NORTH END SEWAGE TREATMENT PLANT
ENVIRONMENT ACT LICENCE 2684 RRR

INTERIM PHOSPHOROUS REDUCTION AND NEWPCC UPGRADE PLAN UPDATE

February 15, 2022

Executive Summary

The City of Winnipeg's North End Sewage Treatment Plant (NEWPCC) requires upgrading to meet the effluent quality limits specified in its Environment Act Licence No. 2684 RRR and in The Water Protection Act. Effluent limits are intended to mitigate impacts on water quality in the Red River and further downstream in Lake Winnipeg and beyond.

The Licence issued in 2005 required the NEWPCC to be upgraded by 2014. In 2014, a Notice of Alteration was approved by the province to extend the upgrade completion date to December 31, 2019. In recognition that the City would not comply with the Environment Act Licence requirements by December 31, 2019, on January 23, 2019 the Province requested the City provide a detailed analysis and schedule for the full biological nutrient removal upgrade and interim phosphorous removal in advance of the full upgrade. The City responded on July 31, 2019 asking for an extension to December 31, 2021 to allow time for an interim compliance plan, to secure funding opportunities, to integrate SEWPCC Nutrient Facility in the City's sludge treatment system and to study and test partial chemical trimming at NEWPCC. On December 5, 2019 the Province denied the City's request for extension and in the absence of an approved plan ordered the formation of a Project Steering Committee and a Project Advisory Committee.

A Project Steering Committee consisting of representatives from the City of Winnipeg and several departments of the Province of Manitoba was created and tasked with developing and overseeing the implementation of the Interim Phosphorous Reduction Plan and Nutrient Removal Implementation Plan (January 2020 Implementation Plan). A Project Advisory Committee consisting of external stakeholders in addition to City and Provincial representatives was also created to provide feedback to the Project Steering Committee as work proceeds. The committee submitted a report in September 2020 describing plans for the NEWPCC Upgrade and Interim Phosphorous Removal. Following the submission of the report, the Manitoba Government disbanded the committee. The City of Winnipeg continues with the NEWPCC Upgrades and provides monthly, quarterly, and annual reports directly to the Province of Manitoba and holds quarterly meetings with external stakeholders, with the Province also in attendance.

This report is an update to the September 2020 NEWPCC Upgrade Implementation Plan. The plan to reduce phosphorous and achieve licence compliance for the NEWPCC consists of two components:

- Objective 1 Interim Phosphorous Reduction Plan: a chemical-based interim phosphorous reduction phase, and
- Objective 2 NEWPCC Upgrade Plan: NEWPCC Upgrade with biological nutrient removal for full licence compliance.

The completion of the NEWPCC Upgrade will result in the construction of nutrient removal facilities at the NEWPCC, which will be capable of meeting all effluent licence conditions. Interim phosphorous reduction will reduce phosphorous in the effluent through chemical addition until such time as the NEWPCC Upgrade is completed and operational.

<u>Objective 1 Interim Phosphorous Reduction Plan</u>

The City of Winnipeg hired KGS to complete the design and perform contract administration for the construction of the Interim Phosphorous Facility. Design is expected to be complete in mid-2022 with construction complete in August 2023. While 1 mg/L total phosphorous removal may

not be achievable with the existing biosolids facility, the new biosolids facility may be able to meet 1 mg/L until the new Nutrient Removal (NR) facility is commissioned. This will be confirmed with full scale testing and implementation as the facilities are brought online.

The City will seek clarification from the Province on Manitoba on phosphorus reduction targets and factor into the ongoing design.

Objective 2 NEWPCC Upgrade Plan

The schedule proposed by the City for full nutrient removal includes three projects (Power Supply and Headworks Facilities, Biosolids Facilities, Nutrient Removal Facilities) that, once completed, will result in the NEWPCC being in full compliance by 2032. This schedule assumes there is sufficient municipal, provincial, and federal funding available before each project is scheduled to start.

The first two projects, the Headworks Facilities and the Biosolids Facilities, have been submitted for funding under the Investing in Canada Infrastructure Program (ICIP). The Headworks project was approved on May 31, 2021. A design build (DB) agreement was subsequently executed with Red River Solutions on June 11, 2021. Work on the Headworks project commenced in August 2021.

The Biosolids project ICIP application was submitted by the Province to the Federal Government and is currently awaiting a formal response. Discussions are underway regarding the procurement method to be used. The delay in ICIP funding approval is anticipated to extended the completion of the Upgrades to 2032. A constructability review, scheduled for 2023, will evaluate if there are opportunities to accelerate the final Nutrient Removal Facilities project to bring the NEWPCC into full compliance by 2030. The constructability review will explore options to mitigate site constraints such as lay down areas, traffic flows, etc. to allow concurrent construction of all three projects within a continuously operating the sewage treatment facility.

2022 Planned Upgrade Activities are as follows:

- Complete Power Supply project by Q1 2022;
- Finalize procurement model for the biosolids project that will accelerate completion
- Start biosolids procurement once ICIP funding approval has been received.
- Conduct a constructability review and feasibility of project stacking after biosolids project awarded. This will allow the City to evaluate opportunities to complete the Upgrades as soon as possible; and
- Review and revise the schedule as assumptions are validated and/or constraints are realized.

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Figures and Tables

1. Introduction

The City of Winnipeg's North End Sewage Treatment Plant (NEWPCC) requires upgrading to meet the effluent quality limits specified in its Environment Act Licence No. 2684 RRR and in The Water Protection Act. Effluent limits are intended to mitigate impacts on water quality in the Red River and further downstream in Lake Winnipeg and beyond.

The original Licence issued in 2005 required that the NEWPCC to be upgraded by 2014. In 2014, a Notice of Alternation was approved by the Province to extend the upgrade completion date to December 31, 2019. In recognition that the City would not comply with the Environment Act Licence requirements by December 31, 2019, on January 23, 2019 the Province requested the City provide a detailed analysis and schedule for the full biological nutrient removal upgrade and interim phosphorous removal in advance of the full upgrade. The City responded on July 31, 2019 asking for an extension to December 31, 2021 to allow time for an interim compliance plan, to secure funding opportunities, to integrate SEWPCC Nutrient Facility in the City's sludge treatment system and to study and test partial chemical trimming at NEWPCC. On December 5, 2019, the Province denied the City's request for extension and in the absence of an approved plan ordered the formation of a Project Steering Committee and a Project Advisory Committee.

The Interim Phosphorous Reduction Plan and Nutrient Removal Implementation Plan (January 2020 Implementation Plan) was submitted in January 2020. In January 2020, the Province and City agreed to the first year of work outlined within the January 2020 implementation plan (i.e., 2020) and committed to further work on reviewing timelines with an objective of bringing the NEWPCC into compliance earlier than the current end date of 2032. A review of the plans was intended for July 31, 2020 so that opportunities to accelerate the schedules and additional funding sources could be explored. Due to ongoing discussions regarding funding, schedule, and complications due to COVID-19 an update to the Interim Phosphorous Reduction Plan and Nutrient Removal Implementation Plan was rescheduled for September 30, 2020. This is the third update to describe the activities for the year 2021.

2. Background

2.1. Existing Wastewater Treatment in the City of Winnipeg

The City of Winnipeg Water and Waste Department owns and operates three sewage treatment plants and a sludge treatment plant, as shown in Figure 1.

The Water and Waste Department is in the midst of an upgrade program to all plants to comply with licence requirements, including nutrient removal.

The City's smallest plant, the West End Sewage Treatment Plant (WEWPCC) is licensed under Environment Act Licence 2669 E RR issued June 19, 2009. It treats 10% of the City's wastewater and was upgraded to meet nutrient removal requirements in 2008. It discharges to the Assiniboine River, which eventually flows to the Red River.

The City's middle-sized plant, the South End Sewage Treatment Plant (SEWPCC) is licensed under Environment Act Licence 2716 RR, issued April 18, 2012. It is currently under construction to increase capacity and to meet licence requirements, including nutrient removal. It will start removing total phosphorous to 1 mg/L from its effluent in 2022. The SEWPCC treats approximately 30% of the City's wastewater and discharges to the Red River upstream of the

Assiniboine River.

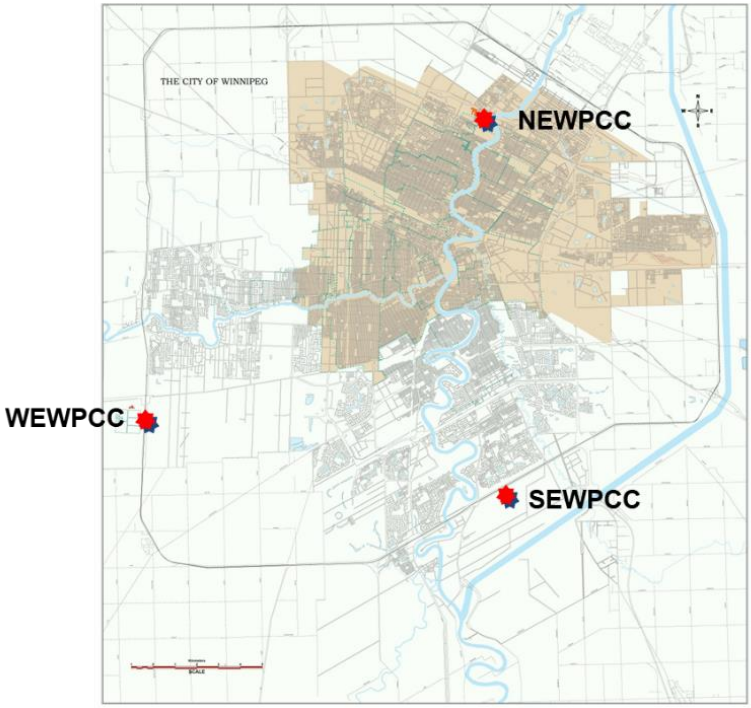


Figure 1: The City of Winnipeg's three sewage treatment plants

The North End Sewage Treatment Plant (NEWPCC) is the City's largest treatment plant and treats approximately 60% of the City's wastewater. It discharges to the Red River downstream of the Assiniboine River. The NEWPCC is licensed under Environment Act Licence 2684 RRR, issued June 19, 2009. The licence required the NEWPCC to be upgraded by 2014. In 2014, a Notice of Alteration was approved to extend the upgrade completion date to 2019. The facility is currently not in compliance with this licence.

The Water Protection Act also includes specific conditions related to the NEWPCC including a requirement to meet a 1 mg/L phosphorous limit and monthly ammonia limits along with five requirements related to nutrient removal and reuse:

- Nutrient removal must be achieved primarily by biological methods through application of the best available biological nutrient removal technologies.
- The use of chemical methods to remove nutrients must be minimized.
- If the NEWPCC is not able to fully remove nitrogen by the date required by subsection (1), it must be capable of being modified to do so with minimal additional costs.
- Nutrients that are removed must be recovered and recycled to the maximum extent possible through application of the best available technologies.
- Biosolids and wastewater sludge remaining after the treatment process must be reused.

All sludge that is generated by the three sewage treatment plants is treated at the NEWPCC. The City is currently implementing the Biosolids Master Plan submitted by the City in 2014 and approved by the Province in 2016.

The sludge from the nutrient removal plants is rich in nutrients and some of those nutrients can be released into the NEWPCC plant. The upgrades to the WEWPCC and SEWPCC will, therefore, impact nutrient levels in the NEWPCC plant effluent. Nutrient removal processes at WEWPCC and SEWPCC remove nutrients from the liquid phase and concentrate them in the solids (sludge). When this sludge is transported to the NEWPCC for further processing, nutrients may be released from the solids back into the liquid phase, which will result in increased total phosphorous concentration in the liquid effluent at NEWPCC unless a form of interim phosphorous removal is established at NEWPCC. In 2008 the NEWPCC was upgraded to reduce nutrients associated with the sludge. These upgrades, while reducing phosphorous, do not meet the 1 mg/L total phosphorous final effluent limit. Furthermore, as upgrades at the SEWPCC come online, nutrients in the final effluent at NEWPCC will increase. Interim phosphorous reduction options may be implemented to mitigate the impact of nutrient rich sludge. These options are discussed further in 'Objective 1 Interim Phosphorous Reduction Plan.'

2.2. The Provincial/Federal Funding Application Process

Investing in Canada Infrastructure Program (ICIP)

For information on the Investing in Canada Infrastructure Program (ICIP) and the project submission and approval process, please see Manitoba's *ICIP Program Guide* available at www.gov.mb.ca/ICIP.

The City of Winnipeg submitted the following two project applications under the ICIP Green Infrastructure Stream - Environmental Quality Sub-Stream related to upgrades at the NEWPCC:

Project 1: Headworks Facilities

This project will include upgrades to the Headworks Facilities such as raw sewage pumping, screening, grit screening, and grit removal. This project is a prerequisite for the subsequent Biosolids and Nutrient Removal Facilities projects that will address regulatory requirements. This project will also include replacement of end-of-life equipment. The estimated costs are as follows:

Total Gross Project Costs:	$421,099,000
Total Eligible Project Costs:	$290,277,657
Estimated Federal Contribution:	$116,111,063
Estimated Provincial Contribution:	$96,749,543
Estimated Proponent Contribution:	$208,238,394

The Headworks project was approved for ICIP funding on May 31, 2021; this excludes the NEWPCC Power Supply Upgrade Project that was already underway.

Project 2: Biosolids Facilities

This project will provide Biosolids treatment for Winnipeg's three sewage treatment plants at the NEWPCC, replace end-of-life equipment and address regulatory requirements regarding the recovery of nutrients and maximizing Biosolids reuse. The scope of this project will include new digesters, thermal hydrolysis equipment, phosphorous recovery equipment and sludge handling facilities. This project is a prerequisite for the subsequent Nutrient Removal Facilities project. Estimated costs are as follows:

Total Gross Project Costs:	$552,712,000
Total Eligible Project Costs:	$502,182,000
Estimated Federal Contribution:	$200,872,800
Estimated Provincial Contribution:	$167,377,261
Estimated Proponent Contribution:	$184,461,939

On September 30, 2020 City Council approved the transfer of $321.24M of the City of Winnipeg's federal allocation under the Public Transit Infrastructure Stream to the Green Infrastructure Stream to accommodate the federal share of the above projects.

A joint news release by the Province of Manitoba and the City of Winnipeg was issued on November 24, 2021 announcing the advancement of the City's Biosolids ICIP funding application to the Federal Government. The City is currently finalizing the procurement method to be used for the project and will proceed with procurement once funding is approved.

Project 3: Nutrient Removal Facilities
This project will support biological nutrient removal at the NEWPCC and address regulatory requirements for effluent quality limits and minimizing chemicals. These facilities are estimated to cost $828 million. The City will continue discussions with the Province on a funding structure for the biological nutrient removal facilities.

3. Objective 1: Interim Phosphorous Reduction Plan

The Interim Phosphorous Reduction Plan addresses short term phosphorous removal while construction activities for both biological phosphorous removal and other licence parameters (solids removal, ammonia removal, etc.) are in progress. Interim phosphorous reduction will also mitigate the increased phosphorous load at the NEWPCC as a result of nutrient removal at the SEWPCC. Interim phosphorous reduction will utilize the existing and future sludge treatment system; the updated schedule is presented in Attachment 1.

The creation of an Interim Phosphorous Reduction Plan started in early 2019 with the development of an Interim Phosphorous Options Report (AECOM, 2019), which described several options for reducing phosphorous at the NEWPCC before all projects of the Upgrade are complete. These options were evaluated assuming 2023 annual average flow conditions. The Interim Phosphorous Options Report (AECOM, 2019) concluded that while some phosphorous removal may be possible, none of the options would meet the NEWPCC 1 mg/L final effluent total phosphorous limit. This is due to capacity constraints of the existing sludge treatment system which was not designed or built for sludge associated with nutrient removal. However, all nutrient reduction efforts, even if they do not meet the 1 mg/L phosphorous limit, can contribute to improved water quality in the Red River, Lake Winnipeg and further downstream.

Since the completion of the Interim Options Phosphorous Report (AECOM 2019), the City hired AECOM to conduct laboratory testing and computer modeling for the following scenarios:

1. Scenario 1: Side-stream chemical phosphorous removal by dosing ferric chloride into the sludge treatment system to prevent phosphorous from the SEWPCC from releasing back into the system. It will also reduce phosphorous-based mineral (e.g., struvite) formation, which is known to coat pumps, pipes, and tanks, causing operational issues

and reduced capacity.

2. Scenario 2: Scenario 1 plus chemically enhanced primary treatment to remove additional phosphorous.
3. Scenario 3: Option 1 plus chemical phosphorous removal in the high purity oxygen reactors (HPO) and/or secondary clarifiers.

3.1. Activities in 2021

In the first quarter of 2021, the City received budget approval to design and build an Interim Phosphorous Removal Facility. AECOM also concluded their studies with laboratory testing of max-month flows in the spring flood season. These results were compared to computer model simulations and confirmed the overall recommendation: some interim phosphorous removal via chemical is possible at the NEWPCC but the high loads in spring would limit the amount of phosphorous that could be removed during this time period.

In the second quarter, the City issued a contract to KGS for the final design and contract administration of the Interim Phosphorous Removal Facility. KGS submitted the preliminary design in December 2021 for City review.

3.2. Activities Planned for 2022/2023

KGS will finalize the design of the Interim Phosphorous Removal Facility. A contract for construction is planned for mid-2022, with construction scheduled to be completed in mid-2023.

3.3. Interim Phosphorous Removal to Meet 1 mg/L

The new sludge treatment plant may allow for an enhanced interim chemical phosphorous removal option to meet the licence limit of 1 mg/L final effluent total phosphorous. An analysis of the future biosolids facility found that, to achieve a 1 mg/L phosphorous removal, the new biosolids facility would be at 99% capacity in 2031. This is due to the existing HPO and interim phosphorous removal processes which produce large quantities of sludge. The 1 mg/L phosphorous level in the final effluent assumes that the existing HPO processes can operate with these ferric chloride dosing rates; full scale testing is required to confirm this once the new biosolids facility is operational.

4. Objective 2: NEWPCC Upgrade Plan

The schedule for full biological nutrient upgrade is presented in Attachment 2. Timeframes assumed that funding was provided by all three levels of government by specific dates. Delays in funding approvals can have subsequent impacts on the overall design and construction schedules for the different phases of work. The City will undertake a constructability review to determine if there are opportunities to accelerate the completion of the upgrades.

Several factors will influence the schedule beyond 2022, such as a procurement review, a constructability review, contractor schedules, and progress regarding the funding application process. The constructability review will determine if some of the previously identified site constraints (lay down areas, traffic flows, construction congestion, etc.) can be mitigated so that the start of the Nutrient Removal Facilities can be advanced. The schedule will continue to be revised as new information becomes available and the risks/constraints/assumptions that were used to develop the schedule are realized and/or mitigated.

4.1. NEWPCC Site Preparation, Power Supply and Headworks Facilities Project

The Power Supply Project, which was advanced ahead of the Headworks project, brings electrical supply to the site to power the future upgraded plant and was substantially completed in 2020.

The ICIP funding application for Headworks was approved in 2021 and the design build agreement with Red River Solutions (RRS) was subsequently executed. RRS has since mobilized to site and undertaken the following major work items:

- Issued for Construction (IFC) drawings for temporary works are complete,
- permanent fencing installation complete,
- the realignment of Highland Avenue complete including traffic signalization,
- Installation of project funding sign installed on Main Street,
- the main site has been stripped and the grit building excavation started,
- Pile Dynamic Analysis (PDA) and vibration testing is complete, and
- mobilization for secant and precast piles and rock grouting installation is underway.

RRS is currently working towards the 60% Design Submission for the full project. RRS has currently been paid for 3 of 104 Milestones.

4.2. Biosolids Facilities Project

Due to capacity limitations of the current sludge treatment system, the Biosolids Facilities project is critical to support growth in Winnipeg and the Capital Region. This project was originally scheduled to start in the second quarter of 2020. Due to the provincial requirement to undertake a market sounding and the subsequent procurement method review, this has been delayed and is now anticipated to commence in 2022. Substantial Completion dates identified in Appendix 2 will be adjusted once the City has confirmation of ICIP funding approval.

4.3. Activities in 2021

In order to advance the biosolids ICIP funding application to the Government of Canada, the Province required the City to review the feasibility of a private public partnership (P3) procurement. The City, with the assistance of an external consultant, conducted market sounding interviews; the City did not study a procurement method where a private entity would take over operations and maintenance activities. The Province undertook a separate market sounding exercise on a design build finance operate and maintain procurement model for biosolids and nutrient removal. A report detailing the results of the market sounding was received as information by City Council on November 25, 2021. Prior to this on November 24, 2021, the Province announced that the Biosolids funding application, as submitted by the City of Winnipeg In October 2019, would be forwarded to the federal government for approval.

As a result of splitting the NEWPCC Upgrade into three capital projects, a revision to the preliminary design report for Biosolids Facilities was required. The draft report was submitted to the City in 2021 and is being finalized based on City's comments. A third-party cost consultant has also been engaged to provide an independent construction cost estimate for the project based on the revised preliminary design.

4.4. Nutrient Removal Facilities

The Nutrient Removal Facilities project is currently unfunded. As with the Biosolids

Facilities, the Nutrient Removal Facilities will require an update to the preliminary design and a procurement method and funding review; this is anticipated to take about nine months. Once funding is in place, the procurement period is estimated to take two and half to three years and the duration for detailed design, construction and commissioning is estimated at six years.

Opportunities to advance the schedule will continue to be reviewed. A constructability review to determine if the Nutrient Removal Facilities project can begin sooner will be carried out after the Biosolids Facilities project is further defined.

5. Assumptions and Constraints in Developing the Schedule

To develop a construction schedule of this scale and complexity, a series of assumptions and constraints are developed that will influence how the projects progress. An assumption is made based on current or expected conditions and experiences, recognizing that those experiences/conditions may change in the future. If an assumption is not realized then it may increase or decrease the length of the schedule and cost.

A constraint is a limitation that is imposed on the project. If the constraint is removed then the time scheduled and cost to complete a project may decrease. If an unidentified constraint is realized then there may be a delay in the schedule and increased cost.

In project management the risks related to assumptions and constraints are documented and mitigated as the schedule progresses. While there are risks that these assumptions and constraints can lengthen the schedule, corrective action may mitigate their impacts. They may also result in opportunities to accelerate the schedule. Throughout the NEWPCC Upgrade, the City will manage the project according to industry best practices. The following are a list of updated assumptions and constraints that were used to develop the construction schedules illustrated in Attachments 1 and 2 for Objectives 1 and 2, respectively.

5.1. Assumptions

1. The 2014 NEWPCC Upgrade Master Plan completed a conceptual and preliminary design of a biological nutrient removal (BNR) treatment process. It is assumed that this is the process that will be constructed and implemented.

2. The Biosolids Facilities project has a conceptual design with pre-selected equipment approved under the Biosolids Master Plan. It is assumed that pre-selected equipment will not change substantially following the procurement review.

3. The Biosolids procurement review will be completed in Q2 2022 and will determine the method that will best deliver Objective 2.

4. Dividing the upgrades into several smaller projects has helped move the overall objectives forward, as it was easier to identify funding and to award contracts.

5. The required funding is available from the City, Provincial and Federal governments per the schedule to complete the NEWPCC Upgrade:
    a. The Nutrient Removal Facilities project is not eligible for ICIP funding because the project completion date is outside of the funding program end date; there may be future opportunities for funding. This schedule assumes there will be

sufficient funding to support the Nutrient Removal Facilities project.
b. Affordability for City of Winnipeg ratepayers must be considered.

6. The schedule for Biosolids and Nutrient Removal Facilities assumes a form of design build procurement.

7. The City will continue to look for opportunities to advance design and construction to facilitate the completion on the NEWPCC Upgrade project. A constructability review has been added to the project to facilitate this.

8. There are sufficient professional consultant resources to design the NEWPCC Upgrades.

9. There are sufficient construction resources to build the NEWPCC Upgrades.

10. The construction tender pricing remains within the cost estimate for the NEWPCC Upgrade.

11. The City will have internal resources available to deliver the NEWPCC Upgrades:
    a. City Engineering staff will be executing the Interim Phosphorous Plan which may limit staff availability for other NEWPCC Upgrade projects.
    b. There is limited capacity for Wastewater Services staff to participate in these large projects due to daily operational work requirements.

12. The NEWPCC will continue to operate and treat wastewater during the construction schedule:
    a. Sludge hauling from WEWPCC and SEWPCC will not be impacted by the construction activities.
    b. Biosolids hauling from the NEWPCC for beneficial reuse will continue uninterrupted during construction.
    c. The Hauled Liquid Waste facility truck traffic into and out of the site will not be impacted by the construction activities per the schedule. The NEWPCC location is the only city Hauled Liquid Waste facility and must remain in service.

13. The NEWPCC Wastewater Services staff are available and able to facilitate the needs of the contractors working onsite.

14. A number of other construction projects outside the scope of the NEWPCC Upgrade are required to maintain treatment plant operations. These projects will be managed such that they do not impact the delivery of the NEWPCC Upgrade.

15. Full digester capacity is available.

16. The Power Supply Upgrade Total Performance to be completed in Q1 of 2022.

17. Biosolids capacity will be managed to remain within the existing digester capacity until the new Biosolids Facilities are brought into service.

18. Phosphorous rich sludge from the SEWPCC BNR Upgrade will be mitigated by the NEWPCC Interim Phosphorous project.

19. Interim Phosphorous reduction with chemical solution must be submitted by the City to

the Province and will be assessed and approved by the Provincial government as a Notice of Alteration per The Environment Act.

20. The impacts of COVID-19 will not result in further delays or added expense to the project. It is assumed that future COVID-19 outbreaks and isolation safety protocols will not interfere with construction efforts. The City will continue to assess COVID-19 impacts as the pandemic evolves.

21. The City's projected industrial loadings have made some allowance for high-strength industrial wastewater based on historical trends. Manitoba's Agricultural and Economic Development strategies will be in keeping with these trends.

5.2. Constraints

1. There is only one sludge treatment (i.e. digestion) process for the entire city. The existing NEWPCC Sewage Treatment Plant has competing load demands on capacity:
   - Annual growth and development (e.g., residential, commercial, industrial)
   - Interim Phosphorous generated sludge
   - SEWPCC BNR sludge
   - Capital Region Service Sharing Agreements

2. Further review has indicated that chemical phosphorous removal to 1.0 mg/L final effluent total phosphorous may be implemented with the new digestion facility but that full scale trials are necessary to confirm.

3. The NEWPCC site is very congested and construction lay-down area is limited and will impact contractor production rates as materials will have to be stored off site per the construction schedule.

4. The NEWPCC Upgrade project is a very large and complex construction process. The actions of one project can have a cascading impact on other projects and must be actively reviewed and managed to maintain scope, cost, and budget.

5. The existing City of Winnipeg approval process for budgets, awards etc. will be followed. Council is the award authority for contract values in excess of $5 million.

6. The delivery of the NEWPCC Upgrade Project will occur over a long period of time. During this time the NEWPCC is susceptible to periodic major flooding and/or weather events which could impact the construction schedule.

7. The NEWPCC is the oldest City sewage treatment plant. There have been many alterations and modifications to this plant over the years. Construction tie-ins from the new facilities to the existing will be difficult due to potential unknowns with respect to: existing facility records, condition of existing assets, and site geotechnical considerations.

8. The design and construction of the Headworks Facilities, Biosolids Facilities, and Nutrient Removal Facilities must follow in this order because each subsequent project has technical requirements from its predecessor before it can become operational.

9. If there is an outbreak of COVID-19, operating staff may need to go into isolation. Access to the NEWPCC site may become restricted to protect existing operations and

wastewater treatment.

10. The overall cost of the next phases of work will be a factor in execution.

6. Next Steps

For Objective 1 Interim Phosphorous Reduction Plan, the next steps are as follows:

- Complete preliminary and detailed design;
- Hire a contractor to build the facility (scheduled for completion in Q3 2023); and
- Optimize interim phosphorous removal with full scale trials and testing.

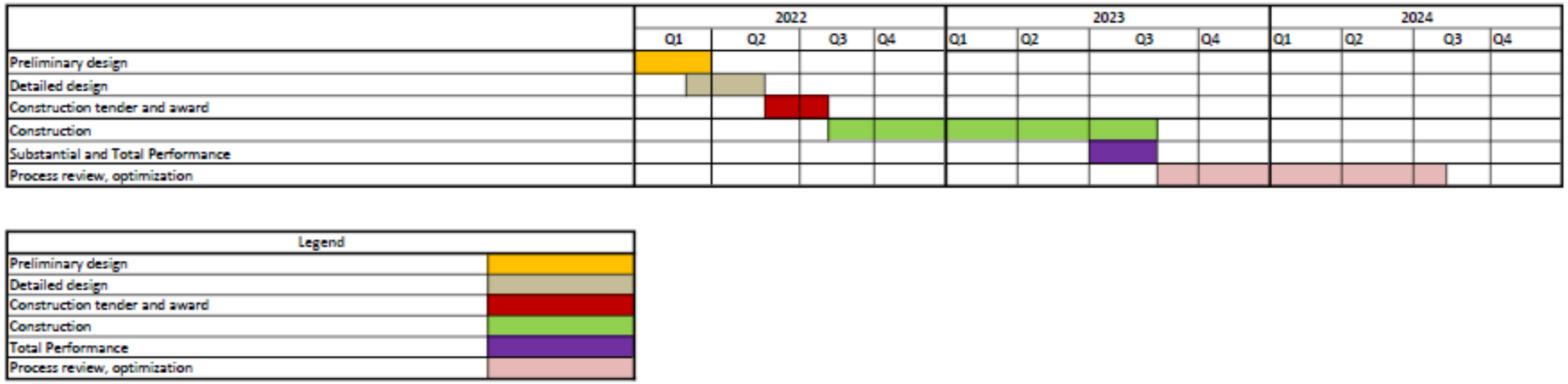
For Objective 2 NEWPCC Upgrade Plan, the next steps are as follows:

- Complete Power Supply project by end of 2022;
- Complete the Biosolids procurement review in Q2 2022;
- Conduct a constructability review in 2023 to determine how to complete the project as soon as possible; and
- Review and revise the schedule as assumptions are validated and/or constraints are realized.

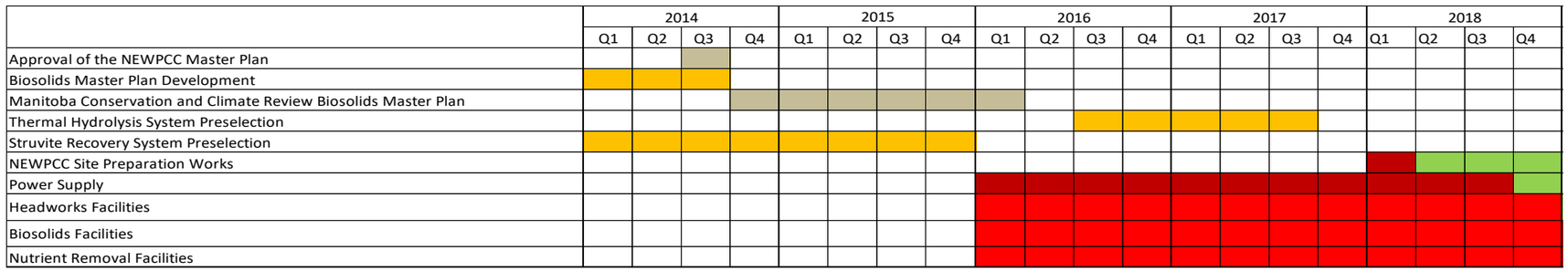
For both objectives, updates will continue to be provided to the Province of Manitoba.

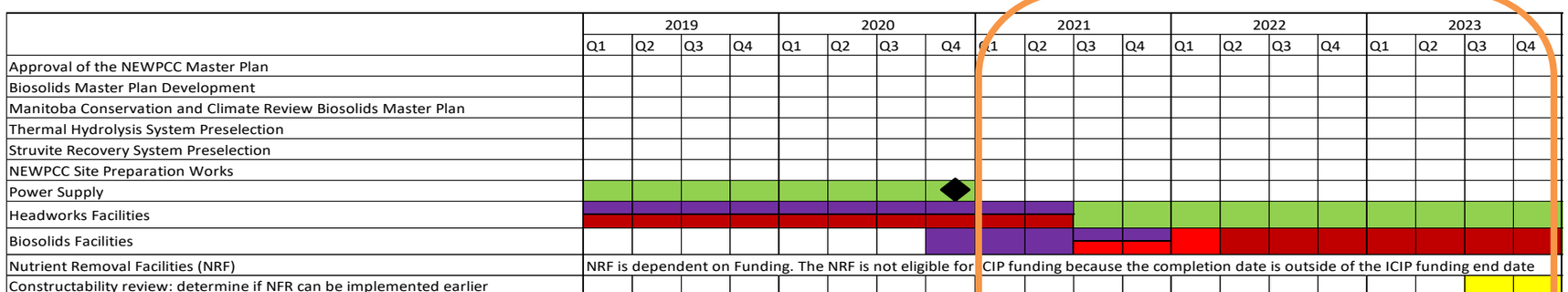
Attachments

Attachment 1: Interim Phosphorous Removal Schedule



Attachment 2: NEWPCC Upgrade Schedule[1] (page 1 of 2)





Legend	
Study, Review, or Pre-selection of Equipment	
Manitoba Conservation and Climate Review	
Conceptual/Preliminary Design	
Procurement	
Detailed Design, Construction and Commissioning	
Funding Applications and/ or Procurement Review	
Constructability Review	
Substantial Completion	◆

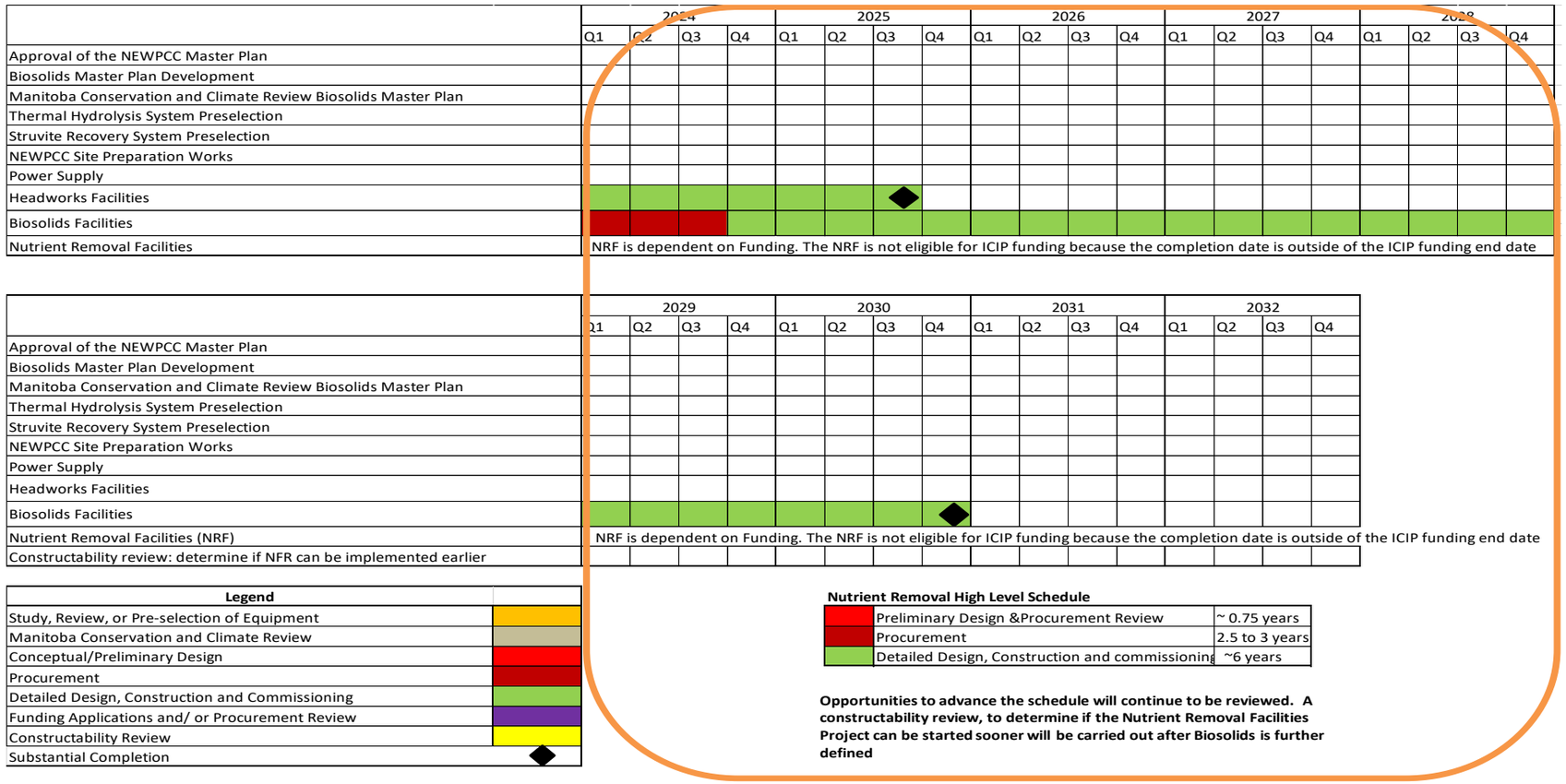
Nutrient Removal High Level Schedule

	Preliminary Design &Procurement Review	~ 0.75 years
	Procurement	2.5 to 3 years
	Detailed Design, Construction and commissioning	~6 years

Opportunities to advance the schedule will continue to be reviewed. A constructability review, to determine if the Nutrient Removal Facilities Project can be started sooner will be carried out after Biosolids is further defined

[1] Schedule based on initial assumed ICIP funding approval dates; schedule to be revised as funding is confirmed.

Attachment 2: NEWPCC Upgrade Schedule[1] (page 2 of 2)



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