

Minutes – Standing Policy Committee on Finance – January 16, 2017

REPORTS

**Item No. 6 Water Supervisory Control and Data Acquisition (SCADA) Upgrade
Financial Status Report No. 7 for the Period from August 1, 2016 to
October 31, 2016**

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 – January 16, 2017

DECISION MAKING HISTORY:

Moved by Councillor Gerbasi,

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. 7 FOR THE PERIOD FROM
AUGUST 1, 2016 TO OCTOBER 31, 2016

Critical Path: The Standing Policy Committee on Finance

AUTHORIZATION

Author	Department Head	CFO	CAO
G. K. Patton, P. Eng. Manager of Engineering Services	M. L. Geer, CPA, CA Acting Director, Water and Waste Department	M. Ruta	D. McNeil

EXECUTIVE SUMMARY

This report provides a quarterly update on the status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade Project. This capital project is financed from the approved Capital Budget for Water Supervisory Control and Data Acquisition (SCADA) Upgrades. The project is currently on budget. The project schedule has been revised in consultation with Legal Services and Materials Management.

RECOMMENDATIONS

That this report be received as information.

REASON FOR THE REPORT

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

IMPLICATIONS OF THE RECOMMENDATIONS

There are no implications associated with receiving this report as information.

HISTORY / DISCUSSION

DISCUSSION:

1. THE 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. In addition, the PLCs at the aforementioned locations have also reached the end of their useful life and are no longer manufactured.

The Department currently has two water SCADA system providers; Telvent, which is used for the regional water system, and Wonderware, which is used for the water treatment plant. A Regional SCADA Upgrade Life Cycle Cost Analysis was completed in June 2015. The analysis considered two options for upgrading the Regional SCADA system:

1. Updating the existing Telvent system
2. Replacing the existing Telvent system with a Wonderware system

The analysis considered costs for hardware, software and support agreements over a 25-year period. The report found that Wonderware was the preferred option having the lowest life-cycle cost.

The project objective is to upgrade the Regional SCADA and PLCs to ensure timely replacement of end of life hardware and software. The delivery method for this project is design-build (D-B). The project requires specialized systems integration knowledge. As such, an Owner's Advocate Engineer will be engaged to assist the City in developing the D-B Request for Proposal (RFP) and monitoring construction. Proponents for the D-B RFP will be shortlisted using a Request for Qualifications (RFQ) process.

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 Water SCADA Upgrade adopted project includes the following Project Identifications:

Project ID	Project Year	Amended Budget
2005000211	2011	\$367,339 ¹
2005000214	2014	\$432,661 ²
2005000215	2015	\$7,600,000
2005000216	2016	\$3,900,000
Total Amended Budget		\$12,300,000

¹ Does not appear in the Capital Expenditures Monthly Report as the funds have been expended and it is designated as a closed Project ID

² The amount shown in the Capital Expenditures Monthly Report is \$1,100,000, however \$300,000 was transferred to 552/598 Plinguet Fire Protection (Project ID 2001002914) as approved by Council March 26, 2014. The \$ balance was re-budgeted and was included in the 2016 Capital Budget funds request.

The Executive Project Sponsor is the Director of Water and Waste. The Project Manager is Alison Weiss, P. Eng.

2. MAJOR CAPITAL PROJECT STEERING COMMITTEE

Administrative policy for projects with capital cost exceeding \$20 million requires formation of a Major Capital Project Steering Committee. This threshold was approved by Council on October 28, 2015. Any project reporting to SPC Finance under the previous \$10 million threshold will continue to report. The Committee has been formed and its members are:

Clive Wightman, Director, Community Services
 John Kiernan, Director, Planning, Property and Development
 Georges Chartier, Chief Asset & Project Management Officer
 Moira Geer, Acting Director of Water and Waste
 Lucy Szkwarek, Acting Manager of Finance and Administration, Water and Waste
 Geoffrey Patton, Manager of Engineering, Water and Waste
 Alison Weiss, Project Manager, Water and Waste

3. RISKS AND RISK MITIGATION STRATEGIES

An ongoing risk management strategy has been implemented for the project encompassing a proactive process of identifying and assessing project risk, defining appropriate risk handling strategies and plans, and monitoring those actions to completion.

Formal risk and opportunity analyses of the project are scheduled to be performed by the project team at major milestones as the project progresses. Global project risks of significance include:

Risk Matrix¹	
Risk Statement and Explanation	Mitigation
PLC components to be replaced are at the end of their intended service life and may fail prior to project completion. These components are no longer manufactured.	An inventory of spare PLC components has been obtained by the Department. D-B has been selected as the delivery method for this project, allowing for design and construction to occur simultaneously, resulting in earlier replacement of PLC components.
SCADA hardware to be replaced is at the end of its intended service life and may fail prior to project completion.	The Department is in the process of procuring SCADA servers and virtualization software to have on hand in the event of equipment failure to minimize system impacts and maintain system operation. The purchased hardware will be re-used in the upgraded SCADA system as a test bed platform.
D-B reduces the City's control during detailed design, resulting in a sub-optimal final design.	Project requirements will be specified as detailed as possible in the D-B RFP. The RFP will include strict performance requirements.
Bid prices for the D-B RFP exceed budget resulting in inability to award and schedule delay.	Ongoing discussion with the Owner's Advocate Engineer on any significant cost impacts, obtain an updated cost estimate of D-B RFP as early as possible.
An unqualified/inexperienced contractor bids on the D-B RFP with a low price that skews the evaluation.	Bidders for the D-B RFP will be pre-qualified using an RFQ.

Risk Matrix ¹	
Risk Statement and Explanation	Mitigation
D-B reduces the City's ability to control risks associated with tie-ins to existing equipment and coordination of work.	Project constraints will be clearly defined in the D-B RFP. D-B proponents will be required to submit a detailed implementation plan.

¹Risk Matrix is arranged vertically from higher to lower assessed risk

4. CHANGES SINCE THE LAST REPORT

The RFP for the Owner's Advocate Engineer (583-2016) has been posted to the Materials Management website and project award is anticipated by the second quarter of 2017.

The eventual upgrade of the Regional SCADA system will require both the existing SCADA and upgraded SCADA to communicate over the network simultaneously during the commissioning stage to confirm the new system is performing as it should be. With this upgrade in mind, two routers were purchased during this reporting period as under \$5,000 expenditures to allow the future increase in network traffic. The purchase of the routers is reflected in the costs submitted this report shown in Appendix 1 (\$8,004). The routers were purchased in advance so the communication network could be tested and confirmed prior to SCADA commissioning. Two additional routers are required to complete the communication network upgrade and will be purchased in the next reporting period. One of the routers will be purchased as an under \$5,000 expenditure and the final router will be purchased as a single source negotiation approved by the Manager of Materials.

The project schedule has been revised in consultation with Legal Services and Materials Management to reflect timelines that have been achieved on other City D-B projects.

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 -20% (\$7.2 million) to +30%.(11.7 million). The cost estimate of \$9 million includes a 20% contingency (\$1.5 million).

The cost estimate for the Regional SCADA upgrade has been refined from a Class 5 estimate of \$3.3 million to a Class 4 estimate of \$3.1 million based on the results of the life cycle cost analysis completed in 2015. The current estimate is slightly lower than the original estimate; however, the Department is not recommending a change in the requested budget at this time due to the class of the estimate. The updated cost estimate has an expected accuracy range of -30% (\$2.17 million) to +60% (\$4.96 million). The cost estimate of \$3.1 million includes a 20% contingency (\$0.5 million).

Total project contingency is \$2 million. No project contingency funds have been expended to date.

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

Schedule

The SCADA and 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 SCADA and 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 including the development of an overall construction schedule, implementation/changeover planning, and preparation of shutdown protocols. Further, lessons learned through the sequential station upgrading will be applied to succeeding upgrades.

6. SCHEDULE

Current key schedule milestones are:

SCADA Upgrade		
Milestone Description	Timeline	
	Previous Report	This Report
Issue RFP for Owner's Advocate Engineer	September 2016	Issued October 2016
Start D-B RFQ/RFP Development	November 2016	Q3 2017 ¹
Issue D-B RFQ	March 2017	Q4 2017 ¹
Issue D-B RFP	September 2017	Q4 2018 ¹
Start SCADA Detailed Design/Upgrading	December 2017	Q4 2019 ¹
Complete SCADA Upgrading/Commissioning	September 2018	Q3 2020 ¹
Start PLC Upgrading Phase 1 (Tache/Shoal Lake)	November 2018	Q4 2020 ¹
Start PLC Upgrading Phase 2 (McPhillips/Hurst)	October 2019	Q4 2021 ¹
Start PLC Upgrading Phase 3 (MacLean/Deacon)	October 2020	Q4 2022 ¹
Complete Commissioning of all project components	May 2021	Q3 2023 ¹

¹ The project schedule has been revised in consultation with Legal Services and Materials Management to reflect timelines that have been achieved on other City D-B projects.

The constraints on construction to minimize potential impacts on the water supply system mean that small changes in the schedule can cause completion date shifts of up to a year.

The project schedule will be adjusted as the project progresses with key schedule reviews anticipated prior to the release of the D-B RFP, after award of the D-B contract and upon completion of the SCADA upgrade.

7. FINANCIAL ANALYSIS

The status of current RFPs and Bid Opportunities are as follows:

RFP or Bid Opportunity	Description	Current Status	Contract Value (GST and MRST extra as applicable)
RFP 224-2012	PLC Replacement and Power Reliability Upgrades Preliminary Design	Completed by SNC Lavalin Inc.	\$315,563
Sole Source Consultant Assignment 307-2012	Equipment Identification Standard and Electrical Design Guide Development	Completed by SNC Lavalin Inc.	\$46,948
Consultant assignment at or under \$35,000	Regional SCADA Life Cycle Cost Analysis	Completed by Dillon Consulting Ltd.	\$35,000
RFP 583-2016	Owner's Advocate Engineer and Professional Engineering Services for PLC, Regional SCADA and Power Reliability Upgrades	Open procurement period	To be determined

Future major RFQs, RFPs and Bid Opportunities include:

- RFQ – Design & Build PLC, Regional SCADA and Power Reliability Upgrades
- RFP – Design & Build PLC, Regional SCADA and Power Reliability Upgrades

Project funding

The approved capital budget is as follows:

Year	Capital Program	Actual and Projected Cash Flows	Cumulative Capital Budget Remaining
Up to 2015	\$8,400,000	\$402,339	\$7,997,661
2016	\$3,900,000	\$58,004	\$11,839,657
2017		\$187,000	\$11,652,657
2018		\$114,000	\$11,538,657
2019		\$151,000	\$11,387,657
Beyond 2019		\$11,387,657	\$0
Total	\$12,300,000	\$12,300,000	

A summary of the budget to forecast comparison is contained in Appendix 1 (attached). The projected cash flows are tied to the project schedule and will be adjusted as the project progresses.

The Water SCADA upgrade project is funded by retained earnings.

The variance in spending up to 2015 from this report to the Capital Expenditure Monthly Report is \$367,339, which is equivalent to the expenditure in the closed 2011 budget. These funds were spent on preliminary engineering.

8. ANTICIPATED PROGRESS DURING NEXT REPORTING PERIOD

The open procurement period to retain an Owner's Advocate Engineer has been extended to December 16, 2016 with contract award anticipated by Q2 2017. The Department will complete the procurement of SCADA servers and virtualization software within the next reporting period to minimize operating risk in the event of failure prior to project completion. The remaining routers for the SCADA communication network will also be purchased in the next reporting period.

FINANCIAL IMPACT

Financial Impact Statement **Date:** **November 16, 2016**

Project Name:

**WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE
FINANCIAL STATUS REPORT NO. 7 FOR THE PERIOD FROM AUGUST 1, 2016 TO
OCTOBER 31, 2016**

COMMENTS:

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

Original signed by Lucy Szkwarek, CPA, CGA
Lucy Szkwarek, CPA, CGA
Acting Manager of Finance and Administration

CONSULTATION

In preparing this report there was consultation with:

N/A

OURWINNIPEG POLICY ALIGNMENT

01-1b Key Directions for Building a City That Works

The SCADA Upgrade will provide clean, safe, reliable and sustainable drinking water.

SUBMITTED BY

Department: Water and Waste
Division: Engineering Services
Prepared by: A. M. Weiss, P. Eng.
Date: December 05, 2016, 2016
File No.: W-761

c: Major Capital Project Steering Committee (email)

ATTACHMENTS:

Appendix 1 – Costs of SCADA Upgrade Project

**WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE
WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION
APPENDIX 1
As at October 31, 2016**

Components	COSTS			PROJECTED COSTS TO COMPLETE				Total Costs Remaining to Complete	TOTAL	VARIANCE	NOTE
	Approved Budget To Date ¹	Costs submitted this report	Total Costs Incurred to Date (to October 31, 2016)	2016	2017	2018	2019		Total Project Cost	Variance from Budget (Unfavourable)	
A PROFESSIONAL SERVICES	\$4,690,000	\$0	\$402,339	\$0	\$187,000	\$114,000	\$151,000	\$3,835,661	\$4,690,000	0	2
B CONSTRUCTION	\$5,610,000	\$8,004	\$8,004	\$50,000	\$0	\$0	\$0	\$5,551,996	\$5,610,000	0	
C CONTINGENCIES	\$2,000,000	\$0	\$0	\$0	\$0	\$0	\$0	\$2,000,000	2,000,000	0	
TOTALS	\$12,300,000	\$8,004	\$410,343	\$50,000	\$187,000	\$114,000	\$151,000	\$11,387,657	\$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, B and C was done by the Water and Waste Department. The budget included \$9 million for PLC upgrades and \$3.3 million for SCADA upgrades. The cost estimate for the SCADA upgrades has been refined to \$3.1 million, however a change in budget is not recommended at this time. These are estimates and will be revised as the project progresses.

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