

**Minutes – Standing Policy Committee on Finance and Economic Development –
April 12, 2023**

REPORTS

**Item No. 4 Water Supervisory Control and Data Acquisition (SCADA) Upgrade,
Project ID: 2005100200,
Quarterly Project Status Report No. 19
For the Period Ended January 31, 2023**

STANDING COMMITTEE DECISION:

The Standing Policy Committee on Finance and Economic Development concurred in the recommendation of the Winnipeg Public Service and approved the following:

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 next reporting on the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project occur in 2024 Q3, as opposed to quarterly, given the long project delivery schedule. The project reporting schedule would be as identified in the Major Capital Projects Reporting Schedule.

**Minutes – Standing Policy Committee on Finance and Economic Development –
April 12, 2023**

DECISION MAKING HISTORY:

Moved by Councillor Rollins,

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

Carried

STANDING COMMITTEE DECISION:

On May 10, 2022, the Standing Policy Committee on Finance concurred in the recommendation of the Winnipeg Public Service and approved:

1. That the financial status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project, as contained in the report, be received as information.
2. That the next reporting on the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project, occur in 2023 Q2, as opposed to quarterly, given the long project delivery schedule. The project reporting schedule would be as identified in the Major Capital Projects Reporting Schedule.

ADMINISTRATIVE REPORT

**Title: Water Supervisory Control and Data Acquisition (SCADA) Upgrade,
Project ID: 2005100200,
Quarterly Project Status Report No. 19
For the Period Ended January 31, 2023**

Critical Path: Standing Policy Committee on Finance and Economic Development

AUTHORIZATION

Author	Department Head	CFO	CAO
C. D. Wiebe, P. Eng., CAMP, Manager of Engineering Services	T. W. Shanks, M. Eng., P. Eng. Director, Water and Waste Department	C. Kloepfer	M. Jack

EXECUTIVE SUMMARY

Project On Schedule: Yes No

Project On Adopted Budget: Yes No

Percent of Schedule Complete: 82%

Percent of Adopted Budget Spent: 49%

During this reporting period from March 1, 2022, to January 31, 2023, contract administration services under Request for Proposal (RFP) No. 583-2016 were provided.

Implementation of the supervisory control and data acquisition (SCADA) system replacement, programmable logic controller (PLC) replacement, and power reliability upgrades for the City's drinking water regional distribution system is ongoing under Tender No. 805-2019 with Manco Control Systems Inc.

Manco Control Systems Inc. has continued to develop the Functional Requirements Specification (FRS), advanced the programming for the work, and completed some factory acceptance testing. Commissioning for the SCADA and Tache Booster Pumping Station upgrades was completed in Q1 2023.

The total amended budget for the Water SCADA Upgrade project is \$19.115M. The total project budget spent to date (as of January 31, 2023) is \$6.025M or 32% of the total amended budget. A total of \$2.750M was expended during this reporting period on consulting services, implementation, project insurance, software, and desks.

Global supply chain issues and unanticipated networking issues have affected the project schedule and delayed project completion by approximately nine months, from Q2 2024 to Q1 2025. An amending agreement to pre-purchase hardware has mitigated any further hardware-related schedule impacts. The project team is investigating options to shorten the

implementation timeline to minimize the schedule delay.

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

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 next reporting on the Water Supervisory Control and Data Acquisition (SCADA) Upgrade project occur in 2024 Q3, as opposed to quarterly, given the long project delivery schedule. The project reporting schedule would be as identified in the Major Capital Projects Reporting Schedule.

REASON FOR THE REPORT

The Asset Management Administrative Standard FM-004 requires all projects with a total estimated cost of \$25 million (2022) or more report quarterly to the Standing Policy Committee on Finance and Economic Development. This threshold is adjusted annually for construction inflation as part of the annual Capital Budget approval. The Standing Policy Committee on Finance and Economic Development may also request reporting on any capital project.

IMPLICATIONS OF THE RECOMMENDATIONS

That reporting on the Water Supervisory Control and Dada Acquisition (SCADA) Upgrade project be suspended until 2024 Q3.

HISTORY/DISCUSSION

See Appendix C – Key Project Events (History)

Design (Update from last report)

Contract administration services under Phase II of RFP No. 583-2016 were provided within this reporting period.

The scope of Phase I of RFP No. 583-2016 was reduced by \$192,434.03 as electrical and control records to be created and updated as part of the Contract have been determined to be no longer required. The de-scoped fees have been moved to Phase II of RFP No. 583-2016 as a contingency allowance.

Phase I of RFP No. 583-2016 also included a \$125,000.00 contingency allowance. As the work of Phase I is essentially complete and the contingency allowance was not used, the unexpended contingency allowance has been transferred from Phase I to Phase II of RFP No. 583-2016.

Construction (Update from last report)

Implementation is ongoing under Tender No. 805-2019 with Manco Control Systems Inc. The scope of Tender No. 805-2019 consists of the supply, installation, programming, testing, start-up commissioning, training, and support for a complete SCADA system replacement, and PLC system and power reliability upgrades for the City's drinking water regional distribution system.

Manco Control Systems Inc. has continued to develop the FRS, advanced the programming for the work, and completed some factory acceptance testing. Commissioning for the SCADA and Tache Booster Pumping Station upgrades was completed in Q1 2023.

The network switch hardware previously reported as outstanding and affected by ongoing global supply chain issues has been received. Further, the amending agreement to Tender No. 805-2019 to allow for the pre-purchase of hardware and payment to the Contractor prior to its incorporation into the work has mitigated the schedule risk for the remaining hardware required for the work.

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.	Professional Consulting Services for the Regional Water Distribution System SCADA System Upgrade, Programmable Logic Controller Replacement and Power Reliability Upgrades - Phase I	\$509,000.00	1,294,475.55	2/28/2017		99%
		Professional Consulting Services for the Regional Water Distribution System SCADA System Upgrade, Programmable Logic Controller Replacement and Power Reliability Upgrades - Phase II	\$1,529,385.13	-	3/5/2021		24%
922-2017	Shaw Telecom G.P. operating as Shaw Business	Water SCADA Upgrade: Provision of Fiber Optic Based Transparent LAN Services	\$315,000.00	-	11/30/2018	2/20/2020	100%
805-2019	Manco Control Systems Inc.	RDS SCADA System Upgrade, PLC Replacement, and Power Reliability Upgrades	\$9,321,164.83	-	1/14/2021		30%
Total			\$ 12,067,948	\$ 1,295,924			

Schedule (Update from last report)

Global supply chain issues have affected the project schedule. A schedule extension due to hardware delays to Tender No. 805-2019 was issued and pushed project completion (excluding warranty) to Q4 2024. The amending agreement to pre-purchase hardware has mitigated any further hardware-related schedule impacts.

Unanticipated networking issues beyond the control of the Contractor have caused a delay to the implementation schedule. The Contractor is estimating that this delay will push project completion from Q4 2024 to Q1 2025. A schedule extension for this delay has yet to be issued, as options to shorten implementation timelines are being investigated.

The revised targeted completion dates (shown in bold) in Table 2 have been updated to reflect the Contractor’s implementation schedule for the work.

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	Complete Detailed Design	2020 Q3	-	2020 Q3	100%
6	Award Tender	2021 Q1	-	2021 Q1	100%
7	Complete SCADA Upgrade	2021 Q3	2023 Q1		90%
8	Complete PLC Upgrading - Tache	2022 Q2	2023 Q1		90%
8	Complete PLC Upgrading - Shoal Lake	2022 Q2	2023 Q2		10%
9	Complete PLC Upgrading - McPhillips	2023 Q2	2023 Q4		0%
9	Complete PLC Upgrading - MacLean	2024 Q2	2024 Q2		0%
10	Complete PLC Upgrading - Hurst	2023 Q2	2024 Q4		0%
10	Complete PLC Upgrading - Deacon	2024 Q2	2025 Q1		0%
11	Complete Commissioning of all Project Components	2024 Q2	2025 Q1		0%
12	Project Closeout	-	2025 Q1		0%

Risk (Update from last report)

No new risks were identified within this reporting period.

Table 3 – Significant Risks and Mitigations Strategies

Significant Risks and Mitigation Strategies	
Risk Statement and Explanation	Risk Mitigation Management Plan
New:	
Ongoing:	
Difficulties in commissioning or changeover that may affect system operation.	Project constraints were 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; upon receipt of Contractor's schedule and at completion of the Regional SCADA upgrade.
Mitigated:	
COVID-19 pandemic affecting workforce, travel, supply chain, and facility access.	COVID-19 schedule delay clauses have been incorporated into the Tender. Schedule extension to be considered as required. Amending agreement to allow the pre-purchase of hardware to mitigate supply chain impacts.
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.

A total of \$2,750,651.81 was expended during this reporting period. Expenditures included \$202,507.64 on consulting services under RFP No. 583-2016 and \$2,446,370.84 on programming, configuration, factory acceptance testing, and implementation under Tender No. 805-2019. Owner-controlled project insurance for Tender No. 805-2019 was also procured during this reporting period at a cost of \$93,690.22. Additionally, some software and desks were purchased for the project at a cost of \$8,083.11.

Funding (Update from last report)

There is no external funding for this report.

Table 4 – Project Funding Forecast

Funding Forecast			
Funding Source	Adopted Budget (in millions)	Amended Budget (in millions)	Committed (in millions)
Class of Estimate	Class 3		
Retained Earnings	12.300	19.115	19.115
Total	\$12.300	\$19.115	\$19.115

Property Acquisition (Update from last report)

N/A

Stakeholder Engagements/Communications (Update from last report)

N/A

Subsequent Events after Report Period End Date

N/A

FINANCIAL IMPACT

Financial Impact StatementDate: [March 17, 2023](#)

Project Name:

**Water Supervisory Control and Data Acquisition (SCADA) Upgrade,
Project ID: 2005100200,
Quarterly Project Status Report No. 19
For the Period Ended January 31, 2023**

COMMENTS:

Financial Forecast for Water Supervisory Control and Data Acquisition (SCADA) can be found in Appendix B.

A. Wiebe, CPA, CGA for

Lucy Szkwarek, CPA, CGA
Manager of Finance & Administration

CONSULTATION

This Report has been prepared in consultation with:

N/A

OURWINNIPEG POLICY ALIGNMENT

This report aligns with OurWinnipeg 2045 Policy 2.18 - Potable Water Conservation. Investment in the drinking water regional distribution system will ensure a continuous supply of water to the City of Winnipeg.

WINNIPEG CLIMATE ACTION PLAN ALIGNMENT

N/A

WINNIPEG POVERTY REDUCTION STRATEGY ALIGNMENT

Consideration was given as to whether this report connects to the Winnipeg Poverty Reduction Strategy (PRS) and its Goals and Objectives, and it was determined that the PRS is not applicable to this specific report.

SUBMITTED BY

Department: Water and Waste
Division: Engineering Services
Prepared by: A. Weiss, P. Eng., Senior Project Engineer
Date: March 22, 2023

Appendices

Appendix A – Key Project Facts

Appendix B – Financial Forecast

Appendix C – Key Project Events (History)

Appendix A – Key Project Facts

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	\$12,300,000
Class of Estimate (Adopted)	3 (blended Class 3 and Class 4)
Range of Estimate (Adopted)	-24% to +35% or \$9,370,000 to \$16,660,000
Amended Budget	\$19,115,000
Class of Estimate (Amended)	3
Range of Estimate (Amended)	-20% to +30% or \$15,292,000 to \$24,849,500
<u>Project Scope</u>	
<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. The Regional SCADA communication network will also be upgraded to increase bandwidth capacity.</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>	
<p>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.</p>	
Major Capital Projects Advisory Committee Membership:	
<ul style="list-style-type: none"> - Tim Shanks (Chair), Director of Water and Waste - Cynthia Wiebe, Manager of Engineering, Water and Waste - Cindy Fernandes, Director of Community Services - Marc Pittet, Acting Director of Planning, Property & Development - Danny Tooth, Manager of Major Projects Oversight, Assets and Project Management - Lucy Szwarek, Manager of Finance and Administration, Water and Waste 	

Appendix B – Financial Forecast

Appendix B - Project Water Supervisory Control and Data Acquisition (SCADA) Financial Forecast As at January 31, 2023

Project Component Deliverables	Budget (in 000's)			Actual Costs To Jan. 31, 2023	Expenditure Forecast (in 000's)				Total Forecasted Costs	Surplus (Deficit) From Amended Budget	Variance Last Report	Change in Variance
	Adopted Budget ¹	Council Approved Change ²	Amended Budget		Projected Costs							
					2023	2024	2025	2026				
Engineering, Design and Other ³	\$ 1,428	\$ 2,403	\$ 3,831	\$ 2,421	\$ 678	\$ 670	\$ 62	\$ -	\$ 3,831	\$ -	\$ -	\$ -
Construction ⁴	\$ 8,872	\$ 1,433	\$ 10,305	\$ 3,604	\$ 3,367	\$ 2,925	\$ 424	\$ -	\$ 10,320	\$ (15)	\$ -	\$ (15)
Contingency	\$ 2,000	\$ 2,979	\$ 4,979					\$ 4,964	\$ 4,964	\$ 15	\$ -	\$ 15
Total Project Budget	\$ 12,300	\$ 6,815	\$ 19,115	\$ 6,025	\$ 4,045	\$ 3,595	\$ 486	\$ 4,964	\$ 19,115	\$ -		
% of Project Budget Spent (Actual Costs to Date / Adopted & Amended Budget)	49%		32%									

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 table below.

¹The distribution of costs between engineering, construction and contingency was done by the Water and Waste Department.

²On March 20, 2019, Council adopted the 2019 Capital Budget which included a \$4,125,000 increase to the Water SCADA Upgrade budget. On March 20, 2020, Council adopted the 2020 Capital Budget which included a \$2,690,000 increase to the Water SCADA Upgrade budget.

³Engineering, Design, and Other includes professional engineering services (preliminary design, life cycle cost analysis, procurement services, detailed design and contract administration).

⁴Construction includes equipment and hardware, software, programming, implementation, warranty services, insurance and internal finance and administration costs associated with construction.

Project ID	Project Year	Amended Budget	Costs to Date
2005100200	2016-2020	\$18,712,661	\$5,622,391
Total Closed Project Budget ⁵		\$402,339	\$402,339
Total Project Budget to Date		\$19,115,000	\$6,024,730

⁵Does 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) No. 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 included contract administration, post construction services and associated project management and was to be awarded at a later date subject to the conditions of RFP No. 583-2016. As part of the preliminary design work under RFP No. 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 \$4,125,000.00 increase to the Water SCADA Upgrade budget. The increase was due to project amalgamation (\$1,539,000.00) and cost increases identified in an updated Class 3 cost estimate for the project (\$2,586,000.00).

On March 20, 2020, Council adopted the 2020 Capital Budget which included a \$2,690,000.00 increase to the Water SCADA Upgrade budget. The increase includes additional funds to account for construction innovation loss that may have been achieved through a design-build project delivery method and project scope and cost increases.

On January 14, 2021, Tender No. 805-2019 was awarded to Manco Control Systems Inc. for the implementation phase of the project. The work of Tender No. 805-2019 consists of the supply, installation, programming, testing, start-up commissioning, training, and support for a complete SCADA system replacement, and PLC system and power reliability upgrades for the City's drinking water regional distribution system.

On March 5, 2021, Phase II of RFP No. 583-2016 was awarded to Dillon Consulting Ltd. in accordance with the terms of the Contract. The Phase II services to be provided include contract administration, post construction services, and associated project management.