



April 14, 2022

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Environment, Climate and Parks
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street
Winnipeg, MB R3H 0W4

Attention: James Capotosto, A/Director

**RE: INTERIM PHOSPHOROUS REMOVAL QUARTERLY REPORT FOR JANUARY,
FEBRUARY, MARCH 2022**

The City of Winnipeg (City) is submitting a Quarterly Report for the periods of January, February, March (first Quarter) of 2022 in accordance with the conditional approval of the Notice of Alteration for the North End Sewage Treatment Plant (NEWPCC). Table 2 shows the schedule for the Interim Phosphorous Removal Project, which is currently on schedule.

January

The preliminary design, which was submitted in December 2021 by the current consultant, KGS, was reviewed by the City. The design has altered slightly from what was previously proposed. More storage for ferric chloride was recommended and the projected chemical requirements were 20% greater than previously estimated. It was also recommended that an additional ferric chloride dosing point, downstream of the secondary clarifiers, be installed.

February

The City accepted the recommended changes by KGS and the preliminary design was finalized. A 'Hazard and Operability' (HAZOP) workshop was conducted in mid-February. A HAZOP workshop is a walk-through of the design and controls to identify hazards and operational conflicts and propose ways to correct and/or mitigate these issues.

The City also submitted an update to the Province on activities at the NEWPCC, including Interim Phosphorous Removal. The update can be found at the City's website:

<https://winnipeg.ca/waterandwaste/pdfs/sewage/2022%20NEWPCC%20Upgrade%20Report.pdf>

March

The outcomes of the HAZOP workshop were incorporated into the ongoing detailed design of the facility. KGS submitted a 60% design to the City for review and comment. A 60% design meeting was also held on March 23, 2022. Moving forward, the project team will continue the design and costing of the project and prepare tender documents for construction.

On March 11, 2022, the City responded to a request for more information from the Province. Table 1 below was provided to indicate the expected phosphorous concentrations in the NEWPCC effluent throughout various stages of the NEWPCC Upgrade.

Table 1. Estimated phosphorous concentrations through various phases of the NEWPCC Upgrade

Phase	Period	Estimated total phosphorous concentration in NEWPCC Final Effluent
Stage 1: Phosphorous reduction with existing infrastructure	Until August 2021	Approximately 4.0 to 4.5 mg/L on average
Stage 2: Maximized phosphorous reduction through optimization with existing infrastructure	August 2021 to July 2023	Approximately 3.5 mg/L on average
Stage 3: Interim phosphorous reduction through additional infrastructure as approved on May 28, 2021	August 2023 to December 2030	Approximately 2.5 to 3.0 mg/L on average (phosphorous levels may increase as City growth consumes sludge processing capacity)
Stage 4: Enhanced interim phosphorous reduction to as low as the 1.0 mg/L effluent phosphorous limit upon commissioning of the biosolids facility	January 2031 to January 2032	1 mg/L – beyond January 2032, 1 mg/L is dependant on the sludge loading levels. This assumes the maximum sludge generating scenario.
Stage 5: Ongoing phosphorous removal meeting the 1.0 mg/L effluent phosphorous limit upon commissioning of the biological nutrient removal facility	Dependent on constructability review and funding for NEWPCC Nutrient Removal Facility	1 mg/L

Phosphorous concentrations in the final effluent are reported in the NEWPCC's monthly compliance reports and can be found online: <https://winnipeg.ca/waterandwaste/sewage/compliance.stm>



Table 2. Schedule for Interim Phosphorous Removal

Deliverable	Description	Contractual Dates	% Complete February Report	% Complete March Report	% Complete Q1 2022 Report	Originally Projected Date	Revised or Completed Date	Work Remaining
Consultant RFP	Draft, review, post RFP	N/A	100%	100%	100%	July 2021	July 31, 2021	Complete, RFP closed
	Evaluation, Admin Report, Approvals, Award	N/A	100%	100%	100%	September 30, 2021	September 28, 2021	Complete, RFP awarded
Preliminary Design (PD)	PD plus reviews and approval by WWD	February 3, 2022	100%	100%	100%	March 31, 2022	February 2, 2022	Complete
Detailed Design (DD)	DD plus reviews and approval by WWD	May 18, 2022	5%	60%	60%	June 30, 2022		100% design review
Construction Tender	Draft, review, post tender	May 26	0%	0%	0%	June 30, 2022		
	Tender posting period	May 26, 2022 to June 23, 2022	0%	0%	0%	June 30, 2022		
	Award Recommendation, Admin Report, Approvals, Award	July 15, 2022	0%	0%	0%	June 30, 2022		
Construction and Commissioning	Substantial Performance	July 20, 2023	0%	0%	0%	June 30, 2023		
	Total Performance	August 31, 2023	0%	0%	0%	September 30, 2023		
	Warranty Period	August 31, 2024	0%	0%	0%	December 31, 2024		
Full Scale Testing and Implementation	Process review, dosing estimates, trouble shooting, optimization	August 31, 2024	0%	0%	0%	December 31, 2024		
Closeout	Certificate of Acceptance	September 2, 2024	0%	0%	0%	December 31, 2024		



Phosphorous Optimization

The NEWPCC Operators have maximized ferric dosing to the SBRs and digesters based on the existing ferric chloride pumping capacity. The average SBR effluent phosphorous load for Q1 2022 is 18 kg/day which corresponds with an average effluent concentration of 8.3 mg/L.

This is less than the average reported for Q4 2021, which had an average phosphorous load of 41.2 kg/day. Although the ferric chloride dosing rate in Q1 2022 is the same as Q4 2021, the lower hydrogen sulphide levels in the digesters have resulted in more ferric chloride being available for phosphorous removal. Ferric chloride will react more readily with hydrogen sulphide than with phosphorous thus when sulphur levels are high, there is less ferric available for phosphorous removal. Sulphur levels at the NEWPCC can vary depending on influent wastewater temperature, flow, and industrial activities in the NEWPCC catchment.

Opportunities for further phosphorous removal will be tested once construction of the Interim Phosphorus Removal Facility has been completed. Current pumping rates for ferric chloride will continue, with removal rates varying depending on environmental conditions (e.g. hydrogen sulphide levels in the digesters). For both Q4 2021 and Q1 2022, the SBRs have been performing better than intended in their original design and below the licence limit of 119 kg/d specified in Clause 27 of the NEWPCC Licence No. 2684RRR.

Should you have any questions on this report, please contact Michelle Paetkau at 204-986-4904 or by email at mpaetkau@winnipeg.ca.

Sincerely,



Michelle Paetkau, P. Eng.
A/Branch Head of Wastewater Planning and Project Delivery

Attachment

MP/dr

- c: Siobhan Burland Ross, M. Eng., P. Eng., Manitoba Conservation and Climate (email)
- Yvonne Hawryliuk, MSc, Manitoba Conservation and Climate (email)
- C. D. Wiebe, P. Eng., CAMP, Water and Waste Department (email)
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- C. Carrol, P. Eng., Water and Waste Department (email)
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