade
- Bid Opportunity – PLC and Power Reliability Upgrades (may be split into multiple Bid Opportunities)

Project funding

The approved capital and 2014 projected budget are as follows:

YEAR	CAPITAL PROGRAM	ACTUAL + PROJECTED CASH FLOWS	CUMULATIVE CAPITAL BUDGET REMAINING
Up to 2014	4,900,000	370,139	4,529,861
2015	7,400,000	724,068	11,205,793
2016		6,715,531	4,490,262
2017		1,433,466	3,056,796
2018		929,699	2,127,097
Total Costs Remaining to Complete		2,127,097	0
Total	12,300,000	12,300,000	

A summary of the budget to forecast comparison is contained in Appendix 1.

The Water SCADA upgrade project is funded by retained earnings.

FINANCIAL IMPACT

Financial Impact Statement

Date: **February 18, 2015**

Project Name:

**WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE
FINANCIAL STATUS REPORT NO. 1 FOR THE PERIOD FROM NOVEMBER 1, 2014
TO JANUARY 31, 2015**

COMMENTS:

As this report is submitted for informational purposes only, there is no financial impact associated with this recommendation.

"Original signed by M. L. Geer, CA"

Moira L. Geer, C. A.

Manager of Finance and Administration

CONSULTATION

In preparing this report there was consultation with:

N/A

SUBMITTED BY

Water and Waste Department
Engineering Services Division
Prepared by: A. Weiss, P.Eng.
Date: March 3, 2015
File No. W-761

APPENDIX 1
As at January 31, 2015

Components	COSTS			PROJECTED COSTS TO COMPLETE					TOTAL	VARIANCE	NOTE	
	Approved Budget To Date ¹	Costs submitted this report	Total Costs Incurred to Date (to January 31, 2015)	2015	2016	2017	2018	Total Costs Remaining to Complete	Total Project Cost	Variance from Budget (Unfavourable)		
A PROFESSIONAL SERVICES	5,502,339	376,089	376,089	718,118	3,817,870	341,466	62,199	186,597	0	5,502,339	0	²
B CONSTRUCTION	6,797,661	0	0	0	2,897,661	1,092,000	867,500	1,940,500	0	6,797,661	0	
TOTALS	12,300,000	376,089	376,089	718,118	6,715,531	1,433,466	929,699	2,127,097	0	12,300,000	0	

Percentage Complete 3%

¹ Total budget of \$12,300,000 for the Water SCADA Upgrade Project; Distribution of costs to Components A) and B) was done by the Water and Waste Department.

² Professional Services include Professional Engineering Services (preliminary design, life cycle cost analysis, detailed design, programming and contract administration), overhead and administration charges.