Agenda – Council – February 28, 2019

Report – Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – February 14, 2019

Item No. 2 North End Sewage Treatment Plant Biological Nutrient Removal Upgrade Project

STANDING COMMITTEE RECOMMENDATION:

On February 19, 2019, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management, and the Environment, as amended, and submitted the following to Council:

1. That the existing capital project budget for the North End Sewage Treatment Plant (NEWPCC) Biological Nutrient Removal Upgrade be renamed to NEWPCC Upgrade: Power Supply and Headworks Facilities.

2. That the existing capital project budget be reduced by $387,209,958 and the remaining capital budget of $408,380,000 (including $4.2 million of interest to be capitalized during the construction period) be used to deliver the NEWPCC Upgrade: Power Supply and Headworks Facilities which is based upon a Class 3 estimate.

3. That subject to written confirmation of funding from the Federal and Provincial governments, the Winnipeg Public Service prioritize the remaining two major capital projects, NEWPCC Upgrade: Biosolids Facilities, and NEWPCC Upgrade: Nutrient Removal Facilities, to complete the NEWPCC Upgrade, taking into consideration licencing requirements, rate impacts and available funding, and report back to Council.

4. That the Proper Officers of the City of Winnipeg do all things necessary to implement the foregoing.

Report – Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – February 14, 2019

DECISION MAKING HISTORY:

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On February 19, 2019, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment, with the following amendment:

- Add "subject to written confirmation of funding from the Federal and Provincial governments," immediately after "That" in Recommendation 3,

and submitted the matter to Council.

STANDING COMMITTEE RECOMMENDATION:

On February 14, 2019, the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment concurred in the recommendation of the Winnipeg Public Service and submitted the to the Executive Policy Committee and Council.

ADMINISTRATIVE REPORT

Title: **NORTH END SEWAGE TREATMENT PLANT (NEWPCC) BIOLOGICAL NUTRIENT REMOVAL UPGRADE PROJECT**

Critical Path: **The Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – Executive Policy Committee – Council**

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

The objectives of the North End Sewage Treatment Plant Biological Nutrient Removal Upgrade (NEWPCC Upgrade) project are to meet regulatory requirements, address end-of-life assets, and to manage wet weather flows. The revised overall estimated project construction cost is $1.634 billion (Class 3 estimate +30%/-20%) which exceeds the existing construction cost budget of $795.59 million (Class 5 estimate, +100%/-50%) approved by Council. In addition to the overall project construction cost there is an estimated $155.0 million in interest charges to be capitalized during the construction period. The total estimated cost for the NEWPCC Upgrade project is $1.789 billion.

The Department undertook a review of the procurement strategy with the goal to mitigate risk and provide opportunities to manage the overall project complexity and cost.

The Department recommends implementing the NEWPCC Upgrade in phases by creating three capital projects, and prioritizing the projects based on risks and available funding.

The funding strategy for the NEWPCC Upgrade is included in the 2019 Water and Sewer Rates Report.

RECOMMENDATIONS

1. That the existing capital project budget for the North End Sewage Treatment Plant (NEWPCC) Biological Nutrient Removal Upgrade be renamed to NEWPCC Upgrade: Power Supply and Headworks Facilities.

2. That the existing capital project budget be reduced by $387,209,958 and the remaining capital budget of $408,380,000 (including $4.2 million of interest to be capitalized during

the construction period) be used to deliver the NEWPCC Upgrade: Power Supply and Headworks Facilities which is based upon a Class 3 estimate.

3. That the Public Service prioritize the remaining two major capital projects, NEWPCC Upgrade: Biosolids Facilities, and NEWPCC Upgrade: Nutrient Removal Facilities, to complete the NEWPCC Upgrade, taking into consideration licencing requirements, rate impacts and available funding, and report back to Council.

4. That the Proper Officers of the City of Winnipeg do all things necessary to implement the foregoing.

REASON FOR THE REPORT

Council approval is required to change an existing approved capital project and budget.

IMPLICATIONS OF THE RECOMMENDATIONS

Completing the NEWPCC Upgrade as three separate capital projects will mitigate the risk associated with a single large, complex, and lengthy project, and provide opportunities to better manage the overall project scope and cost.

Completing the Power Supply and Headworks Facilities project first maintains momentum of the project team, achieves progress towards licence compliance and provides risk mitigation of critical end-of-life assets. Completion of this project will also provide the necessary reliability for the treatment plant's power supply, raw sewage pumping and pre-treatment assets, and automation control system.

Funding for the NEWPCC Upgrade: Power Supply and Headworks Facilities project is incorporated as part of the Water and Waste Department 2019, Water and Sewer rate 10-year Financial Plan. Funding of the overall NEWPCC Upgrade assumes support from the federal and provincial governments.

HISTORY / DISCUSSION

The NEWPCC has been in operation since 1937 and treats about 70% of sewage in Winnipeg. It is the largest and most complex of the three sewage treatment plants serving the City of Winnipeg, and provides all primary and secondary activated sludge treatment, and sludge processing for the City's 3 sewage treatment plants. The objectives of the NEWPCC Upgrade are:

- to meet the Province of Manitoba regulatory licence and Water Protection Act;
- address end-of-life assets;
- expand solids capacity for future growth; and
- manage wet weather flows.

In the past 15 years, the Manitoba Clean Environment Commission has convened public hearings on the City's wastewater collection and treatment systems (2003) and nutrient reduction and ammonia treatment at the sewage treatment plants (2009 and 2011).

Following these hearings, the Province issued Environment Act Licenses for the City's 3 sewage treatment plants which stipulate limits for nitrogen and phosphorus. The biological nutrient upgrade at the West End Sewage Treatment Plant is complete and the South End Sewage Treatment Plant upgrade is ongoing.

The NEWPCC Environment Act License No 2684 RRR stipulates an in service date of December 31, 2014 which was subsequently altered to December 31, 2019 in a letter from Manitoba Sustainable Development on December 30, 2014. In 2019 the Public Service will submit a request for alteration of the license for the in service date based upon the three project schedule.

The NEWPCC Plant upgrade was previously estimated at $795.59 million based upon a Class 5 Association for the Advancement of Cost Engineering (AACE) cost estimate. Council approved this budget on March 22, 2016. At that time, the project procurement strategy was that the NEWPCC Upgrade project be undertaken predominantly as a single, large capital project with smaller ancillary projects. In 2017 a revised Class 5 cost estimate was provided by the engineering consultant, as the design of the Upgrade progressed, indicating that the estimated project would cost over one billion dollars.

The NEWPCC estimate, based upon a Class 3 estimate is $1.634 billion (+30%/-20%) which is based upon an updated preliminary level design construction cost, escalation, an increase in the US dollar exchange rate and lessons learned from South End Sewage Treatment Plant Upgrade. In addition to the overall project construction cost there is an estimated $155.0 million in interest charges to be capitalized during the construction period. The total estimated cost for the NEWPCC Upgrade project is $1.789 billion. Due to the increase in the project construction cost, the procurement strategy was reviewed for mitigating opportunities.

Based on the review of the procurement strategy, the Department recommends that the NEWPCC Upgrade be completed as three separate capital projects but that the design-build methodology still be utilized for project one and evaluated for future works. Each project has consideration for innovation, its attractiveness to bidders, less interdependency and process constraints, and increased independent operation. Decommissioning is also considered to be carried out within each project.

The three capital projects and Class 3 cost estimates (including interest charges) to complete the NEWPCC Upgrade are identified as:

1. NEWPCC Upgrade: Power Supply and Headworks Facilities - $408 million;
2. NEWPCC Upgrade: Biosolids Facilities - $553 million; and
3. NEWPCC Upgrade: Nutrient Removal Facilities - $828 million

The Department recommends that the Power Supply and Headworks Facilities project be delivered first as it is associated with critical end-of-life assets and the scope of work needs to be operational before the work in the remaining two projects can be brought on-line. It should be noted that the Power Supply component has been awarded and construction is ongoing under the original project budget and being reported on at the Standing Policy Committee on Finance.

The estimated total cost for NEWPCC Upgrade: Power Supply and Headworks Facilities capital project is $ 408.38 million (Class 3 estimate, +30%/-20%) which also includes existing committed funds.

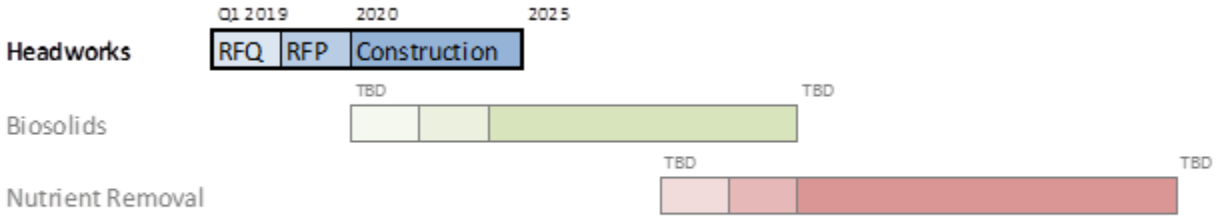
The existing sewage sludge treatment facility (Biosolids) at NEWPCC is nearing its treatment capacity – preliminary reviews indicated that the facility could be at capacity in the next 5 – 10 years. Additional and ongoing reviews are needed to be undertaken to confirm the facility's capacity horizon, including the beneficial impact of upgrades to the Headworks Facility and the SEWPCC. Failure to upgrade the sludge treatment facility at NEWPCC will result in limiting the economic growth within the City of Winnipeg and the Capital Region.

The project schedule is indicated in Figure 1. Based on a Request for Qualification (RFQ) posting date of Q1 2019, it is anticipated that Headworks Facilities construction would start in 2020, and would be substantially complete in 2025. The duration of the project is anticipated to be six years due to the need for tunneling, numerous tie-ins, extensive control system migration work, and several deep excavations. The contractor selected for this work could potentially reduce the project schedule through innovation.

The Biosolids Facilities and Nutrient Removal Facilities capital projects will be evaluated after the Power Supply and Headworks Facilities project has been awarded. It is possible that these projects can be executed simultaneously to reduce the overall construction schedule but this will require additional review by the Department.

A funding strategy for the capital projects is expected to include support from the provincial and federal governments.

Figure 1 – NEWPCC Upgrade Schedule



Scope of Project: NEWPCC Upgrade: Power Supply and Headworks Facilities

The scope of work under this capital project will include the following:

- Upgrading the existing power supply as the electrical loads associated with the future NEWPCC upgrades will exceed the current power supply capacity and redundancy. It also provides improved high voltage switchgear performance.
- Construction of standby power generation to mitigate the risks associated with utility power failure. The NEWPCC, largest of the City's three sewage treatment plants, is the only facility without standby power.
- Implementation of a plant-wide migration of the existing distributed control system (at its end-of-life) to a new process control system to avoid loss-of-support, obsolescence and reliability issues.
- Replacement of the existing 1937 raw sewage pumping station, which is approaching the end of its service life.
- Replacement of the existing re-aeration and grit removal building with a new aeration and grit removal facility which will meet the requirements of the future downstream treatment

process. The existing screening and grit removal system is at end-of-life and would not be compatible with the future works.

- Removal of the scum and carrier water from the primary treatment to reduce the volumetric loading rate to the digesters.
- Decommissioning of the existing raw sewage pumping station, aeration and grit removal facility and associated appurtenances.
- Relocation of the communication tower and early planning works.
- Professional consulting services and administrative costs.

FINANCIAL IMPACT

Financial Impact Statement

Date: January 14, 2019

Project Name:

First Year of Program **2018**

NORTH END SEWAGE TREATMENT PLANT (NEWPCC) BIOLOGICAL NUTRIENT REMOVAL UPGRADE PROJECT

	2018	2019	2020	2021	2022
Capital					
Capital Expenditures Required	$ 408,380,000				
Less: Existing Budgeted Costs	795,589,958				
Additional Capital Budget Required	$ (387,209,958)	$ -	$ -	$ -	$ -
Funding Sources:					
Debt - Internal					
Debt - External					
Grants (Enter Description Here)					
Reserves, Equity, Surplus					
Other - Enter Description Here					
Total Funding	$ -	$ -	$ -	$ -	$ -
Total Additional Capital Budget Required	$ (387,209,958)				
Total Additional Debt Required	$ -				
Current Expenditures/Revenues					
Direct Costs					
Less: Incremental Revenue/Recovery					
Net Cost/(Benefit)	$ -	$ -	$ -	$ -	$ -
Less: Existing Budget Amounts					
Net Budget Adjustment Required	$ -	$ -	$ -	$ -	$ -

Additional Comments: Adopted capital budget of $408,380,000 will be retained to fund the NEWPCC Upgrade: Power Supply and Headworks Facilities project. The balance of existing capital budget, in the amount of $387,209,958, formerly the NEWPCC Biological Nutrient Removal Upgrade project will be cancelled.

"Original signed by L. Szkwarek, CPA, CGA"
Lucy Szkwarek, CPA, CGA
Manager of Finance and Administration

CONSULTATION

In preparing this report there was consultation with:

N/A

OURWINNIPEG POLICY ALIGNMENT

This report is in accordance with the OurWinnipeg policies through

OurWinnipeg Reference: 02-2 Environment:

The upgrade of NEWPCC seeks to reduce the environmental impact of our citizens on the Red River and the downstream lakes and rivers while also increasing the reliability of the sewage treatment facility.

SUBMITTED BY

Department: Water and Waste
Division: Engineering Services
Prepared by: Jackie Veilleux, PMP, P. Eng., and, Remi Adedapo, M.A.Sc., PMP, P. Eng.
Date: January 23, 2019
File No.: S-972