Minutes – Standing Policy Committee on Finance – July 5, 2019

REPORTS

Item No. 5 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:

1. That the financial status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project, as contained in this report, be received as information.

2. That the project schedule be reset, as detailed in Table 2 of this report, to reflect the change in project delivery method.

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

DECISION MAKING HISTORY:

Moved by Councillor Gilroy,

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. 13 For the Period Ended March 31, 2019**

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	P. Olafson, Interim CFO	M. Ruta, Interim CAO

EXECUTIVE SUMMARY

Project On Schedule: Yes ☐ No ☑ **Project On Adopted Budget: Yes ☐ No ☑**

Percent of Schedule Complete: 35% **Percent of Adopted Budget Spent:** 7%

During this reporting period, preliminary design work was completed and a short form over-expenditure report was approved for additional consultant effort to assist the City in Design-Build (DB) template development. A DB Request for Qualification (RFQ) document to prequalify DB Proponents was issued. The RFQ submissions received did not meet the passing thresholds to prequalify any of the Proponents to advance to the Request for Proposal (RFP) phase for the project. The Department determined that the go forward option with the greatest likelihood of successful procurement and least impact on project schedule was to change the project delivery method from DB to Design-Bid-Build (DBB). The change in project delivery method has been approved by the Major Capital Projects Advisory Committee.

Subsequent to the DB RFQ process, a second over-expenditure report was submitted to the Chief Financial Officer to increase the Owner's Advocate Engineer's scope of work to include detailed design services and to de-scope the remaining DB procurement services to reflect the change in the project delivery method. The over-expenditure report was approved on May 3, 2019, subsequent to the report period end date.

The change in project delivery method will extend the project completion date by approximately eight months. The Department recommends a project schedule reset to reflect the change in project delivery method now that the over-expenditure report has been approved.

As part of the 2019 Capital Budget process, the Water SCADA Upgrade budget was increased by $4,125,000. The increase was due to project amalgamation and cost increases identified in an updated Class 3 cost estimate for the project. Costs incurred during this reporting period

were related to preliminary engineering and procurement 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

1. That the financial status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project, as contained in this report, be received as information.

2. That the project schedule be reset, as detailed in Table 2 of this report, to reflect the change in project delivery method.

3. That the proper officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

REASON FOR THE REPORT

The Asset Management Administrative Standard FM-004 requires all projects with a total estimated cost of $23 million (2019) 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)

Within this reporting period, the preliminary design report was finalized and an updated Class 3 cost estimate was established under Contract 583-2016. A short form over-expenditure report was approved by the Manager of Engineering Services under Contract 583-2016 for additional consultant effort to assist the City in DB template development which was beyond the scope of the original assignment.

The DB RFQ was also issued during this reporting period and three Proponent submissions were received. The technical and financial consensus meetings for the RFQ determined the three Proponent submissions did not meet the passing thresholds required to pre-qualify any of the Proponents to advance to the RFP phase for the project. The Department has assessed go forward options and has determined that changing the project delivery method from DB to DBB

was the option with the greatest likelihood of successful procurement with the least impact on the project schedule. The Major Capital Projects Advisory Committee concurred with the Department's recommendation to change the project delivery method from DB to DBB. Proponents were notified on March 5, 2019 that a DB RFP would not be issued for the project.

Subsequent to the DB RFQ process, a second over-expenditure report was submitted to the Chief Financial Officer to increase the Owner's Advocate Engineer's scope of work under Contract 583-2016 to include detailed design, procurement and associated project management services and to de-scope the remaining DB procurement services and associated project management services to reflect the change in the project delivery method. The over-expenditure report was approved on May 3, 2019, subsequent to the report period end date.

The former Corporate Support Services (now Innovation, Transformation & Technology) Department awarded RFP 922-2017 for the Provision of Transparent LAN Services and Internet Gateway Services on November 11, 2018. The Water SCADA Upgrade project will fund a portion of the contract to allow the communication network used by the Regional SCADA system to be upgraded to fiber optic as shown in Table 1.

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	$ -	7/23/2012	1/31/2014	100%
307-2012	SNC-Lavalin Inc.	Equipment Identification Standard and Electrical Design Guide Development	$ 45,500.00	1,448.00	4/24/2012	11/15/2013	100%
Consultant assignment at or under $35,000	Dillon Consulting Ltd.	Regional SCADA Life Cycle Cost Analysis	$ 35,000.00	-	9/26/2014	2/5/2016	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	78,032.59	2/28/2017		71%
922-2017	Shaw Telecom G.P. operating as Shaw Business	Overall Contract: Provision of Transparent LAN Services and Internet Gateway Services - Portion funded by Water SCADA Upgrade: Provision of Fiber Optic Based Transparent LAN Services	$ 315,000.00	-	11/30/2018		0%
		Total	**$ 1,217,398.00**	**$ 79,481**			

Upcoming Procurements:

Description	Anticipated Award Date
583-2016 Phase II - Contract Administration, Post Construction Services and associated Project Management	2021 Q1
Tender - Regional SCADA, PLC and Power Reliability Upgrades	2021 Q1

Schedule (Update from last report)

The preliminary design report was finalized on April 26, 2018 and the DB RFQ was issued on May 1, 2018 as shown in Table 2.

The RFQ process to shortlist DB Proponents, however, was unsuccessful and a Proponent shortlist was not established as shown in Table 2. Proponents were notified on March 5, 2019 that an RFP would not be issued for the project.

Table 2 has been updated to include revised deliverables and target completion dates that reflect the change in project delivery method. As shown in Table 2, the change in project delivery method will extend the project completion date by approximately eight months. The Department recommends that the project schedule be reset to reflect the change in project delivery method. The new schedule is detailed in Table 2, below.

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 release of the tender, upon award of the tender 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			2016 Q4	100%
2	Complete Preliminary Design	2017 Q3	2018 Q2	**2018 Q2**	100%
3	Issue DB RFQ	2017 Q4	2018 Q2	**2018 Q2**	100%
4	Prequalify DB Proponents	2018 Q3	2018 Q4	**2019 Q1 (no shortlist established)**	100%
5	Issue DB RFP	2018 Q4	**N/A**	**N/A**	**N/A - change in delivery method**
6	Award DB Contract	2019 Q4	**N/A**	**N/A**	**N/A - change in delivery method**
7	**Complete Detailed Design (new)**	**2020 Q3**	-		0%
8	**Award Tender (new)**	**2021 Q1**	-		0%
9	Complete SCADA Upgrade	2020 Q3	**2021 Q3**		0%
10	Complete PLC Upgrading Phase I (Tache/Shoal Lake)	2021 Q1	**2022 Q2**		0%
11	Complete PLC Upgrading Phase II (McPhillips/Hurst)	2022 Q1	**2023 Q2**		0%
12	Complete PLC Upgrading Phase III (MacLean/Deacon)	2023 Q1	**2024 Q2**		0%
13	Complete Commissioning of all Project Components	2023 Q3	**2024 Q2**		0%

Risk (Update from last report)

Table 3 – Significant Risks and Mitigation Strategies has been updated to reflect the most current version of the Risk Management Register.

Table 3 – Significant Risks and Mitigations Strategies

Significant Risks and Mitigation Strategies	
Risk Statement and Explanation	**Risk Mitigation Management Plan**
New:	
Tender could yield no bidders, however likelihood is low as bidders are more familiar with DBB procurement approach.	Potential bidders to be notified once tender is posted.
Ongoing:	
Difficulties in commissioning or changeover that may affect system operation.	Project constraints to be clearly defined in the tender documents. Start upgrades at low risk stations and apply lessons learned to future station upgrades.
Constraints on implementation meant 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 reviewed and adjusted at key milestones including; prior to release of the tender, upon award of the tender and at completion of the Regional SCADA upgrade.
Bid prices exceed available budget resulting in inability to award and schedule delay.	Detailed design to establish a Class 1 cost estimate prior to issuance of the tender.
Mitigated:	
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. As stations are upgraded, the obsolete PLC components will be retained and added to the spare parts inventory as necessary.
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.

As part of the 2019 Capital Budget process, the Water SCADA Upgrade project budget was increased by $4,125,000. The increase was due to project amalgamation ($1,539,000) and cost increases identified in an updated Class 3 cost estimate for the project ($2,586,000).

The Department determined it would be beneficial to amalgamate the Water SCADA Upgrade Project with the Pumping Stations Reliability Upgrades project to minimize station shut-down times during project implementation and potentially reduce overall upgrade costs. The previously approved budget for the Pumping Stations Reliability Upgrades project of $1,539,000 was added to the Water SCADA Upgrade project budget.

An updated Class 3 cost estimate was also established as part of the preliminary design work under Contract 583-2016. The previous estimate was a blend of two estimates and included a

Class 4 estimate for the SCADA upgrade work and a Class 3 estimate for the PLC upgrades. The new Class 3 estimate was prepared for the project as a whole and identified the following which increased the overall project estimate by $2,586,000:

- Increased equipment costs; some of the equipment in the original estimate is no longer available in Canada or is now being made obsolete by the manufacturer. The proposed replacement equipment is more expensive and/or requires additional installation costs to make up for lost functionality.
- Additional scope; the project scope was increased to include emergency backup power supply for the pump motor control circuit.
- Additional overhead; the contingency, corporate administration and corporate interest charges were increased to account for the increased project scope and cost.

The total costs incurred during this reporting period were $225,692.57. The incurred costs 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 expenditures in the closed 2011 and 2014 budgets. These funds were spent on preliminary engineering.

Funding (Update from last report)

There is no external funding for this project.

Table 4 – Project Funding Forecast and Receivable

Funding Forecast and Receivable			
Funding Source	**Adopted Budget (in millions)**	**Amended Budget (in millons)**	**Committed (in millions)**
Class of Estimate	**Class 3**	**Class 3**	
Retained Earnings	$12.300	$16.425	$16.425
Total	**$12.300**	**$16.425**	**$16.425**

Property Acquisition (Update from last report)

N/A

Stakeholder Engagements/Communications (Update from last report)

N/A

Subsequent Events after Report Period End Date

On May 3, 2019, the Chief Financial Officer approved the over-expenditure to increase the Owner's Advocate Engineer's scope of work to include detailed design services and to de-scope the remaining DB procurement services to reflect the change in the project delivery method.

FINANCIAL IMPACT

Financial Impact Statement **Date:** June 27, 2019

Project Name:
Water Supervisory Control and Data Acquisition (SCADA) Upgrade,
Project ID: 2005100200,
Quarterly Project Status Report No. 13
For the Period Ended March 31, 2019

COMMENTS:

This report is submitted for information. The financial forecast can be found in Appendix B.

"Original signed by L. Szkwarek, CPA, CGA"
Lucy Szkwarek, 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: June 27, 2019

File No.: W-761

Appendices

Appendix A – Key Project Facts

Appendix B – Financial Forecast

Appendix C – Key Project Events (History)

Appendix A – Key Project Facts

Project Name	Water Supervisory Control and Data Acquisition (SCADA) Upgrade
Business Owner (Department)	Water and Waste
Project ID	2005100200
Project Sponsor	Linda McCusker
Department Responsible for Project Delivery	Water and Waste
Consultant Engineer (Company Name)	Dillon Consulting Ltd.
Adopted Budget	$16,425,000
Class of Estimate (Adopted)	3
Range of Estimate (Adopted)	-20% to +30% or $13,140,000 to $21,353,000
Amended Budget	$16,425,000
Class of Estimate (Amended)	3
Range of Estimate (Amended)	-20% to +30% or $13,140,000 to $21,353,000
Project Scope	
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.	
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. The Regional SCADA communication network will also be upgraded to increase bandwidth capacity.	
The PLCs currently in use at the three regional pumping stations (McPhillips, MacLean and Hurst), Tache and Deacon booster pumping stations, a 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.	
A number of upgrades to address risks associated with the configuration of the pumping and ancillary equipment were identified in a Water Pumping Station Power Reliability Study. These power reliability upgrades will address shortcomings in the existing control and instrumentation design and will add redundancy to ensure greater station reliability. The Regional SCADA and PLC upgrades will be undertaken in conjunction with power reliability upgrades at the pumping stations to minimize station shut down times and potentially reduce overall project costs.	
Major Capital Projects Advisory Committee Membership:	
- Moira Geer (Chair), Director of Water and Waste - Geoffrey Patton, Manager of Engineering, Water and Waste - Cindy Fernandes, Director of Community Services - John Kiernan, Director of Planning, Property & Development - Rob Taylor, Manager, Major Capital Projects Oversight, Infrastructure Planning Office - Lucy Szkwarek, Manager of Finance and Administration, Water and Waste	

Appendix B – Financial Forecast

Appendix B - Water Supervisory Control and Data Acquisition (SCADA) Upgrade Financial Forecast*
As at March 31, 2019

Project Component Deliverables	Budget (in 000's)			Expenditure Forecast (in 000's)								Surplus (Deficit) From Amended Budget	Variance Last Report	Change in Variance
	Adopted Budget[1]	Council Approved Change[2]	Amended Budget	Actual Costs To March 31, 2019	Projected Costs						Total Forecasted Costs			
					2019	2020	2021	2022	2023	2024				
Engineering, Design and Other[3]	$ 1,428	$ 1,012	$ 2,440	$ 825	$ 727	$ 624	$ 90	$ 80	$ 80	$ 14	$ 2,440	$ -	$ -	$ -
Construction[4]	$ 8,674	$ 2,367	$ 11,041	$ 91	$ 340	$ -	$ 4,791	$ 3,853	$ 1,675	$ 291	$ 11,041	$ -	$ -	$ -
Land Acquisition	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Internal Financing/Overhead Costs	$ 198	$ 159	$ 357	$ 2	$ 11	$ -	$ 154	$ 124	$ 54	$ 12	$ 357	$ -	$ -	$ -
Contingency	$ 2,000	$ 587	$ 2,587	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,587	$ 2,587	$ -	$ -	$ -
Total Project Budget	**$ 12,300**	$ 4,125	$ 16,425	$ 918	$ 1,078	$ 624	$ 5,035	$ 4,057	$ 1,809	$ 2,904	$ 16,425	$ -		
% of Project Budget Spent (Actual Costs to Date / Adopted & Amended Budget)	7%		6%											

*Adopted and Amended budget and actual costs to date have been agreed to the City's general ledger and Monthly Capital Expenditures Report. Actual cost variance equals spending from closed budget years. See below.

[1] The distribution of costs between engineering, construction, internal financing/overhead and contingency was done by the Water and Waste Department. Budget funds and projected costs have been reallocated between project component deliverables to reflect the change in project delivery method from design-build to design-bid-build.

[2] On March 20, 2019, Council adopted the 2019 Capital Budget which included a $4,125,000 increase to the Water SCADA Upgrade budget.

[3] Engineering, Design and Other includes Professional Engineering Services (preliminary design, life cycle cost analysis, procurement services, detailed design and contract administration).

[4] Construction includes equipment and hardware, software, programming, implementation and warranty services.

Project ID	Project Year	Amended Budget	Costs to Date
2005100200	2016 - 2019	$16,022,661	$516,107
Total Closed Project Budget[5]		$402,339	$402,339
Total Project Budget to Date		$16,425,000	$918,446

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

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 (DB) was the preferred delivery method for the project. The DB 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 included: preliminary design, procurement of a design-builder and associated project management services. Phase II of the Contract includes 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 provided an updated Class 3 cost estimate for the project to confirm project budgets.

On May 1, 2018, Request for Qualifications (RFQ) No. 706-2017A was issued to shortlist DB Proponents. The RFQ closed on July 31, 2018 and three Proponent submissions were received.

The technical and financial consensus meetings for the RFQ determined the three Proponent submissions did not meet the passing thresholds required to pre-qualify any of the Proponents to advance to the RFP process for the DB project. The Department determined that changing the project delivery method from a DB to a Design-Bid-Build (DBB) was the option with the greatest likelihood of successful procurement with the least impact on the project schedule. On February 22, 2019, the Major Capital Projects Advisory Committee concurred with the Department's recommendation to change the project delivery method from DB to DBB.

On March 20, 2019, Council adopted the 2019 Capital Budget which included a $4,125,000 increase to the Water SCADA Upgrade budget. The increase was due to project amalgamation ($1,539,000) and cost increases identified in an updated Class 3 cost estimate for the project ($2,586,000).

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

Project ID	**Project Year**	**Amended Budget**
2005100200	2016 - 2017	$11,897,661
2005100200	2019	$4,125,000
Total Closed Project Budget[1]		$402,339
Total Project Budget to Date		$16,425,000

[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.