

**Minutes – Standing Policy Committee on Finance – February 15, 2018**

**REPORTS**

**Item No. 6                      Water Supervisory Control and Data Acquisition (SCADA) Upgrade**

**STANDING COMMITTEE DECISION:**

The Standing Policy Committee on Finance concurred in the recommendation of the Winnipeg Public Service that the financial status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project, be received as information.

**Minutes – Standing Policy Committee on Finance – February 15, 2018**

**DECISION MAKING HISTORY:**

Moved by Councillor Mayes,

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

Carried

## ADMINISTRATIVE REPORT

**Title:** Water Supervisory Control and Data Acquisition (SCADA) Upgrade,  
Project ID: 2005100200,  
Quarterly Project Status Report No. 11  
For the Period Ended October 31, 2017

**Critical Path:** 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, Director, Water and Waste Department	M. Ruta	D. McNeil

### EXECUTIVE SUMMARY

Project On Schedule: Yes  No

Project On Adopted Budget: Yes  No

Percent of Schedule Complete:

Percent of Adopted Budget Spent:

During this reporting period, preliminary design work under the Owner's Advocate Engineer Contract continued. A draft design-build Request for Qualification (D-B RFQ) document to prequalify design-build (D-B) Proponents was also received and reviewed by the City.

There has been delay in the delivery of subconsultant reports. This delay has resulted in a subsequent delay in the overall delivery of the preliminary design report. Delivery targets for the project implementation remain on schedule.

Costs incurred during this reporting period were related to preliminary engineering and procurement services under the Owner's Advocate Engineer Contract.

The Advisory Committee has reviewed this report and recommends that the report be sent to the Standing Policy Committee on Finance.

### RECOMMENDATIONS

That the financial status of the Water Supervisory Control and Data Acquisition (SCADA)

Upgrade project, as contained in this report, be received as information.

## REASON FOR THE REPORT

The Asset Management Administrative Standard FM-004 requires all projects with a total estimated cost of \$21 million (2017) or more report quarterly to the Standing Policy Committee on Finance. This threshold is adjusted annually for construction inflation as part of the annual Capital Budget approval. The Standing Policy Committee on Finance may also request reporting on any capital project.

## IMPLICATIONS OF THE RECOMMENDATIONS

No implications.

## HISTORY/DISCUSSION

See Appendix C – Key Project Events (History)

### **Design** (Update from last report)

An Owner's Advocate Engineer has been engaged under Request for Proposal (RFP) 583-2016. Services to be provided under Phase I of the Contract include: preliminary design, procurement of a design-builder and associated project management services. Phase II of the Contract will include contract administration, post construction services and associated project management and will be awarded at a later date subject to the conditions of RFP 583-2016.

The Owner's Advocate Engineer Contract (RFP 583-2016) was awarded to Dillon Consulting Ltd. in February of 2017. During this reporting period, preliminary design work continued and the draft D-B RFQ was received and reviewed by the City. Finalization of the preliminary design report and D-B RFQ is anticipated in Q1 2018.

Table 1 – Contracts

Contracts							
Bid Opportunity #	Company Name	Description	Original Contract Award Value (GST & MRST extra as applicable)	Total Approved Over-Expenditures (Over-Expenditure amount only)	Date of Award	Date of Total Completion	Estimated % Complete
224-2012	SNC-Lavalin Inc.	PLC Replacement and Power Reliability Upgrades Preliminary Design	\$ 312,898.00	\$ -	07/23/2012	01/31/2014	100
307-2012	SNC-Lavalin Inc.	Equipment Identification Standard and Electrical Design Guide Development	\$ 45,500.00	\$ 1,448	04/24/2012	11/15/2013	100
Consultant assignment at or under \$35,000	Dillon Consulting Ltd.	Regional SCADA Life Cycle Cost Analysis	\$ 35,000.00	\$ -	09/26/2014	02/05/2016	100
583-2016	Dillon Consulting Ltd.	Owner's Advocate Engineer and Professional Engineering Services for PLC, Regional SCADA and Power Reliability Upgrades - Phase I	\$ 509,000.00	\$ -	02/28/2017		28
<b>Total</b>			<b>\$ 902,398.00</b>	<b>\$ 1,448.00</b>			

**Upcoming Procurements:**

Description	Anticipated Award Date
RFQ 706-2017 - Design & Build PLC, Regional SCADA and Power Reliability Upgrades	Q3 2018
RFP - Design & Build PLC, Regional SCADA and Power Reliability Upgrades	Q4 2019
583-2016 - Phase II (Contract Administration, Post Construction Services and associated Project Management)	Q1 2020

**Schedule** (Update from last report)

There has been delay in the delivery of subconsultant reports. This delay has resulted in a subsequent delay in the overall delivery of the preliminary design report. A draft preliminary design report is anticipated to be received in Q4 2017, however completion of the report is not anticipated until Q1 2018. Table 2 – Milestones has been updated to reflect this change in schedule.

A draft D-B RFQ has been received and reviewed by the City and is anticipated to be finalized in Q1 2018. Under the current schedule, the D-B RFQ will be issued in Q1 2018 with Proponents prequalified in Q3 2018. The design-build Request for Proposal (D-B RFP) development will begin in Q1 2018 and the D-B RFP is anticipated to be issued in Q4 2018. It has been Water and Waste's previous experience that the development of the D-B RFP tends to be complex and lengthy. Based on Water and Waste's lessons learned on previous D-B projects, delays in the development of the D-B RFP may result in delays between the prequalification of Proponents to the issuance of the D-B RFP. This delay may result in prequalified Proponents losing interest or changes to joint venture relationships potentially

resulting in Proponent withdrawal from the procurement process. The project team may delay the issuance of the D-B RFQ until the D-B RFP has undergone significant development to ensure the procurement timelines provided to Proponents will be maintained. This potential schedule change will be considered further by the project team and reported on in the upcoming reporting period.

The delivery targets for project implementation remain on schedule.

The constraints on implementation 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 Regional SCADA upgrade.

Table 2 – Milestones

Milestones					
	Deliverable	Original Targeted Completion Date	Revised Targeted Completion Date	Actual Completion Date	Estimated % Complete
1	Issue RFP for Owner's Advocate Engineer			31-Oct-16	100
2	Complete Preliminary Design	2017 Q3	<b>2018 Q1</b>		60
3	Issue D-B RFQ	2017 Q4	2018 Q1		66
4	Prequalify D-B Proponents	2018 Q3	2018 Q3		0
5	Issue D-B RFP	2018 Q4	2018 Q4		0
6	Award D-B Contract	2019 Q4	2019 Q4		0
7	Complete SCADA Upgrade	2020 Q3	2020 Q3		0
8	Complete PLC Upgrading Phase I (Tache/Shoal Lake)	2021 Q1	2021 Q1		0
9	Complete PLC Upgrading Phase II (McPhillips/Hurst)	2022 Q1	2022 Q1		0
10	Complete PLC Upgrading Phase III (MacLean/Deacon)	2023 Q1	2023 Q1		0
11	Complete Commissioning of all Project Components	2023 Q3	2023 Q3		0

**Risk** (Update from last report)

No new risks were identified within this reporting period.

Table 3 – Significant Risks and Mitigations Strategies

<b>Significant Risks and Mitigation Strategies</b>	
<b>Risk Statement and Explanation</b>	<b>Risk Mitigation Management Plan</b>
<b>New:</b>	
n/a	
<b>Ongoing:</b>	
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 D-B 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 Class 3 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.
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.
<b>Mitigated:</b>	
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 implementation 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 has virtualized the existing SCADA servers to minimize system impacts and maintain system operation in the event of a failure prior to project completion. The purchased hardware will be re-used in the upgraded SCADA system as a test bed platform.

**Financial** (Update from last report)

For further information, refer to Appendix B – Financial Forecast

Costs incurred during this reporting period (\$130,250) were related to preliminary engineering and procurement services under Contract 583-2016.

The variance in spending from this report to the Capital Expenditures Monthly Report is \$402,339, which includes the expenditure in the closed 2011 and 2014 budgets. These funds were spent on preliminary engineering.

The total budget of \$12,300,000 for the Water SCADA Upgrade Project includes a budget for engineering and implementation for the PLC upgrade work of \$9 million based on a Class 3 estimate prepared in 2013. The project budget for engineering and implementation for the Regional SCADA upgrade is \$3.3 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 previously prepared cost estimates assumed a design-bid-build procurement approach and are a number of years old. As part of the preliminary design work under Contract 583-2016, the Owner's Advocate Engineer will be providing an updated Class 3 cost estimate for the project to confirm project budgets prior to procurement of a design-builder.

**Funding** (Update from last report)

There is no external funding for this project.

Table 4 – Project Funding Forecast and Receivable

<b>Funding Forecast and Receivable</b>			
<b>Funding Source</b>	<b>Adopted Budget (in millions)</b>	<b>Amended Budget (in millions)</b>	<b>Committed (in millions)</b>
<b>Class of Estimate</b>	<b>Class 3</b>		
City of Winnipeg	\$12.3	\$12.3	\$12.3
Province of Manitoba	-	-	-
Federal Government of Canada	-	-	-
Other Contributions	-	-	-
<b>Total</b>	<b>\$12.3</b>	<b>\$12.3</b>	<b>\$12.3</b>

- The funding forecast should match the Capital Budget Detail Sheet.

**Property Acquisition** (Update from last report)

N/A

**Stakeholder Engagements/Communications** (Update from last report)

N/A



### **Subsequent Events after Report Period End Date**

The Department is currently reviewing upcoming capital projects and the potential to amalgamate synergistic projects. The Department is considering amalgamating the delivery of the Water SCADA upgrade project with the Pumping Stations Reliability Upgrades to minimize station shut-down times during project implementation and to potentially reduce overall upgrade costs.

**FINANCIAL IMPACT**

**Financial Impact Statement** Date: [November 27, 2017](#)

**Project Name:**  
**Water Supervisory Control and Data Acquisition**  
**(SCADA) Upgrade,**  
**Project ID: 2005100200,**  
**Quarterly Project Status Report No. 11**  
**For the Period Ended October 31, 2017**

**COMMENTS:**

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

"Original signed by L. Szkwerek, CPA, CGA"  
Lucy Szkwerek, CPA, CGA  
Manager of Finance & Administration

## CONSULTATION

This Report has been prepared in consultation with:

N/A

## OURWINNIPEG POLICY ALIGNMENT

01-3 Prosperity Direction 1: Provide efficient and focused civic administration and governance. This report supports demonstration of accountability through service performance measurement and reporting.

03-6c of the Sustainable Water and Waste Direction Strategy: Water Distribution System Investment. This capital project supports investment in the water SCADA system.

## SUBMITTED BY

**Department:** Water and Waste

**Division:** Engineering Services

**Prepared by:** A.M. Weiss, P.Eng., Senior Project Engineer

**Date:** November 29, 2017

## Appendices

Appendix A – Key Project Facts

Appendix B – Financial Forecast

Appendix C – Key Project Events (History)

## Appendix A – Key Project Facts

<b>Project Name</b>	Water Supervisory Control and Data Acquisition (SCADA) Upgrade
<b>Business Owner (Department)</b>	Water and Waste
<b>Project ID</b>	2005100200
<b>Project Sponsor</b>	Linda McCusker
<b>Department Responsible for Project Delivery</b>	Water and Waste
<b>Consultant Engineer (Company Name)</b>	Dillon Consulting Ltd.
<b>Adopted Budget</b>	\$12,300,000
<b>Class of Estimate (Adopted)</b>	3
<b>Range of Estimate (Adopted)</b>	\$9,370,000 to \$16,660,000
<b>Amended Budget</b>	\$12,300,000
<b>Class of Estimate (Amended)</b>	3
<b>Range of Estimate (Amended)</b>	\$9,370,000 to \$16,660,000
<b><u>Project Scope</u></b>	
<p>The SCADA system controls and monitors the operation of the Winnipeg Drinking Water Treatment Plant and the Water Supply and Distribution System. The automated control system is comprised of specialized computer hardware and software, remote communications, instrumentation, and Programmable Logic Controllers (PLCs). The Department currently has two water SCADA systems; the Regional SCADA system which is used to control and monitor processes for the Water Supply and Distribution System and the Water Treatment Plant SCADA which is used to control and monitor processes at the Winnipeg Drinking Water Treatment Plant. The SCADA system is essential for the supply, water treatment process control and distribution of drinking water.</p>	
<p>The computer servers, workstations and software of the Regional SCADA system were last upgraded in 2006 and have reached the end of their useful life. Operating system support for this hardware ended in July 2015 and hardware age has exceeded the current industry standard for replacement, increasing risks to system reliability. To achieve system sustainability and to ensure continuous operation of the system, replacement of server and workstation hardware and installation of software with longer support lifespan, including compatibility with new hardware, is required. As part of the upgrade, the Regional SCADA will be integrated with the Water Treatment Plant SCADA as this solution was found to have an overall lower 25-year lifecycle cost than maintaining two separate SCADA systems.</p>	
<p>The PLCs currently in use at the three regional pumping stations (McPhillips, MacLean and Hurst), Tache and Deacon booster pumping stations, and the Shoal Lake Intake Facility were installed in 1992 and are no longer serviced or supported by the manufacturer. Upgrading the water supply system's PLCs at this time will allow for the review of the control software to optimize the operation of the system.</p>	
<b>Major Capital Projects Advisory Committee Membership:</b>	
<ul style="list-style-type: none"> <li>- Moira Geer (Chair), Director of Water and Waste</li> <li>- Geoffrey Patton, Manager of Engineering, Water and Waste</li> <li>- Cindy Fernandes, Director of Community Services</li> <li>- John Kiernan, Director, Planning, Property and Development</li> <li>- Georges Chartier, Chief Asset &amp; Project Management Officer</li> <li>- Lucy Szkwarek, Manager of Finance and Administration, Water and Waste</li> </ul>	

## Appendix B – Financial Forecast

**Appendix B - Water Supervisory Control and Data Acquisition (SCADA) Financial Forecast\***  
As at October 31, 2017

Project Component Deliverables	Budget (in 000's)			Actual Costs To Oct 31,	Expenditure Forecast (in 000's)					Total Forecasted Costs	Surplus (Deficit) From Amended Budget	Variance Last Report	Change in Variance
	Adopted Budget <sup>1</sup>	Council Approved Change <sup>**</sup>	Amended Budget <sup>1</sup>		Projected Costs								
					2017	2018	2019	2020	2021 and Beyond				
Engineering, Design and Other <sup>2</sup>	\$ 1,428	\$ -	\$ 1,428	\$ 554	\$ 120	\$ 135	\$ 160	\$ 158	\$ 301	\$ 1,428	\$ -	\$ -	\$ -
Construction <sup>3</sup>	\$ 8,674	\$ -	\$ 8,674	\$ 80			\$ 55	\$ 4,490	\$ 4,049	\$ 8,674	\$ -	\$ -	\$ -
Land Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Internal Financing/Overhead Costs	\$ 198	\$ -	\$ 198	\$ 2	\$ -	\$ -	\$ -	\$ 113	\$ 83	\$ 198	\$ -	\$ -	\$ -
Contingency	\$ 2,000	\$ -	\$ 2,000	\$ -					\$ 2,000	\$ 2,000	\$ -	\$ -	\$ -
<b>Total Project Budget</b>	<b>\$ 12,300</b>	<b>\$ -</b>	<b>\$ 12,300</b>	<b>\$ 636</b>	<b>\$ 120</b>	<b>\$ 135</b>	<b>\$ 215</b>	<b>\$ 4,761</b>	<b>\$ 6,433</b>	<b>\$ 12,300</b>	<b>\$ -</b>		
<b>% of Project Budget Spent</b> (Actual Costs to Date / Adopted & Amended Budget)	5%		5%										

<sup>1</sup> Total budget of \$12,300,000 for the Water SCADA Upgrade Project: Distribution of costs between Engineering, Construction, Internal Financing/Overhead and Contingency was done by the Water and Waste Department. The project budget for engineering and implementation for the Programmable Logic Controller upgrade work is \$9 million based on a Class 3 estimate. The project budget for engineering and implementation for the Regional SCADA upgrade is \$3.3 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 a change in budget is not recommended due to the class of the estimate. These are estimates and will be revised as the project

<sup>2</sup> Engineering, Design and Other includes Professional Engineering Services (preliminary design, life cycle cost analysis, procurement of Design-Builder and contract administration services).

<sup>3</sup> Construction includes Design-Builder Services (detailed design, programming, procurement, implementation and warranty services).

\* Amended budget and actual costs to date have been agreed to the City's general ledger and Monthly Capital Expenditures Report.

\*\* Footnote to Council approved change should reference the date of the Council meeting the change was approved and the reason for the increase in budget.

## Appendix C – Key Project Events (History)

In 2012, SNC-Lavalin Inc. was retained by the City to provide professional consulting services for the predesign of the Programmable Logic Controller (PLC) replacement. The predesign was undertaken in conjunction with the predesign of power reliability upgrades required at the pumping stations. A final preliminary design report was issued in 2013 and recommended the complete replacement of the PLCs and that a complete rewrite of the PLC program code be undertaken. A Class 3 cost estimate was prepared for the PLC upgrades as part of the preliminary design work.

In 2014 and 2015, Dillon Consulting Ltd. performed a Regional Supervisory Control and Data Acquisition (SCADA) life cycle cost analysis. The Department currently has two water SCADA systems; the Regional SCADA system which is used to control and monitor processes for the Water Supply and Distribution System and the Water Treatment Plant SCADA which is used to control and monitor processes at the Winnipeg Drinking Water Treatment Plant. The life cycle cost analysis examined the option of upgrading the existing Regional SCADA system and the option to integrate the Regional SCADA with the Water Treatment Plant SCADA into a single SCADA system. The life cycle cost analysis found that integrating both the Water Treatment Plant SCADA and the Regional SCADA into a single system was the preferred option having the lowest life-cycle cost. A Class 4 cost estimate was prepared for the Regional SCADA upgrade as part of the life cycle cost analysis.

On April 9, 2015, the Water SCADA Upgrade project began reporting to the Standing Policy Committee on Finance under the \$10 million reporting threshold for capital projects in effect at that time.

On October 28, 2015, Council approved a new reporting threshold of \$20 million for capital projects. The Council approval also included provision for adjustment of the reporting threshold on an annual basis to account for construction inflation. Projects reporting to the Standing Policy Committee on Finance under the previous \$10 million reporting threshold will continue to report.

In early 2016, the Department determined that design build (D-B) was the preferred delivery method for the project. The D-B project delivery method was selected due to shorter implementation timelines and the additional benefit of having the contractor on the design team. The project design will require significant overlap between the designer and contractor to complete the programming, shut down planning and coordination and commissioning for the project. The Department also determined that an Owner's Advocate Engineer would be required to provide additional preliminary design services, to procure the design-builder and to provide guidance to the City throughout the project.

On February 28, 2017, Dillon Consulting Ltd. was engaged under Request for Proposal (RFP) 583-2016 as an Owner's Advocate Engineer. Services to be provided under Phase I of the Contract include: preliminary design, procurement of a design-builder and associated project management services. Phase II of the Contract will include contract administration, post construction services and associated project management and will be awarded at a later date subject to the conditions of RFP 583-2016. As part of the preliminary design work under Contract 583-2016, the Owner's Advocate Engineer will provide an updated Class 3 cost estimate for the project to confirm project budgets prior to procurement of a design-builder.

The Water SCADA Upgrade adopted project roll-up includes the following Project Identifications:

<b>Project ID 2005100200</b>	<b>Project Year</b>	<b>Amended Budget</b>
2005000211	2011	\$367,339 <sup>1</sup>
2005000214	2014	\$35,000 <sup>1</sup>
2005000215	2015	\$0 <sup>2</sup>
2005000216	2016	\$3,864,661 <sup>2</sup>
2005000217	2017	\$8,033,000 <sup>2</sup>
<b>Total Amended Budget</b>		<b>\$12,300,000</b>

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

<sup>2</sup> 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 of 2014, the \$ balance of 2015 and a portion of 2016 was re-budgeted and included in the 2017 Capital Budget funds request.