City of Selkirk

Notice of Alteration - Selkirk Wastewater Treatment Plant Upgrade

Manitoba Water Services Board

Project Number: 60530834

October 2017

AECOM Canada Ltd.
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Date
October 25, 2017

Ms. Tracey Braun, M.Sc.
Director
Environmental Assessment & Licensing Branch
123 Main Street, Suite 160
Winnipeg, Manitoba R3C 1A5

Our Reference: 60530834

Dear Ms. Braun:

Notice of Alteration – Selkirk Wastewater Treatment Plant Upgrade

Please find enclosed four hard copies and one electronic copy of the Notice of Alteration (NOA) and supporting information to obtain approval for an upgrade to the City of Selkirk Wastewater Treatment Plant.

The existing wastewater treatment plant (WWTP) operates under Environment Act License No. 2265R, issued in June 1997. In May 2016, AECOM submitted an Environment Act Proposal (EAP) for the City of Selkirk Wastewater Treatment Facility to seek an alteration to the existing license. The 2014 Functional Design report was reviewed by Birchtree in 2016 to provide wastewater treatment options based on more recent flow data. It was recommended that the City of Selkirk (the "City") consider the Sequencing Batch Reactor (SBR) technology, coupled with upstream flow equalization in the existing bioreactors. The City then retained AECOM to modify the 2014 Functional Design and advance the Detailed Design of the City's WWTP for use of the membrane bioreactor (MBR) process. In addition to the secondary treatment process change, wet weather flows will be diverted to and stored in the existing wastewater lagoons to allow for a significant reduction in the design capacity of the secondary process. Stored wet weather flows will be returned to the WWTP at a controlled rate.

Please also find enclosed the NOA Form and a cheque for the application fee of $500.00.

We trust that the information on the form and the attached supporting information are sufficient. Should you have any questions, please do not hesitate to contact me directly at 204-928-7475.

Yours sincerely,

Kristiina Cusitar, BA, CET, EP(SAR)
Environmental Assessor
Environment, Canada West

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

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4	1	Department of Sustainable Development – Approvals Branch
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-	1	City of Selkirk

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Manitoba Water Services Board

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Executive Summary

In May 2016, AECOM Canada Ltd. ("AECOM") submitted an Environment Act Proposal ("EAP") for the City of Selkirk Wastewater Treatment Facility ("2016 EAP"). This EAP was based on information from the 2014 City of Selkirk Wastewater Treatment Plant Functional Design Report (2014 Functional Design) prepared by AECOM.

The City retained AECOM to modify the 2014 Functional Design and advance the Detailed Design of the City's wastewater treatment plant (WWTP) for the use of the membrane bioreactor (MBR) process. The MBR process is considered to be comparable with the previously recommended SBR process. In addition to the secondary treatment process change, wet weather flows will be diverted to and stored in the existing wastewater lagoons to allow for a significant reduction in the design capacity of the secondary process. Stored wet weather flows will be returned to the WWTP at a controlled rate.

The environmental effects for the 2017 WWTP components have been assessed as follows:

Air Quality

Although dust is not anticipated to be a major concern at the Project Site, with the implementation of measures such as limiting material stockpile heights, keeping disturbed/exposed areas to a minimum, and using dust suppression when required, the effect of dust is assessed to be negligible.

With respect to exhaust emissions, with the implementation of measures such as maintaining vehicles and equipment in proper working order and vehicle idling kept to a minimum, the effects of exhaust emissions is assessed to be negligible.

In regards to potential odours from the WWTP during operation, the management of cleaning cycles of the membrane cassettes should mitigate potential odours. The process of sludge removal may generate some odours however, the sludge will be stabilized and will be dewatered using porous "bags". To date, no complaints have been received that warrant any mitigation. If any ordour-related complaints are received from residents in the area following commissioning of the proposed upgrades, the City will work with the residents to address their concerns, as appropriate.

Noise levels at the Project Site during construction are not expected to be loud enough to cause significant disturbance in the Project Area. With the implementation of measures such as providing hearing protection to workers as required and properly maintaining vehicles and equipment are expected to mitigate potential adverse effects. During operation, sources of noise include maintenance vehicles and activities (anticipated to be typical of lawn equipment, trucks, and small handheld tools) at the lagoon site. Therefore, the effect of noise is assessed to be negligible.

Soil

With respect to soil compaction, mixing, and erosion during construction, the implementation of mitigation measures identified in this NOA are anticipated to mitigate any potential soil compaction/mixing and erosion effects. Therefore, it is anticipated that the residual effect on soil is assessed to be negligible.

Surface Water

The upgraded WWTP will meet the following effluent criteria:

- Carbonaceous BOD (98th percentile) - ≤ 25 mg/L;
- Total Suspended Solids (95th percentile) - ≤ 25 mg/L;
- Total Phosphorus (based on 30 day rolling average) - ≤ 1 mgP/L;
- Total Nitrogen (based on 30 day rolling average) - ≤ 15 mgN/L; and
- *E coli* (based on 30 day geometric mean) - ≤ 200 MPN / 100 mL.

With the above criteria as the target key parameters, the quality of effluent that will be discharged into the Red River is expected to improve. Also the quantity of effluent is not anticipated to increase from the volumes proposed in the 2014 EAP (submitted in 2016). Therefore, effluent from the upgraded WWTP is not anticipated to have significant adverse effect on water quality of Red River.

Conclusion Summary

Considering the implementation of the proposed mitigation measures, design features, existing and proposed environmental licence conditions and the social and ecological context of each environmental component addressed in **Section 4**, the residual environmental effects of the proposed 2017 upgrade components of the WWTP are expected to negligible in magnitude.

The measures described to mitigate the risk of occurrence of accidents and malfunctions are deemed to be appropriate in mitigating such risks. Therefore, it is our opinion that based on the available information and documented assumptions, the overall potential adverse effects of the proposed project will range from negligible to moderate and insignificant.

Table of Contents

Figures

Tables

1. Introduction

In May 2016, AECOM Canada Ltd. ("AECOM") submitted an Environment Act Proposal ("EAP") for the City of Selkirk Wastewater Treatment Facility ("2016 EAP"). This EAP was based on information from the 2014 *City of Selkirk Wastewater Treatment Facility Functional Design Report* (2014 Functional Design) prepared by AECOM. As part of the 2014 Functional Design at that time, the installation and operation of a "Johannesburg Biological Nutrient Reactor (BNR)" process to provide nutrient removal was proposed. AECOM recommended alum dosing for intermittent phosphorus removal during the winter when the biological process cannot remove phosphorus.

The 2014 Functional Design report was reviewed by Birchtree in 2016 to provide wastewater treatment options based on more recent flow data. It was recommended that the City of Selkirk (the "City") consider the Sequencing Batch Reactor (SBR) technology, coupled with upstream flow equalization in the existing bioreactors.

The City retained AECOM to modify the 2014 Functional Design and advance the Detailed Design of the City's wastewater treatment plant (WWTP) for the use of the membrane bioreactor (MBR) process. The MBR process is considered to be comparable with the previously recommended SBR process. In addition to the secondary treatment process change, wet weather flows will be diverted to and stored in the existing wastewater lagoons to allow for a significant reduction in the design capacity of the secondary process. Stored wet weather flows will be returned to the WWTP at a controlled rate. The location of the proposed project and the proposed WWTP site layout are provided in **Figure 01** and **Figure 02** respectively.

This Notice of Alteration (NOA) for the 2016 EAP outlines the changes made to the project design of the WWTP (**Section 2**) and the anticipated consequential environmental effects as a result of those changes (**Section 6**).

1.1 Regulatory Requirements

The existing WWTP operates under *Environment Act* Licence No. 2265R.

The WWTP upgrade will be designed based on the discharge parameters outlined in **Table 1**. These limits are anticipated to be included in the *Environment Act* Licence for the operation of the WWTP.

Table 1. Liquid Stream Discharge Limits

Parameter	Value
Carbonaceous BOD (98th percentile)	≤ 25 mg/L
Total Suspended Solids (95th percentile)	≤ 25 mg/L
Total Phosphorus (based on 30 day rolling average)	≤ 1 mgP/L
Total Nitrogen (based on 30 day rolling average)	≤ 15 mgN/L
E coli (based on 30 day geometric mean)	≤ 200 MPN / 100 mL

2. Project Description

2.1 Updated WWTP Design (2017)

The design criteria presented in the 2014 Functional Design Report have been updated. The City's records for flow to the WWTP (2011-2015) were reviewed as part of the Functional Design and the population projections for the City have also been updated to reflect a 20 year design horizon (ending in 2039). The projected population in 2039, including a portion of St. Andrews and the Lower Fort Garry facility is 12,823. The design loads for the WWTP have also been reviewed as part of the Functional Design and have been increased to reflect the increased population projections and the corresponding increases in flow. A summary of the design flows and loads are presented in **Table 2**.

Table 2. Summary of Design Flows and Loads

Parameter	Value	Notes
Design Year	2039	20 years from WWTP commissioning.
Contributing Population	12,823	
Design Flows		
Average Annual Flow, ML/d	4.6	MBR system must meet this flow requirement with one membrane train out of service.
Max Monthly Flow, ML/d	7.5	Based on 30-day rolling average 2011-2015.
Peak Wet Weather Flow, ML/d	36.0	Maximum instantaneous flow based on influent pump station performance with all pumps operating and the existing WWTP hydraulic grade line in place. The new WWTP will result in an increased static head, which will reduce the capacity of the influent pump station. Future pump upgrades may be needed, but are not considered at this time.
Day Max Flow, ML/d	12.0	Maximum flow directed to secondary treatment.
Max 7-day Rolling Average, ML/d	10.2	Based on 7-day rolling average 2011-2015.
Design Loads		
Total Suspended Solids		
AAL, kg/d	1,154	
MML, kg/d	1,916	
BOD		
AAL, kg/d	1,026	
MML, kg/d	1,467	
TKN		
AAL, kg/d	167	
MML, kg/d	207	
Total Phosphorus		
AAL, kg/d	41	
MML, kg/d	53	

The upgraded WWTP is located on City property and will be developed adjacent to the existing WWTP as shown in **C-001** and **C-002** in **Appendix A**. Additional details are also provided in the Selkirk Wastewater Treatment Plant Bioreactor Assessment Report located in **Appendix A**.

Potential environmental effects as a result of changes being proposed in the project design will be discussed in **Section 6**.

2.2 Process Description

In general, the process stages will follow the recommendations of the 2014 Functional Design Report. This section provides a brief summary of treatment stages/approaches that follow the recommendation of the 2014 Functional Design Report and provides more detail on treatment steps that will vary from this previous report. The modified/upgraded WWTP includes the following major process stages:

- Influent pumping (existing Dufferin Lift Station);
- Screening (two stages);
- Grit removal;
- Wet weather flow diversion to existing lagoons;
- Bioreactor;
- Membranes;
- Permeate pumping;
- UV disinfection (existing);
- Outfall;
- Return activated sludge (RAS), waste activated sludge (WAS), and scum pumping;
- Wet weather flow and waste activated sludge (WAS) supernatant return to the Lift Station at the lagoons; and
- Lagoons (existing).

The drawings in **Appendix A** include a process flow diagram, site plant, and functional level plans and sections for the upgraded WWTP.

2.2.1 Influent Pumping

No upgrades are proposed for the Dufferin Lift Station as part of this proposed project.

2.2.2 Influent Screening

The 2017 design includes a two-staged screening process to accommodate the change to MBR treatment.

The first screening stage remains the same as proposed in the 2016 EAP submission. The construction will include two 6 mm bar screens to provide 100% redundancy. These screens will protect the second stage of screening by removing large debris from the influent wastewater. Following the bar screens, wastewater will flow by gravity to the grit removal process described in **Section 2.2.3**.

The second screening stage occurs after grit removal and flow control weir, and consists of three, 1 mm fine screens (duty/standby) to remove finer debris like hair and other material that passes the bar screens. Flows to the fine screens and bioreactors will be limited to 12 ML/d and each screen has a capacity of 12 ML/d. The fine screens protect the downstream membranes from clogging. Excess wet weather flow is diverted upstream of these screens to the lagoon, as described in **Section 2.2.4.**

The screened wastewater flows by gravity through a splitter box and to the bioreactors.

Screenings from both stages will be compacted and dropped into a readily accessible and removal storage bin, similar to the 2016 EAP submission. Screenings will continue to be removed on a regular basis for disposal at the City of Selkirk Solid Waste Transfer Station.

2.2.3 Grit Removal

The 2017 for grit removal has a capacity of 36 ML/d and the removal will consist of a single grit concentrator tank, a grit removal washing and classification, and a grit dewatering unit. Dewatered grit is

discharged to the screenings storage bin for offsite disposal at the City of Selkirk Solid Waste Transfer Station.

The de-gritted wastewater will flow by gravity to the fine screens as described in **Section 2.2.2**.

2.2.4 Flow Equalization

The method of flow equalization (EQ) is a new component not previously proposed in the EAP filed in 2016. Following initial evaluation of flow EQ options, including the tankage in the existing WWTP, AECOM has recommended utilizing the existing lagoon for flow EQ.

Excess wet weather flows will be pumped to the lagoon and return flows will be pumped back to the upgraded WWTP. The lagoon facility is made up of five cells with one dedicated for septage receiving. The other four cells are currently used for sludge storage and stabilization, with supernatant returned to the WWTP. The cells have sufficient capacity to provide both sludge storage, stabilization, and short-term storage of wet weather flows. Therefore, it is proposed that one cell will be retained for sludge stabilization and the remaining four cells will be converted for use as flow equalization.

The City will need to perform the following major tasks to convert the existing lagoons to EQ cell(s):

- Transfer sludge from the cells to be used as EQ cells to the sludge stabilization cells;
- Construct a new pumping station at the WWTP to pump excess flows to the lagoon EQ cells;
- Construct a new lagoon pump station, with VFD controlled pumps to handle return wastewater flows to the WWTP; and
- Install supply and return piping between the lagoon and the WWTP.

2.2.4.1 Wet Weather Flows

Wastewater flows greater than 12 ML/d will be diverted to the existing lagoon. Flows at 12 ML/d for longer than a continuous eight hours will be diverted to the existing lagoons. The effective volume of the storage cells is 49,244 m^3, providing the equivalent of approximately 1.2 days storage of excess flows for the projected peak wet weather flow of 36 ML/d.

2.2.5 Bioreactor

Similar to the 2016 EAP submission, after the wastewater passes through the fine screens (as described in **Section 2.2.2**), all wastewater flows by gravity to the bioreactors. Previously the bioreactor process was arranged in a typical Johannesburg BNR process configuration. The new proposed biological treatment process incorporates a slightly different arrangement of bioreactor cells as described in this section. The biological process will include two treatment trains, each treating 50% of the flow.

Each train contains a single anaerobic zone, followed by anoxic and aerobic zones. The anoxic zone has two discreet cells and the aerobic zone has three discreet cells. These discreet cells enhance mixing and prevent short circuiting through the reactor. The membrane cell acts as an additional aerobic cell. **Table 3** contains a summary of the Biowin modelling results.

Table 3. Results of Biowin Modelling

Scenario	SRT, d	Temp, °C	MLSS		Effluent				Alum Dose, L/d
			Last Aerobic Zone, mg/L	Membrane Tank, mg/L	NH4-N, mg/L	Total N, mg/L	Total P, mg/L	BOD5, mg/L	
AAF Winter, 2 trains	15	7	5,751	7,173	0.7	8.9	0.8	1.0	230

Scenario	SRT, d	Temp, °C	MLSS		Effluent				Alum Dose, L/d
			Last Aerobic Zone, mg/L	Membrane Tank, mg/L	NH4-N, mg/L	Total N, mg/L	Total P, mg/L	BOD5, mg/L	
AAF Summer, 2 trains	10	18	3,900	4,850	0.10	8.7	0.5	1.0	240
MMF Winter, 2 trains	15	7	8,398	10,481	0.8	6.3	0.7	1.0	190
MMF Summer, 2 trains	10	18	5,638	7,021	0.10	5.6	0.8	1.0	200

The bioreactors will be constructed with mixing, aeration, and sludge recycling systems. Jet aerations blowers and pumps will provide the required mixing and aeration.

2.2.6 Membrane System

The membrane system is a new component not previously proposed in the EAP filed in 2016.

AECOM and the City have selected a “fibre” style membrane as they represent the most common membrane system currently in use in wastewater treatment facilities. This system uses vacuum pressure created by pumps to draw treated effluent from the final bioreactor phase through microscopic pores in the membrane. The permeate pumps transfer permeate to the existing ultraviolet (UV) disinfection facility. The liquid then flows by gravity to the outfall and the Red River.

The proposed membrane system has been sized to accommodate peak flows of 12 ML/d for a continuous period of eight hours and 10.2 ML/d for a period of seven days. As indicated in **Section 2.2.4**, excess wet weather flow will be diverted to the lagoon and returned to the WWTP once the wet weather conditions have passed. The membrane can operate at maximum flows for an extended period of time without causing premature fouling.

The membranes are configured in multiple trains each with several modular membrane cassettes and each cassette contains multiple replaceable membrane modules. Cleaning of the membrane trains remove fouling from inorganic compounds like iron or carbonates, and also removes biological fouling. The operator of the WWTP will take each membrane train off-line for six to eight hours approximately every six months to perform an *in-situ* cleaning. The cleanings should take place during low flow periods to ensure that the plant has operational membrane capacity to process incoming flows. In the event of an emergency, the operator could take individual cassettes off-line for cleaning without creating overflow conditions. Prudent management of cleaning cycles should mitigate the risk of requiring cleaning during wet weather conditions.

A review of two trains and three trains was completed and it was determined via consultation with the City that a two train approach would be best for the WWTP.

2.2.7 UV Disinfection

As proposed in the 2016 submission, the proposed 2017 treatment process will also include UV disinfection by utilizing the existing UV disinfection system.

The recovered liquid (permeate) contains very little BOD or suspended solids and will usually meet the regulatory requirements for *E. coli* removal/inactivation without the need for further disinfection. However, the UV disinfection system will have to operate for a period of time (determined by the Department of Sustainable Development) following commissioning of the new WWTP to ensure effluent limits are reached. Document proof (effluent quality readings) that the membrane system meets the requirements of

E. coli removal without the continuous need for the final disinfection step. Once the Department of Sustainable Development has approved that the membrane system has met the regulatory requirements for *E. coli* removal, the City may elect to turn off the UV system under normal operation with certain controls in place to address the WWTP by-pass conditions.

The City will also utilize the existing UV disinfection system for use in by-pass conditions and as a back-up in the event that permeate coliform levels exceed regulatory requirements. All flows would pass through the UV channels prior to entering the outfall and the Red River. The UV disinfection system would not operate under normal conditions, but would automatically start in the event of by-pass conditions.

2.2.8 Sludge Management

The use of the existing lagoons for wet weather flow EQ and the construction of a new dewatering pad are new to the 2017 process.

Waste activated sludge (WAS) from the membrane system, along with scum will be pumped to the lagoon for storage and stabilization. One of the five existing cells with a total storage capacity of 35,494 m^3 will be dedicated to WAS storage. The supernatant from the sludge storage cells will overflow to the equalization cells which will then flow by gravity to the lagoon lift station and then pumped back to the WWTP.

Stabilized sludge will be land applied after approximately five years and then periodically, following the appropriate regulatory requirements as the storage volume becomes limited. Sludge will be removed from the cells and dewatered using porous “bags”, which will be placed on the sludge dewatering pad as shown in **C-001** in **Appendix A**. This clay pad will be constructed along the east side of the lagoon cells at about the same time as the WWTP construction. The pad will be sloped towards the lagoon cells to allow liquid from the sludge to drain back into the cells.

2.2.9 Chemical Feed System

Similar to the 2016 treatment process, the proposed 2017 treatment process will also include chemical dosing.

Alum will be added to the aerobic stage of the bioreactor to assist in the reduction of phosphorus. A 22 m^3 tank alum tank with chemical feed pumps will be located in the membrane building and will have spill containment. Alum will be fed into the aerobic stage to meet the required phosphorus effluent limits.

Cleaning chemicals will also be used periodically during the cleaning of the membrane cassettes and are expected to include sodium hypochlorite and citric acid. All chemicals used at the WWTP will be stored in appropriate spill containment.

2.3 Project Schedule

It is anticipated that construction tender will be in early 2018 (January/February) with construction to begin in the spring of 2018. The new WWTP is expected to be in operation by the late fall 2019.

3. Scope of Assessment

To assess the potential environmental impact of the proposed WWTP new upgrades including the dewatering pad at the lagoon site, spatial and temporal boundaries were defined as follows.

3.1 Temporal Boundaries

The temporal boundaries of the assessment are divided as follows:

- **Construction Phase**: Construction from spring 2018 to late fall 2019;
- **Operation Phase**: late fall 2019 into the future; and
- **Decommissioning Phase**: This refers to the eventual decommissioning of the WWTP, and all associated infrastructure that is being proposed in this document. There are currently no plans to decommission the WWTP in the foreseeable future. However, when the WWTP needs to be decommissioned at some point in the future, a site decommissioning plan will be filed with appropriate regulators prior to decommissioning. Therefore, effects associated with decommissioning have not been assessed as part of this environmental assessment.

3.2 Spatial Boundaries

Spatial boundaries used for the assessment are described below. Where specifically noted, the boundaries may be adjusted to suit the Environmental Component (EC) or Social Component (SC) affected.

- **Project Site**: is comprised of the WWTP and an existing lagoon.
- **Project Area**: is comprised of an area 2 km beyond the Project Site, which is intended to take into account the effects of the Project (such as noise, emissions, and odour).
- **Project Region**: is comprised of an area up to 10 km beyond the Project Site, which is intended to take into account the maximum spatial extent of any potential impacts of the Project.

4. Existing Environment

This NOA utilizes the existing environment information provided in the 2016 EAP submission or the potential environmental effects from the new proposed WWTP components.

At the time of the 2016 EAP submission, the existing environment information focused on the location of the proposed 2016 upgrades at the WWTP as no construction works was proposed at that time at the existing lagoon site. As the 2017 wastewater treatment process includes the construction of a dewatering pad and utilizing some of the existing lagoon cells for wet weather EQ, the following section provides some additional information for the lagoon site if it is different from the WWTP site (previous 2016 EAP submission). The information provided in the following section was gathered via desktop review and communication with AECOM's design team.

4.1 Land Use

The land use immediately surrounding the existing lagoon is agricultural fields. The nearest residence is located approximately 1 km southwest of the existing lagoon site, immediately southwest of Provincial Highway No. 9. There appears to be two commercial/industrial developments near the lagoon; a welding shop located approximately 300 m south and a City of Selkirk yard/shop located approximately 320 m southwest of the existing lagoon.

4.2 Mineral Rights

A search of the lagoon site on the Minerals Resources Division GIS Map Gallery for Mineral Dispositions found that there are currently no mining claims or mines at the lagoon site (Mineral Resources Division, 2013).

4.3 Vegetation and Wildlife

The area surrounding the lagoon consists primarily of agricultural fields and grasses. There appears to be some smaller trees and shrubs located along the northeastern portion of the lagoon site.

The lagoon site is also located within the Gimli Ecodistrict of the Interlake Plain Ecoregion, therefore the potential wildlife that may be found in this Ecodistrict include white-tailed deer, black bear, ruffed grouse, raptors and songbirds (Smith *et.al.*, 1998)

4.4 Protected Species

To identify species at risk that may occur in the Project Region, a variety of online databases were examined including the Department of Sustainable Development, Manitoba Conservation Data Centre (CDC) Occurrence of Species by Ecoregion (DSD, 2013), the Bird Studies Canada (BSC) Manitoba Breeding Bird Atlas (BBA), and the Manitoba Herpetological Atlas (MHA). The species listed in these databases were cross-referenced with Schedule 1 of the Federal *Species at Risk Act* (SARA) SC 2002, C29 and *The Endangered Species and Ecosystems Act* (Manitoba), CCSM c E111 to determine the provincially listed rare or sensitive species with the ecoregion and Project Region. Furthermore, distribution maps and habitat requirements were examined to determine the likelihood of occurrence of federally and/or provincially listed species in the Project Region. The results of the annual surveys conducted by Manitoba CDC were also examined to identify surveys for protected species in the vicinity of the Project Region; the most recent survey results available were from 2014.

Based on this search, there are 31 listed species that may occur in the Project Region

Table 4. Federally and Provincially Listed Species that May Occur in the Project Region

Column heading	SARA Status	MESA Status
Vascular Plants		
Small White Lady's-Slipper *Cypripedium candidum*	Endangered	Endangered
Western Prairie Fringed Orchid *Platanthera praeclara*	Endangered	Endangered
Riddell's Goldenrod *Solidago riddellii*	Special Concern	Threatened
Western Silvery Aster *Symphyotrichum sericeum*	Threatened	Threatened
Rough Agalinis *Agalinis aspera*	Endangered	Endangered
Great Plains Ladies'-Tresses *Spiranthes magnicamporum*	Not Ranked	Endangered
Western Ironweed *Vernonia fasciculata*	Not Ranked	Endangered
Culver's-root *Veronicastrum virginicum*	Not Ranked	Threatened
Invertebrate Animal		
Monarch *Danaus plexippus*	Endangered	Not Ranked
Dakota Skipper *Hesperia dacotae*	Threatened	Threatened
Mapleleaf Mussel *Quadrula quadrula*	Endangered	Endangered
Vertebrate Animals		
Chimney Swift *Chaetura pelagica*	Threatened	Threatened
Piping Plover *Charadrius melodus*	Endangered	Endangered
Common Nighthawk *Chordeiles minor*	Threatened	Threatened
Olive-Sided Flycatcher *Contopus cooperi*	Threatened	Threatened
Yellow Rail *Coturnicops noveboracensis*	Special Concern	Not Ranked
Least Bittern *Ixobrychus exilis*	Threatened	Endangered
Loggerhead Shrike *Lanius ludovicianus*	Endangered	Endangered
Red-Headed Woodpecker *Melanerpes erythrocephalus*	Threatened	Threatened
Golden-Winged Warbler *Vermivora chrysoptera*	Threatened	Threatened

Column heading	SARA Status	MESA Status
Canada Warbler *Cardellina canadensis*	Threatened	Threatened
Whip-poor-will *Antrostomus vociferus*	Threatened	Threatened
Horned Grebe *Podiceps auritus*	Special Concern	Not Ranked
Short-eared Owl *Asio flammeus*	Special Concern	Threatened
Trumpeter Swan *Cygnus buccinator*	Not Ranked	Endangered
Silver Chub *Macrhybopsis storeriana*	Special Concern	Not Ranked
Northern Leopard Frog *Lithobates pipiens*	Special Concern	Not Ranked
Snapping Turtle *Chelydra serpentina*	Special Concern	Not Ranked
Little Brown Myotis *Myotis lucifugus*	Endangered	Endangered
Northern Myotis *Myotis septentrionalis*	Endangered	Endangered
Wood Bison *Bison bison athabascae*	Threatened	Not Ranked

Based on available information of the lagoon site and communication with AECOM's design team, the area of the proposed dewatering pad along with the area surrounding the lagoon site is located in an area that is regularly disturbed either by regular mowing or cultivation. Therefore, the listed species noted above are not expected to be present at the lagoon site.

4.5 Heritage Resources

In 2013, a screening request was submitted to Historic Resources Branch (HRB) based on the proposed development in 2013 to determine if there are any potential heritage resources that may be affected by the proposed development and if a Heritage Resources Impact Assessment (HRIA) is required. At that time, HRB had no concerns with the proposed and a copy of this letter is included in **Appendix B**, however the screening request did not include the area near the lagoon as there were no upgrades proposed at the lagoon. As the location of the proposed upgrades are still within WWTP property, but now along the southwestern portion of the WWTP site, a screening request was submitted to HRB for the upgrades at the WWTP and the lagoon site on June 19, 2017. The Archaeological Assessment Services indicated that the potential to impact significant heritage resources has been deemed low and therefore the HRB has no immediate concerns with the project. A copy of this letter is included in **Appendix B**.

5. Public Engagement

Public consultation (in the form of a public meeting and/or open house) will be undertaken upon confirmation of funding for the upgraded WWTP.

6. Environmental Assessment and Mitigation Measures

6.1 Environmental and Social Components

This section contains the results of the environmental assessment and only includes discussions and mitigation measures for Environmental Components (ECs) and Social Components (SCs) that may be potentially affected by the new components of the proposed WWTP and lagoon as well as any consequential socio-economic implications.

Applying professional judgement and a thorough understanding of the newly proposed components of the proposed project (outlined in **Section 2** of this application) and the existing environment (as described in **Section 4** and the previous 2016 EAP submission); AECOM determined the potential for physical and biological components to interact with project components. Mitigation measures that have been incorporated into the proponent's proposed plan are taken into account, as well as the environmental protection practices included in the proponent's operation.

A review of the potential environmental effects was assessed and the potential interactions between potential ECs and SCs due to the new proposed WWTP components are identified below:

- Membrane System (construction and operation phases)
  - Air Quality
  - Soil
  - Surface Water
- Wet weather flow equalization in existing lagoon (construction and operation phase)
  - Air Quality
  - Soil
  - Surface Water
- Dewatering Pad (construction and operation phases)
  - Air Quality
  - Soil
  - Surface Water

Environmental effects that may be caused as a result of accidents and malfunctions are discussed separately in **Section 6.5**. Definitions of the terms used to guide the effects assessment are provided in **Table 5**.

Table 5. Factors and Definitions Considered in Assessing Environmental Effects

TERM	DEFINITION			
Project Phase:	Refers to the phase of the Project as construction, operation and maintenance ("operation"), or decommissioning.			
Potential Effect:	Potential change that the proposed Project may cause the environment.			
Magnitude of Effect:	Refers to the estimated percentage of population or resource that may be affected by activities associated with the construction, operation and decommissioning of the proposed Project. Where possible and practical, the population or resource base has been defined in quantitative or ordinal terms (e.g., hectares of soil types, units of habitat). Magnitude of effect has been classified as less than (<) 1%, 1% to 10%, or greater than (>) 10% of the population or resource base. Where the magnitude of an effect was determined as virtually immeasurable and represents a non-significant change from background in the population or resource, the effect was considered Negligible. An exception to this is in terms of potential human health effects where, for example health issues due to water-borne diseases amounting to 1% of the population being affected would still be considered major.			
	Negligible (immeasurable)	Minor (<1%)	Moderate (1 to 10%)	Major (>10%)
Direction of Effect:	Refers to whether an effect on a population or a resource is considered to have a positive, adverse or neutral effect.			
	Positive	Adverse	Neutral	
Duration of Effect:	Refers to the time it takes a population or resource to recover from the effect. If quantitative information was lacking, duration was identified as short-term (<1 year), moderate term (1 to 10 years), and long term (>10 years).			
	Short term (< 1 year)	Moderate (1 to 10 years)	Long term (>10 years)	
Frequency:	Refers to the number of times an activity occurs over the Project phase, and is identified as once, rare, intermittent, or continuous.			
	Once	Rare	Intermittent	Continuous
Scope of Effect:	Refers to the spatial area potentially affected by the effect and was rated as Project Site, Project Area, or Project Region as defined in **Section 3.2**. Where possible, quantitative estimates of the resource affected were provided.			
	Project Site	Project Area	Project Region	
Reversibility:	Refers to the extent an adverse effect is reversible or irreversible over a 10-year period.			
	Reversible	Irreversible		
Residual Effect:	A qualitative assessment of the residual adverse effect remaining after implementing appropriate mitigation measures.			
	Negligible (immeasurable)	Minor (<1%)	Moderate (1 to 10%)	Major (>10%)

6.2 Air Quality

The proposed Project (as identified in **Section 2.0**) will generate dust, exhaust emissions, odour, and noise from activities associated with the construction and operation of the new WWTP components, including the dewatering pad at the lagoon site.

6.2.1 Dust

Sources of dust include activities such as clearing, grading, excavating, vehicle movement, and stockpiling of materials. Air quality may be affected by dust and particulates with subsequent effects on

human health (including respiratory issues) and vegetation (dust deposition). Dust occurs primarily during summer and fall, with greater likelihood for an increase in dust during dry and windy conditions.

Vehicles commuting to and from the Project Site will utilize either the paved Provincial Road No. 320 (Main Street) or Provincial Highway No. 4 followed by either the existing paved access road to the existing WWTP site or Walker Avenue (not paved) to the lagoon site. The existing WWTP is surrounded by agricultural fields with the closest residential receptor located approximately 125 m east of the existing WWTP.

Although dust is not anticipated to be a major concern, to further manage potential effects due to dust, the following mitigation measures will be implemented:

- Material stockpile heights will be limited;
- The disturbed/exposed areas will be kept to a minimum; and
- If required, dust suppression activities such as the use of approved dust control agents and/or water will be undertaken.

6.2.2 Exhaust Emissions

During construction, exhaust emissions will be generated during the delivery of materials and construction equipment movement at the Project Site. These emissions could decrease the quality of the air by increasing the local concentration of carbon monoxide, carbon dioxide, particulate matter, and nitrogen oxides in the air with potential for subsequent effects on human health.

The following mitigation measures will be implemented to manage these construction and operation related exhaust emissions:

- Vehicle and equipment will be properly maintained;
- Vehicle and equipment idling will be kept to a minimum; and
- Vehicles and equipment will be placed to minimize congestion in any one particular area.

6.2.3 Odour

Odours may be generated during the operation of the WWTP. With the new components added to the treatment system, potential odour may be generated during the cleaning of the membrane cassettes in the membrane system along with sludge removal and stabilization.

Cleaning of the membrane trains remove fouling from inorganic compounds like iron or carbonates, and also removes biological fouling. The operator of the WWTP will take each membrane train off-line for six to eight hours approximately every six months to perform an in-situ cleaning. The cleanings should take place during low flow periods to ensure that the plant has operational membrane capacity to process incoming flows. In the event of an emergency, the operator could take individual cassettes off-line for cleaning without creating overflow conditions. Prudent management of cleaning cycles should mitigate the risk of requiring cleaning during wet weather conditions.

Stabilized sludge will be land applied after approximately five years following the appropriate regulatory requirements. The process of sludge removal may generate some odours. Sludge will be removed from the cells and dewatered using porous “bags”, which will be placed on the new sludge dewatering pad. This clay pad will be sloped towards the lagoon cells to allow liquid from the sludge to drain back into the cells. Following the appropriate regulatory requirements, the stabilized sludge will be land applied.

With respect to the operating procedures of the remaining treatment system, there are no changes which would result in an increase in odour levels. Further, to date no complaints have been received that warrant any mitigation. If any ordour-related complaints are received from residents in the area following

commissioning of the proposed upgrades, the City will work with the residents to address their concerns, as appropriate.

6.2.4 Noise

An increase in noise levels at the Project Site could potentially affect people (including contractors and employees and any wildlife) at the Project Site and surrounding area.

Sources of noise during construction would be typical of heavy equipment such as graders, excavators, loaders, compactors, and haul trucks. General construction activities are anticipated to generate intermittent noise over the construction period; approximately 16 months of construction at the Project Site. The closest residence to the existing WWTP is approximately 125 m east. The nearest residence to the lagoon site is located approximately 1 km southwest, immediately southwest of Provincial Highway No. 9.

During operation, sources of noise include maintenance vehicles and activities (anticipated to be typical of lawn equipment, trucks, and small handheld tools) at the lagoon site.

Measures to mitigate noise related effects at the Project Site include:

- Vehicles and equipment will be properly maintained; and
- Hearing protection will be provided as required to employees and visitors.

If at any time during construction or operation, noise becomes an issue, the City will work with the local residents to implement additional noise mitigation measures.

6.2.5 Overall Impact on Air Quality

The mitigation measures proposed above are sufficient to mitigate any adverse effects due to dust, exhaust emissions, odour, and noise during construction and operation. Overall, the residual impact on air quality by the proposed Project during the construction phase and operation phase is expected to be negligible.

6.3 Soil

The potential effects due to construction activities of the proposed Project on surface soils will generally be limited to areas that are physically disturbed including the dewatering pad.

6.3.1 Soil Compaction and Mixing of Soil Horizons

As a result of incidental vehicle and equipment movement, along with grading, excavations, compacting, and stockpiling of materials at the Project Site during construction, there is the potential to cause soil compaction and mixing of soil horizons which may change the soil structure.

To reduce potential soil compaction and mixing of soil horizons at the Project Site, the following mitigation measures will be implemented:

- Construction equipment and vehicle movements will be limited to designated roads/pathways within and around work areas;
- Construction activities during periods of extensive precipitation/runoff will be limited;
- Disturbed/exposed areas will be kept to a minimum with site restoration occurring as soon as practical where required;
- Topsoil will be stripped and stockpiled on the Project Site for use in site restoration; and

- The contractor will be responsible for the appropriate repair of any areas where equipment has compacted soils with the repairs including appropriate grading and site restoration.

6.3.2 Soil Erosion

Soil may be lost during the construction phase due to erosion as runoff from wind and precipitation. Conditions favourable for erosion have the potential to occur during grading, excavating, stockpiling, site restoration, and movement of equipment at the Project Site. Erosion of soil and material stockpiles due to wind has the potential to cause consequential effects on air quality (dust and particular matter) and vegetation (dust deposition).

To mitigate potential soil erosion effects, mitigation measures described in **Section 6.2.1** will be implemented.

6.3.3 Overall Impact on Soil

The mitigation measures listed above to minimize the impact on soil (due to soil compaction and mixing, and erosion) are deemed sufficient. Therefore, the overall residual impact on soil as a result of the proposed project is expected to be negligible.

6.4 Surface Water

As effluent from the WWTP will continue to be discharged into the Red River, which eventually flows into Lake Winnipeg, the proposed project could potentially impact surface water quality in the Red River and Lake Winnipeg.

Effluent will continue to be discharged into the Red River, however the upgrade WWTP system will meet the following effluent criteria:

- Carbonaceous BOD (98th percentile) - ≤ 25 mg/L;
- Total Suspended Solids (95th percentile) - ≤ 25 mg/L;
- Total Phosphorus (based on 30 day rolling average) - ≤ 1 mgP/L;
- Total Nitrogen (based on 30 day rolling average) - ≤ 15 mgN/L; and
- *E coli* (based on 30 day geometric mean) - ≤ 200 MPN / 100 mL.

With the above criteria as the target key parameters, it is expected that the quality of effluent that will be discharged into the Red River will improve. In addition, the quantity of effluent is not anticipated to increase from the volume previously identified in the 2016 EAP submission. Therefore, effluent from the upgraded WWTP is not anticipated to have significant adverse effect on water quality of Red River.

6.4.1 Overall Impact on Surface Water

The mitigation measures proposed above are deemed sufficient to mitigate potential indirect effects on surface water quality. Residual effects are therefore expected to be negligible.

6.5 Accidents and Malfunctions

To prevent accidents and malfunctions, all phases of the proposed project will be conducted in accordance with applicable regulatory requirements. The following sections provide additional details on precautionary measures that are proposed to minimize the risk of occurrence for accidents and malfunctions.

6.5.1 Spills

During construction and operation, there is potential for environmental effects due to fuel spills and/or leaks. Accidents (including transportation accidents) could also result in the accidental release of hazardous materials and/or equipment/vehicle fluids and fuels. A number of potential environmental concerns are also associated with the accidental release of chemicals and fuels resulting from improper storage and handling procedures. Spills can affect soil, vegetation, groundwater quality, air quality, and can potentially threaten human health and safety. Activities that may cause a spill are anticipated to occur rarely over the short term during the construction phase of the proposed project. Spills are expected to be predominantly contained to the Project Site. The magnitude of the spill effects are anticipated to range from negligible to moderate depending on the severity of a spill.

To prevent spills from occurring during project activities, the following procedures will be employed:

- All potentially hazardous products (if required on-site) will be stored in a pre-designated, safe and secure product storage area(s) in accordance with applicable legislation;
- Storage and disposal of liquid wastes and filters from equipment maintenance, and any residual material from spill clean-up will be contained in an environmentally safe manner and in accordance with any existing regulations;
- Storage sites (equipment storage, hazardous product storage, etc.) will be inspected periodically for compliance with requirements;
- Service and minor repairs of equipment performed on-site will be performed by trained personnel in appropriate areas;
- Vehicles and equipment will be maintained to minimize leaks. Regular inspections of hydraulic and fuel systems on equipment/machinery will be completed on a routine basis. When detected, leaks will be repaired immediately by trained personnel;
- Any used oils or other hazardous liquids will be collected and disposed of according to provincial requirements;
- Appropriate type and size of spill kits are available on-site; and
- On-site construction staff will be trained in how to deal with spills and clean-up procedures, including review of applicable Spill Response Plans and knowledge of how to properly deploy site spill kit materials; which will be readily accessible at the site at all times.

6.5.2 Fire/Explosions

During construction and operation there exists the potential for fires at the Project Site involving mechanical equipment and fuels. Effects related to fires include, but are not limited to, harm to on-site personnel, equipment, and the potential release of contaminants and hazardous materials.

All precautions necessary will be taken to prevent fire hazards at the Project Site; these include, but are not limited to:

- All flammable waste will be removed on a regular basis and disposed of at an appropriate disposal site;
- Appropriate fire extinguisher(s) are available on the Project Site. Such equipment will comply with and be maintained to, the manufacturers' standards;
- All on-site fire prevention/response equipment is checked on a routine basis, in accordance with local fire safety regulations, to ensure the equipment is in proper working order at all times; and

- Greasy or oily rags or materials subject to spontaneous combustion are deposited and stored in appropriate receptacles. This material will be removed from the Project Site on a regular basis and be disposed of at an appropriate waste disposal facility.

With these mitigation measures employed and assuming the implementation of typical safe work practices, the risk of fires and explosions is considered to be appropriately mitigated.

7. Conclusion

The results of the effects assessment can be summarized as follows:

Air Quality

Although dust is not anticipated to be a major concern at the Project Site, with the implementation of measures such as limiting material stockpile heights, keeping disturbed/exposed areas to a minimum, and using dust suppression when required, the effect of dust is assessed to be negligible.

With respect to exhaust emissions, with the implementation of measures such as maintaining vehicles and equipment in proper working order and vehicle idling kept to a minimum, the effects of exhaust emissions is assessed to be negligible.

In regards to potential odours from the WWTP during operation, the management of cleaning cycles of the membrane cassettes should mitigate potential odours. The process of sludge removal may generate some odours however, the sludge will be stabilized and will be dewatered using porous “bags”. To date, no complaints have been received that warrant any mitigation. If any ordour-related complaints are received from residents in the area following commissioning of the proposed upgrades, the City will work with the residents to address their concerns, as appropriate.

Noise levels at the Project Site during construction are not expected to be loud enough to cause significant disturbance in the Project Area. With the implementation of measures such as providing hearing protection to workers as required and properly maintaining vehicles and equipment are expected to mitigate potential adverse effects. During operation, sources of noise include maintenance vehicles and activities (anticipated to be typical of lawn equipment, trucks, and small handheld tools) at the lagoon site. Therefore, the effect of noise is assessed to be negligible.

Soil

With respect to soil compaction, mixing, and erosion during construction, the implementation of mitigation measures identified in this NOA are anticipated to mitigate any potential soil compaction/mixing and erosion effects. Therefore, it is anticipated that the residual effect on soil is assessed to be negligible.

Surface Water

The upgraded WWTP will meet the following effluent criteria:

- Carbonaceous BOD (98th percentile) - ≤ 25 mg/L;
- Total Suspended Solids (95th percentile) - ≤ 25 mg/L;
- Total Phosphorus (based on 30 day rolling average) - ≤ 1 mgP/L;
- Total Nitrogen (based on 30 day rolling average) - ≤ 15 mgN/L; and
- *E coli* (based on 30 day geometric mean) - ≤ 200 MPN / 100 mL.

With the above criteria as the target key parameters, the quality of effluent that will be discharged into the Red River is expected to improve. Also the quantity of effluent is not anticipated to increase from the volumes proposed in the 2016 EAP submission. Therefore, effluent from the upgraded WWTP is not anticipated to have significant adverse effect on water quality of Red River.

Conclusion Summary

Considering the implementation of the proposed mitigation measures, design features, existing and proposed environmental licence conditions and the social and ecological context of each environmental component addressed in **Section 4**, the residual environmental effects of the proposed 2017 upgrade components of the WWTP are expected to negligible in magnitude.

The measures described to mitigate the risk of occurrence of accidents and malfunctions are deemed to be appropriate in mitigating such risks. Therefore, it is our opinion that based on the available information and documented assumptions, the overall potential adverse effects of the proposed project will range from negligible and insignificant.

8. References

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Figures

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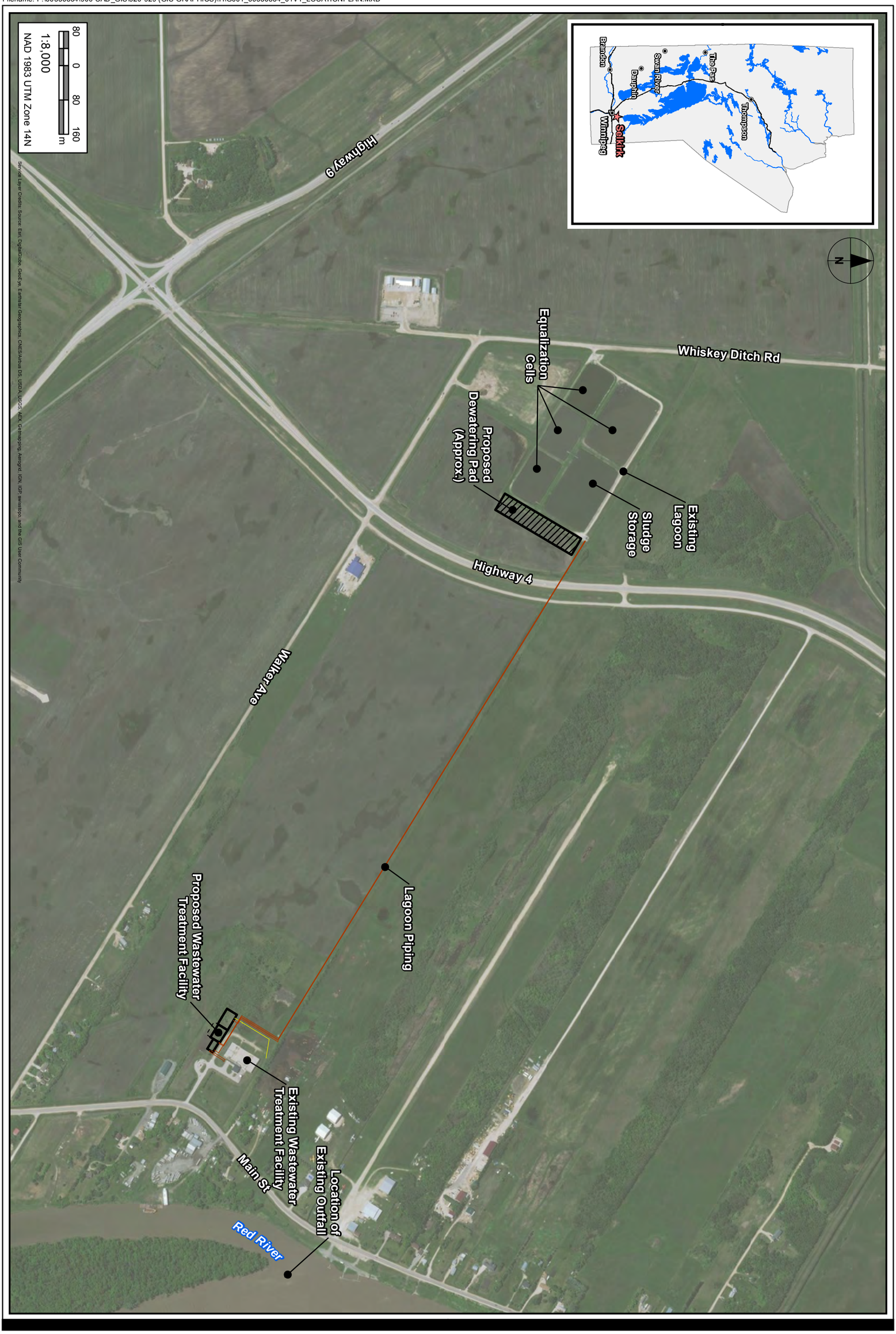
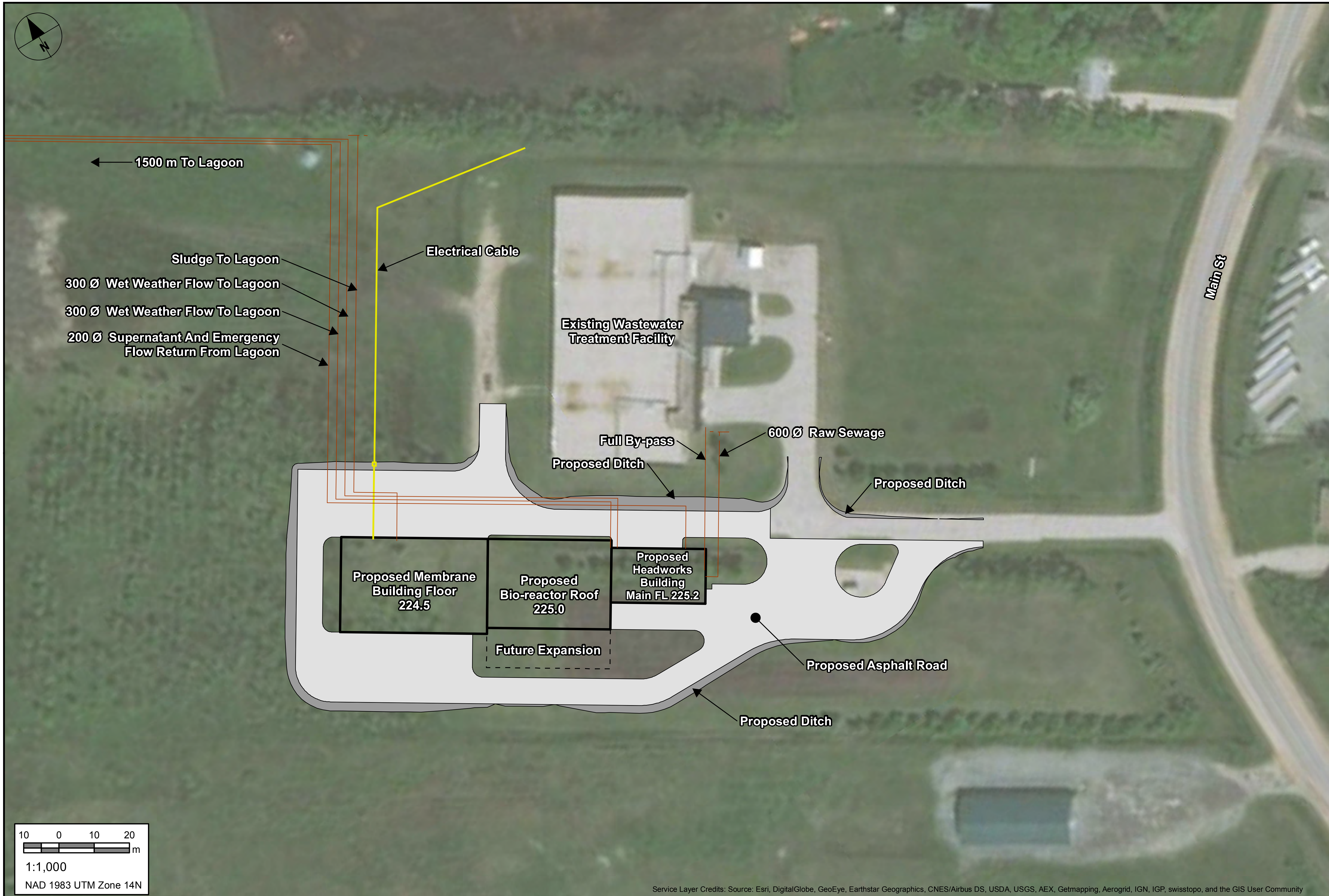


Notice of Alteration - Selkirk Wastewater Treatment Plant Upgrade
City of Selkirk, Manitoba

Location of the Wastewater Treatment Plant and Lagoon

AECOM

Figure: 01



AECOM

Figure: 02

Proposed Wastewater Treatment Plant Site

Notice of Alteration - Selkirk Wastewater Treatment Plant Upgrade
City of Selkirk, Manitoba

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Appendix A

Selkirk Wastewater Treatment Facility MBR Update

Manitoba Water Services Board

Selkirk Wastewater Treatment Plant MBR Update

Prepared by:

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October 2017

Project Number: 60530834

Distribution List

# Hard Copies	PDF Required	Association / Company Name
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1		Dan McDermid, C.E.T., Director of Operations, City of Selkirk

Revision History

Revision #	Date	Revised By:	Revision Description
0	June 13, 2017	E. Hutchison	Draft
1	July 18, 2017	M. Lashkarizadeh	Final
2	October 24, 2017	M. Lashkarizadeh	Final – Rev. 1

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The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

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October 24, 2017

Travis Parsons, P. Eng.
Chief Engineer
Manitoba Water Services Board
Unit #1A 2010 Currie Blvd.
Brandon, MB R7B 4E7

Dear Mr. Parsons:

Project No: **60530834**

Regarding: **Selkirk Wastewater Treatment Plant MBR Update**

As requested, this report outlines the integration of the membrane bioreactor (MBR) process into the new plant, describes the recommended implementation plan, and summarizes the revised capital cost estimate for the City of Selkirk Wastewater Treatment Plant (WWTP). The upgrade to the MBR process is projected to be within the established project budget and the proposed plant configuration and footprint can be constructed within the existing site.

Based on the recent process and overall project reviews, we understand that this process change is acceptable to both the MWSB and the City of Selkirk. We will update the EAP accordingly and submit a Notice of Alteration to advance the issuing of the Environment Act Licence.

AECOM looks forward to working with MWSB and the City of Selkirk through the detailed design and construction phases of this project.

If you have any questions or comments regarding the content of this report, please do not hesitate to contact me at (204) 928-8445.

Sincerely,
AECOM Canada Ltd.

[redacted]

Keith Fitchett, C.E.T., P.Eng.
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Keith.Fitchett@aecom.com

KF:ag
Encl.

cc: Dan McDermid, C.E.T., Director of Operations, City of Selkirk

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Table of Contents

List of Tables

Appendices

1. Background Information

To develop this report, AECOM reviewed the following documents:

- *City of Selkirk Wastewater Treatment Facility Functional Design Report*, AECOM, 2014.
- *Selkirk WWTP Process Comparison Review*, Birchtree Consulting Ltd., 2016.

The 2014 AECOM report based the proposed treatment of wastewater at the City of Selkirk (City) Wastewater Treatment Plant (WWTP) on a "Johannesburg BNR" process to provide nutrient removal. AECOM recommended alum dosing for intermittent phosphorus removal during the winter when the biological process cannot remove phosphorus.

The 2016 Birchtree report provided a second review of wastewater treatment options, based on more recent flow data. Birchtree recommended that the City consider the Sequencing Batch Reactor (SBR) technology, coupled with upstream flow equalization in the existing bioreactors, for use as a secondary treatment process, based on a lower net present value of the process compared to other technologies.

1.1 WWTP Design

The 2016 report summary of the technologies considered indicates that the net present values of most of the options were less than 20% higher than the SBR technology. At the level of detail available for an assessment of the options, AECOM considers all these technologies as roughly equivalent due to the level of detail available when developing capital and operating and maintenance costs. The consideration of other non-economic factors also played a role in the final decision for selecting the treatment technology.

On request of the City, the Manitoba Water Services Board (MWSB) retained AECOM to modify the Functional Design and advance the Detailed Design of the WWTP for the use of the membrane bioreactor (MBR) process. The MBR process is considered to be comparable with the previously recommended SBR process and has a proven track record for treating wastewater for communities like the City of Selkirk. AECOM has no concerns about using this technology for the City. It is expected to provide effective final treatment for the City's wastewater.

In addition to the secondary treatment process change, wet weather flows will be diverted to and stored in the existing wastewater lagoons to allow for a significant reduction in the design capacity of the secondary process. Stored wet weather flows will be returned to the WWTP at a controlled rate.

This report provides a summary of the resulting Functional Design changes.

2. Design Criteria

The design criteria presented in the 2014 AECOM report have been updated. As a result of the elapsed time between the completion of the 2014 report and the ongoing design work, it was considered prudent to re-visit the flow and loading criteria for the design. The City's records for flow to the facility (2011-2015) have been reviewed and the population projections for the City have been updated to reflect a 20 year design horizon, now ending in 2039. The projected population for 2039, including a portion of St. Andrews and the Lower Fort Garry facility, is 12,823.

The design loads for the WWTP have also been reviewed. The 2014 report explained that typical wastewater concentrations were applied, as the City's records indicated slightly lower concentrations of key wastewater criteria. This approach has been retained; therefore, the design loading has been increased to reflect the increased population projections and the corresponding increases in flow.

Table 1 contains a summary of updated flow data, along with other design criteria presented in the 2014 AECOM report.

Table 1: Summary of Design Flows and Loads

Parameter	Value	Notes
Design Year	2039	20 years from WWTP commissioning.
Contributing Population	12,823	
Design Flows		
AAF, ML/d	4.6	MBR system must meet this flow requirement with one membrane train out of service.
MMF, ML/d	7.5	Based on 30-day rolling average 2011-2015.
PWWF, ML/d	36.0	Maximum instantaneous flow based on influent pump station performance with all pumps operating and the existing WWTP hydraulic grade line in place. The new WWTP will result in an increased static head, which will reduce the capacity of the influent pump station. Future pump upgrades may be needed, but are not considered at this time.
Day Max flow, ML/d	12.0	Maximum flow directed to secondary treatment.
Max 7-day rolling average, ML/d	10.2	Based on 7-day rolling average 2011-2015.
Design Loads		
TSS		
AAL, kg/d	1,154	
MML, kg/d	1,916	
BOD		
AAL, kg/d	1,026	
MML, kg/d	1,467	
TKN		
AAL, kg/d	167	
MML, kg/d	207	
TP		
AAL, kg/d	41	
MML, kg/d	53	

2.1 Regulatory Requirements

The Selkirk WWTP Upgrade will be designed based on the discharge parameters outlined in **Table 2.** These limits are anticipated to be included in the Environment Act Licence to be issued for the plant.

Table 2: Liquid Stream Discharge Limits

Parameter	Value
Carbonaceous BOD (98th percentile)	≤ 25 mg/L
Total Suspended Solids (98th percentile)	≤ 25 mg/L
Total Phosphorus (based on 30 day rolling average)	≤ 1 mgP/L
Total Nitrogen (based on 30 day rolling average)	≤ 15 mgN/L
E coli (based on 30 day geometric mean)	≤ 200 MPN / 100 mL

2.2 Process Description

In general, the process stages will follow the recommendations of the 2014 AECOM report. This section provides a brief summary of treatment stages/approaches that follow the recommendations of the 2014 AECOM report and provides more detail on treatment steps that will vary from the previous report. The modified treatment plant includes the following major process stages:

- Influent pumping (existing Dufferin Lift Station);
- Plant Bypass to the existing UV disinfection system;
- Screening (Bar Screens);
- Grit Removal;
- Screening (Fine Screens);
- Wet weather flow equalization;
- Bioreactor;
- Membranes;
- Permeate pumping;
- UV disinfection (existing);
- Outfall (existing);
- Return activated sludge (RAS), waste activated sludge (WAS) and scum pumping;
- Wet weather flow and WAS supernatant return lift station at lagoons; and
- Lagoons (existing).

The following points summarize AECOM's recommended approach to sizing process equipment and tankage:

- Size all equipment, tanks, and channels between the plant inlet and the overflow weir at the fine screens to meet the maximum instantaneous flow capable of being delivered by the Dufferin Lift Station (36 ML/d) and internal recycle flows (less than 1% of the peak influent flow). Return flows will be introduced at off peak times. This approach results in a robust preliminary treatment facility capable of handling all flow scenarios that the Dufferin Lift Station could present.
- Size all equipment, tanks and channels from the overflow weir, through the bioreactors, membranes and UV stages to process 12 ML/d. This approach will allow for treatment of the maximum day flow of 12 ML/d for a continuous 8 hours and treatment of maximum 7-day rolling average flow of 10.2 ML/d for continuous 7 days to the plant with all membrane units in service. A review of rainfall data for the area indicates that the City could receive near to peak wet weather flows for 3-5 days in a row. After 8 hours, flows above 10.2 ML/d would be diverted and stored in

the existing lagoon system until influent flows drop below 10.2 ML/d and the membrane system can operate at maximum capacity to reduce the volume of water stored in the lagoon. This approach balances the need to optimize membrane and bioreactor costs in a manner that does not expose the City to wet weather by-pass conditions.

- AECOM will confirm the system details to manage lagoon supernatant, return excess flows and internal recycle flows during the detailed design phase.

The Figures in **Appendix A** include a process flow diagram, site plan, functional level plans and sections for the new WWTP.

2.2.1 Influent Pumping

The new plant will result in a nearly identical total dynamic head on the Dufferin Lift Station as the existing plant. No appreciable change in flow capacity of the Dufferin Lift Station is anticipated.

2.2.2 Influent Screening

AECOM has changed to a two-stage screening system to accommodate the change to MBR treatment. The first screening stage has the capacity to treat the full pumping capacity of the Dufferin Lift Station with all pumps in operation (i.e. 36 ML/d). The design includes a plant bypass upstream of the bar screens to direct flows directly to the UV system in the event of equipment failure in the headworks area.

The first screening stage remains the same as proposed in the 2014 AECOM report. The initial construction will include, 6 mm bar screens in duty/standby arrangement. These screens will protect the second stage fine screening by removing large debris from the influent wastewater. Following the bar screens, wastewater flows by gravity to the grit removal process described in Section 2.2.3.

The second screening stage occurs after grit removal and the flow control weir, and consists of two, 1 mm fine screens (one duty; one standby) to remove finer debris like hair and other material that passes the bar screens. Flows to the fine screens and bioreactors will be limited to 12 ML/d. Each screen has a capacity of 12 ML/d. These fine screens protect the downstream membranes from clogging. Excess wet weather flow is diverted upstream of these screens to the lagoon, as described in Section 2.2.4.

The screened wastewater flows by gravity through a splitter box and over weir gates to the bioreactors. Space for a third 12 ML/d screen is provided for the future.

Screenings from both stages will be compacted and discharged to storage bins for offsite disposal.

2.2.3 Grit Removal

Grit removal has a capacity of 36 ML/d. Grit removal consists of a single grit concentrator tank, grit removal washing and classification and grit dewatering unit. Dewatered grit is discharged to the screenings storage bin for offsite disposal.

The degritted wastewater flows by gravity to the fine screens described in Section 2.2.2.

2.2.4 Wet Weather Flow Equalization

Wet weather flow equalization (EQ) allows designers to reduce the capacity of the biological treatment and membrane stages by buffering diurnal flows and storm flow conditions. Following the initial evaluation of flow equalization options including the tankage in the existing WWTP, AECOM recommended utilizing the existing lagoon for flow equalization.

The current design incorporates the lagoon for wet weather storage, since this option allows the City to re-use existing infrastructure at the lowest relative cost compared to the other options, which include high construction costs for retro-fitting existing building spaces. The retrofit work of the existing buildings entails considerable risk.

Flows above 12 ML/d will be diverted to the equalization pump well inside the plant from where the wastewater will be pumped to the existing lagoon cells for equalization. Overflows sent to the lagoon will be pumped back to the WWTP for treatment. The return flow from lagoon varies between 1 ML/d to 4 ML/d depending on the available capacity at the plant. According to the historical data from 2011 to 2015, wet weather flow event (above 12 ML/d) does not happen frequently (five times within five years). Therefore, the existing lagoon cells will not have frequent usage for flow equalization.

If the wet weather (12 ML/d) continuous for more than 8 hrs, then flows above 10.2 ML/s will be diverted to the equalization pump well.

Excess wet weather flows will be pumped to the lagoon, and return flows will be pumped back to the WWTP. During the wet weather condition, the bioreactor treatment capacity is 12 ML/d for 8 hours and 10.2 ML/d for 7 days. During these high flow events no flow will be returned to the plant.

The existing lagoon facility is made up of 5 cells, one of which is currently dedicated for septage receiving. The other cells are currently used for sludge storage and stabilization, with supernatant returned to the WWTP. The cells have sufficient capacity to provide both sludge storage and stabilization, and short term storage of wet weather flow. One cell will be retained for sludge stabilization and 4 of the cells will be converted for use as flow equalization. The effective volume of the storage cells is 49,244 m^3, providing the equivalent of approximately 2 days storage of excess flows for the projected total peak wet weather flow of 36 ML/d. In the event of continuous peak wet weather flow of 36 ML/d, during the first 8 hours 24 ML/d will be diverted to the lagoon and after 8 hours the diverted flow will increase to 25.8 ML/d.

The capital cost estimate presented in this report includes the conversion of the lagoon cells and the addition and upgrading of pumping facilities to deliver and return flows from the lagoon to the WWTP.

The City will need to perform the following major tasks to convert the existing lagoons to EQ tank(s):

- Transfer sludge from the cells to be used as EQ cells to the sludge stabilization cells.
- Construct a new pumping station at the WWTP to pump excess flows to the lagoon EQ cells.
- Construct a new lagoon pump station, with VFD controlled pumps to handle return wastewater flows to the WWTP.
- Install supply and return piping between the lagoon and the WWTP.

2.2.5 Bioreactor

After passing through the fine screens, all wastewater flows by gravity to the bioreactor. The bioreactor will include two trains, each treating 50% of the flow. AECOM completed a series of Biowin process simulation runs to confirm bioreactor sizing and expected performance. **Table 3** contains a summary of the design parameters for the bioreactor system. **Table 4** contains a summary of the Biowin modelling results.

Each bioreactor contains a single anaerobic zone, followed by anoxic and aerobic zones. The anoxic zone has two discreet cells. The aerobic zone has three discreet cells. These discreet cells enhance mixing and prevent short circuiting through the reactor. The membrane cell acts as an additional aerobic cell.

Table 3: Bioreactor Design Parameters

Parameter	Value
Anaerobic Zone	
Volume per reactor train, m^3	211
Total Anaerobic Volume, m^3	422
Total Anoxic Zone, m^3	
Volume per reactor train, m^3	555
Total Anoxic Volume, m^3	1110
Total Aerobic Zone, m^3	
Volume per reactor train, m^3	1441
Total Aerobic Volume, m^3	2882
Total Membrane Tank (acts as part of the aerobic zone), m^3	140
Side Water Depth, m	5
Internal Recycle Rate	
Membrane Tank to 1st Aerobic Stage	4Q
2nd Anoxic Stage to Anaerobic Zone	2Q
3rd Aerobic Stage to 1st Anoxic Stage	4Q

Table 4: Results of Biowin Modelling Design Year 2039

Scenario	SRT, d	Temp, ˚C	MLSS		Effluent			
			Last Aerobic Zone, mg/L	Membrane Tank, mg/L	NH_4-N, mg/L	Total N, mg/L	Total P, mg/L	BOD_5, mg/L
AAF Winter, 2 trains	15	7	5,750	7,170	0.7	8.9	0.8	1.0
AAF Summer, 2 trains	10	18	3,900	4,850	0.1	8.7	0.5	1.0
MMF Winter, 2 trains	15	7	8,400	10,480	0.80	6.3	0.70	1.0
MMF Summer, 2 trains	10	18	5,640	7,020	0.10	5.6	0.80	1.0

The BioWin results indicate that the plant can meet the anticipated regulatory requirements under all conditions modelled.

The bioreactors will be constructed with mixing, aeration and sludge recycle systems. Jet aeration blowers and pumps will provide the required mixing and aeration.

2.2.6 Membrane System

Equipment suppliers provided a range of membrane styles (e.g. fibres or plate technologies) and several equipment supply configurations. For this plant, AECOM and the City selected “fibre” style membranes since they represent the most common membrane system in use at wastewater treatment facilities today.

The membrane system uses vacuum pressures created by permeate pumps to draw treated effluent from the final bioreactor phase through microscopic pores in the membrane. The permeate pumps will transfer permeate to the existing UV disinfection facility. The liquid then flows by gravity to the outfall and river.

Membrane systems are sized to meet influent flow conditions rather than loading rates. For this application, AECOM has sized the membrane system to accommodate peak flows of 12 ML/d for a continuous period of 8 hours and 10.2 ML/d for a period of 7 days. As noted earlier, excess wet weather flow will be diverted to the lagoon and returned to the WWTP once the wet weather conditions have passed. As a result, the membranes can operate at maximum design flows for an extended period without causing premature fouling.

Membrane manufacturers typically supply packaged systems which include the following components:

- Immersed wastewater membranes arranged in modular units;
- Permeate system;
- Air blower system;
- Air compressor system;
- Membrane cleaning equipment;
- Inter connecting pipe on skid mounted equipment; and
- Local control panel, programmable logic controller (PLC) and human machine interface (HMI).

AECOM has included these items as a single value in the capital cost estimate. The membrane manufacturer typically does not include the following items:

- Foundations and Buildings;
- Equipment Installation;
- Motor Starters; and
- Electrical components outside of skid mounted equipment.

The membranes will be configured in multiple trains each with several modular membrane cassettes. Each cassette will contain multiple replaceable membrane modules. The operator will take each membrane train off-line for 6-8 hours approximately every six months to perform an in-situ cleaning. This cleaning removes fouling from inorganic compounds like iron or carbonates, and also removes biological fouling. The operator should time the cleanings for low flow periods to ensure that the plant has operational membrane capacity to process incoming flows. In the event of an emergency, the operator could take individual cassettes off line for cleaning without creating overflow conditions. Prudent management of cleaning cycles should mitigate the risk of requiring cleaning during wet weather conditions.

AECOM considered the following membrane configurations:

- Two trains each capable of processing 50% of the peak flow. Each train will have a capacity of 6 ML/d.
- Three trains each capable of processing more than 33% of the average dry weather flows.

The two train approach would lead to a slightly smaller overall structure and cost, but would result in a less flexible system for operation. In consultation with the City, AECOM has adopted the two train approach along with providing additional building space for a future membrane train (future membrane capacity is 18 ML/d). This approach provides sufficient flexibility for operations, as well as space to increase capacity if required for future growth.

2.2.7 Sludge Management

Waste activated sludge (WAS) from the membrane tank, along with any scum will be pumped to the lagoon for storage and stabilization. One of the five existing cells with a total storage capacity of 35,494 m^3 will be dedicated to WAS storage. The supernatant from the sludge storage cells will overflow to the equalization cells from which it will flow by gravity to the lagoon lift station and then be pumped back to the WWTP.

Stabilized sludge will be land applied after approximately five years, and the periodically, following the appropriate regulatory requirements, as the storage volume becomes limited. Sludge will be removed from the cells and dewatered using porous “bags”, which will be placed on the sludge dewatering pad. This clay pad will be constructed along the east side of the cells at about the same time as the WWTP construction. The pad will be sloped towards the lagoon cells, to allow liquid from the sludge to drain back into the cells.

2.2.8 Chemical Feed Systems

Chemical feed systems will be included in the new WWTP. These include the following:

- Alum will be added to the aerobic stage of the bioreactor to assist in the reduction of phosphorus. A 24 cubic metre tank with chemical feed pumps will be located in the membrane room.
- Cleaning chemicals will be used for periodic cleaning of the membrane cassettes. These are expected to include sodium hypochlorite and citric acid.

All chemicals will be stored in compatible tanks, with appropriate spill containment, in a chemical storage room with immediate access to eyewash and shower.

2.2.9 UV Disinfection (Existing)

The recovered liquid – permeate – contains very little BOD or suspended solids and will normally meet the regulatory requirements for *E. coli* removal/inactivation without the need for further disinfection. The City will operate its UV disinfection system for a period of time following commissioning of the new plant and will have to provide documented proof to Manitoba Sustainable Development that the membrane system meets the requirements for *E. coli* removal without the continuous need for the final disinfection step. Once Manitoba Conservation accepts that the membrane system has met the regulatory requirements for *E. coli* removal, the City may elect to turn off the UV system under normal operation with certain controls in place to address plant by-pass conditions. Using this approach, the City would reduce operating costs related to power consumption. AECOM will develop these controls during the detailed design phase.

AECOM recommends that the City also utilize the existing UV disinfection system for use in by-pass conditions and as back-up in the event that permeate coliform levels exceed regulatory requirements. All flows would pass through the UV channels prior to entering the outfall and river. The UV disinfection system would not operate under normal conditions, but would automatically start in the event of bypass conditions.

3. Estimate of Probable Cost

AECOM has prepared a capital cost estimate for the new plant as described in the following subsections. Operations and maintenance costs were not developed at this time, but will be presented during the detailed design phase.

Although the estimate has been made to a detail appropriate to the level of design, it is not possible to estimate the cost with absolute certainty owing to unknown and unpredictable factors such as the state of the local construction market, currency exchange prices, international commodity prices and the like.

3.1 Process

The process estimate is itemized to a degree appropriate to the level of design. Budget quotations for each piece of major process equipment were solicited from one or more manufacturer. Although in most cases, these preliminary prices are valid for between 30 to 90 days and are thereafter subject to fluctuations in currency and commodity exchanges, they provide an accurate picture of the supply costs.

Quotations were reviewed for the following, sized for the specific needs of the new Selkirk WWTP: bioreactor aeration and blowers; bioreactor mixers; RAS, WAS, scum, bioreactor recycle, chemical dosing and permeate pumps, membranes, screens, screenings dewatering and conveyor, overflow pumps and all grit removal system components.

Specific quotations were not solicited for generic process devices such as valves, piping, gates, weirs, and the like. In these cases, a typical unit supply and installation cost is assumed.

Additional factors were applied to account for sales taxes, freight, installation, and contractor mark-ups and profits.

Process costs are distributed among the four process areas (headworks, bioreactor, membranes and lagoon lift station). Administration space is incorporated into the headworks building.

3.2 Structural

The structural estimate is itemized to a degree appropriate to the level of design.

The structural estimate is based on the size of buildings and tanks as shown in this stage of design, with standard unit prices for concrete, masonry, roofing, windows and doors, and other typical building components.

Factors were applied to account for sales taxes, freight, installation, and contractor mark-ups and profits.

Structural costs are distributed among the five process areas.

3.3 Electrical

The electrical estimate is not itemized at this stage of design, and is a lump sum based on the engineer's experience for a wastewater treatment plant of this size and estimated power requirements.

Electrical costs are not distributed among the five process areas, but apply to the entire plant.

3.4 Process Instrumentation and Controls

The instrumentation and controls estimate is itemized to a degree appropriate to the level of design.

It is divided into three groups: instrumentation elements (meters, sensors, etc.) with standard supply and installation costs applied to each; valve actuators with standard supply and installation costs applied to each; and the SCADA system: the computer components, connections, and programming required to provide an integrated functional system.

Factors were applied to account for sales taxes, freight, installation, and contractor mark-ups and profits.

Process instrumentation and controls costs are not distributed among the five process areas, but apply to the entire plant.

3.5 Mechanical (Plumbing and Ventilation)

The mechanical (plumbing and ventilation) estimate is itemized to a degree appropriate to the level of design.

It is divided into four groups: heating systems; ventilation systems (fans, ducts etc.); plumbing; and controls (separate from process instrumentation and controls).

The supply and installation costs for each component are based on experience and industry standard numbers. Factors were applied to account for sales taxes, freight, installation, and contractor mark-ups and profits.

Mechanical (plumbing and ventilation) costs are not distributed among the five process areas, but apply to the entire plant.

3.6 Civil

The civil estimate is itemized to a degree appropriate to the level of design. It consists of four groups: yard piping, at a standard per metre supply and installation cost; subgrade excavation and waste; site grading including ditching; and topsoil, finish grading, and seeding.

The supply and installation costs for each component are based on experience and industry standard numbers. Factors were applied to account for sales taxes, freight, installation, and contractor mark-ups and profits.

Civil costs are not distributed among the four process areas, but apply to the entire plant.

3.7 Demolition

Demolition of the existing WWTP is not included in the cost estimate.

3.8 General Requirements

A separate line item (10% of the total cost of the above) is included to cover the contractor's costs associated with the "front end" (e.g. general conditions, supplementary general conditions, bonding, and insurance) and Division 1 contract general requirements (mobilization, demobilization, shop drawings, site trailers, etc.).

3.9 Estimating Contingency

The total cost needs to include undefined items of work, or elements of costs within the defined scope of work that cannot be explicitly quantified, foreseen or described based on the current project definition level, and potential changes to the scope which have not been contemplated at this stage. Therefore, a project contingency factor, applicable across the board, is included as an integral part of the cost estimate.

This contingency is 15%. It is included in each line item in the table above cost and is not shown as a separate line item.

3.10 Engineering Fees

The engineering fees, like the contractor's administrative costs and general conditions, are part of the capital cost. A factor of 12% has been used to estimate engineering fees.

3.11 Escalation

The cost estimate includes escalation of 2% to reflect the anticipated 2018 construction period.

3.12 Goods and Services Tax

The above costs specifically exclude the federal Goods and Services Tax.

3.13 Summary

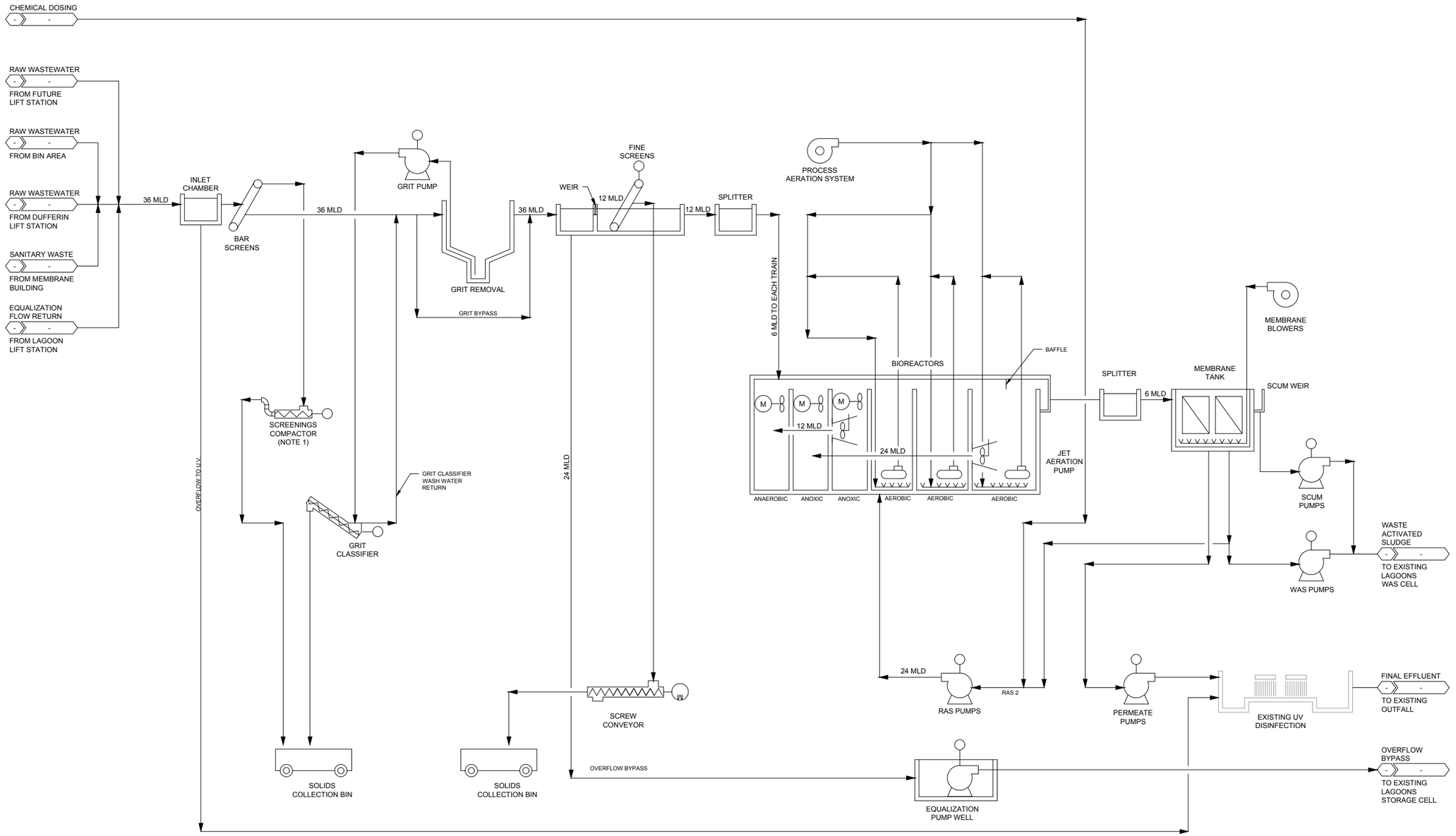
The cost estimate is based on the work of the six main engineering disciplines as described below and is summarized in **Table 5**, divided into the five main process areas where appropriate and rounded to the nearest $1,000.

Table 5: Summary of Estimated Capital Costs

Item	Cost
Process and Structural Costs	
Headworks/Screening	$ 5,648,000
Lagoon Lift Station	$ 400,000
Bioreactor	$ 4,944,000
Membranes	$ 8,900,000
Mechanical	$ 1,970,000
Electrical	$ 1,467,000
Instrumentation and Controls	$ 790,000
Site Civil / Yardworks	$ 2,001,000
Subtotal 1	**$ 26,120,000**
Contingency (15%)	$ 3,918,000
Engineering (12% of Subtotal 1 + Contingency)	$ 3,135,000
Subtotal 2	**$ 33,173,000**
General Conditions (10%)	$ 3,317,000
Total	**$ 36,490,000**

Appendix A

Figures



NOTE:

1. EXISTING SCREENING COMPACTOR TO BE RELOCATED TO NEW FACILITY.

AECOM

PROJECT

CITY OF SELKIRK
WASTEWATER TREATMENT PLANT

Selkirk, MB
MWSB Project # XXXX

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ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

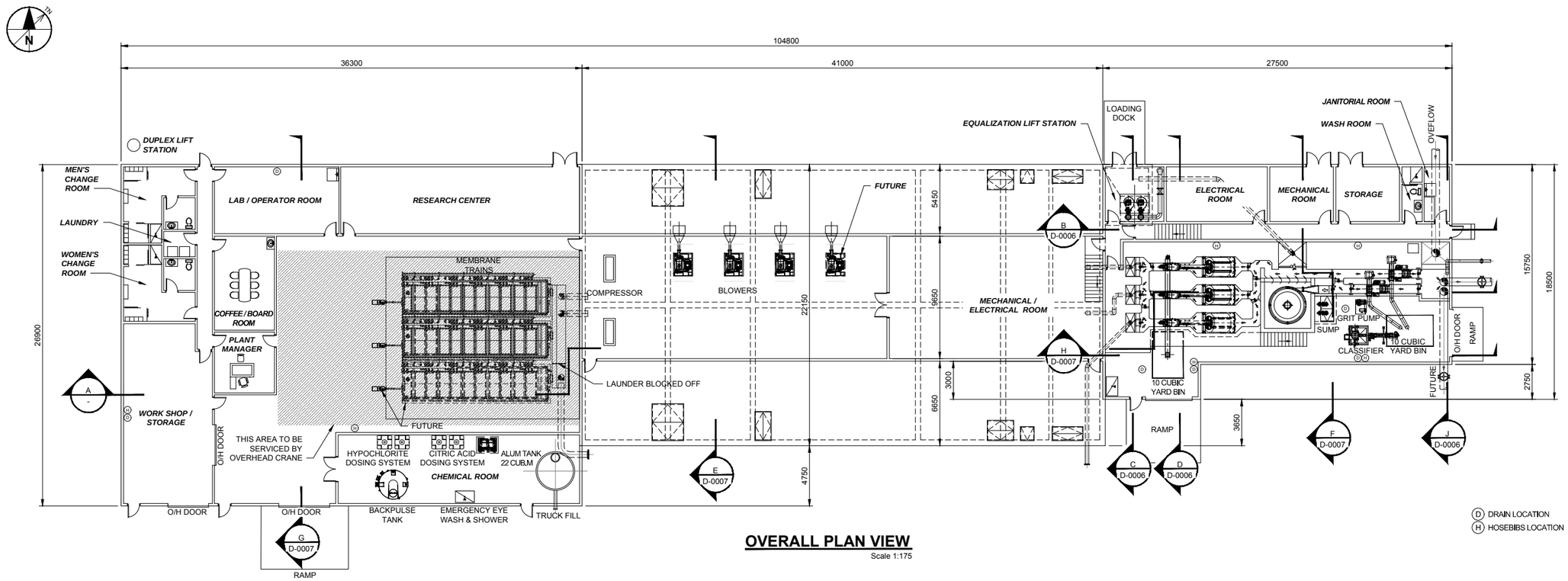
60530834

SHEET TITLE

DIAGRAMS & SCHEMATICS
PROCESS MECHANICAL
PROCESS FLOW DIAGRAM
PROCESS FLOW DIAGRAM

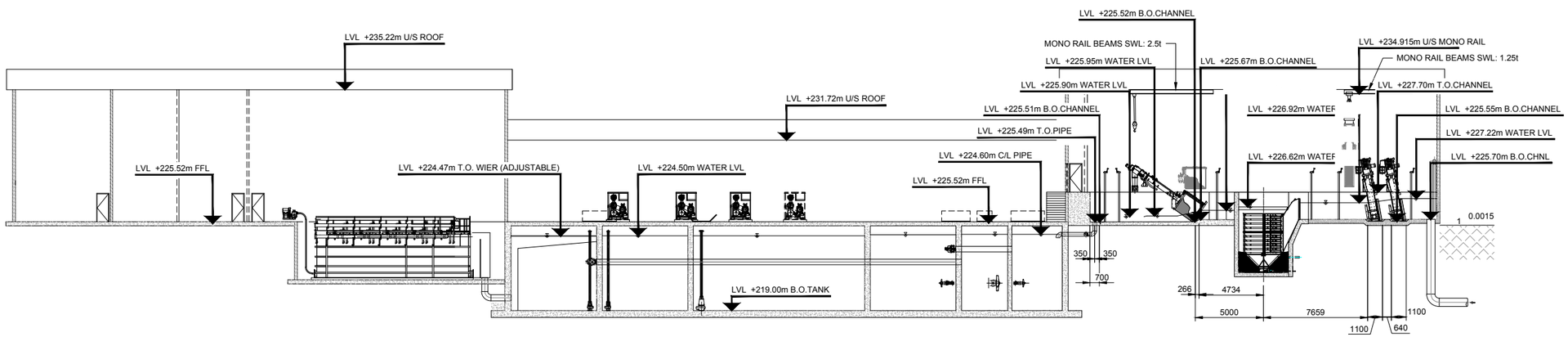
SHEET NUMBER

00-G0002



OVERALL PLAN VIEW

Scale 1:175



A - SECTION VIEW

Scale 1:175

NOTE:
1) ALL CHANNELS TO HAVE A SLOPE OF 1:0015 (U.O.N.)
2) ALL SUMPS TO HAVE MIN SLOPE OF .875% SLOPE (U.O.N.)

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CITY OF SELKIRK
WASTEWATER TREATMENT PLANT

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C	2017-07-20	ISSUED FOR DETAIL DE
B	2017-06-22	ISSUED FOR INFORMAT
A	2017-05-25	ISSUED FOR INFORMAT

PROJECT NUMBER

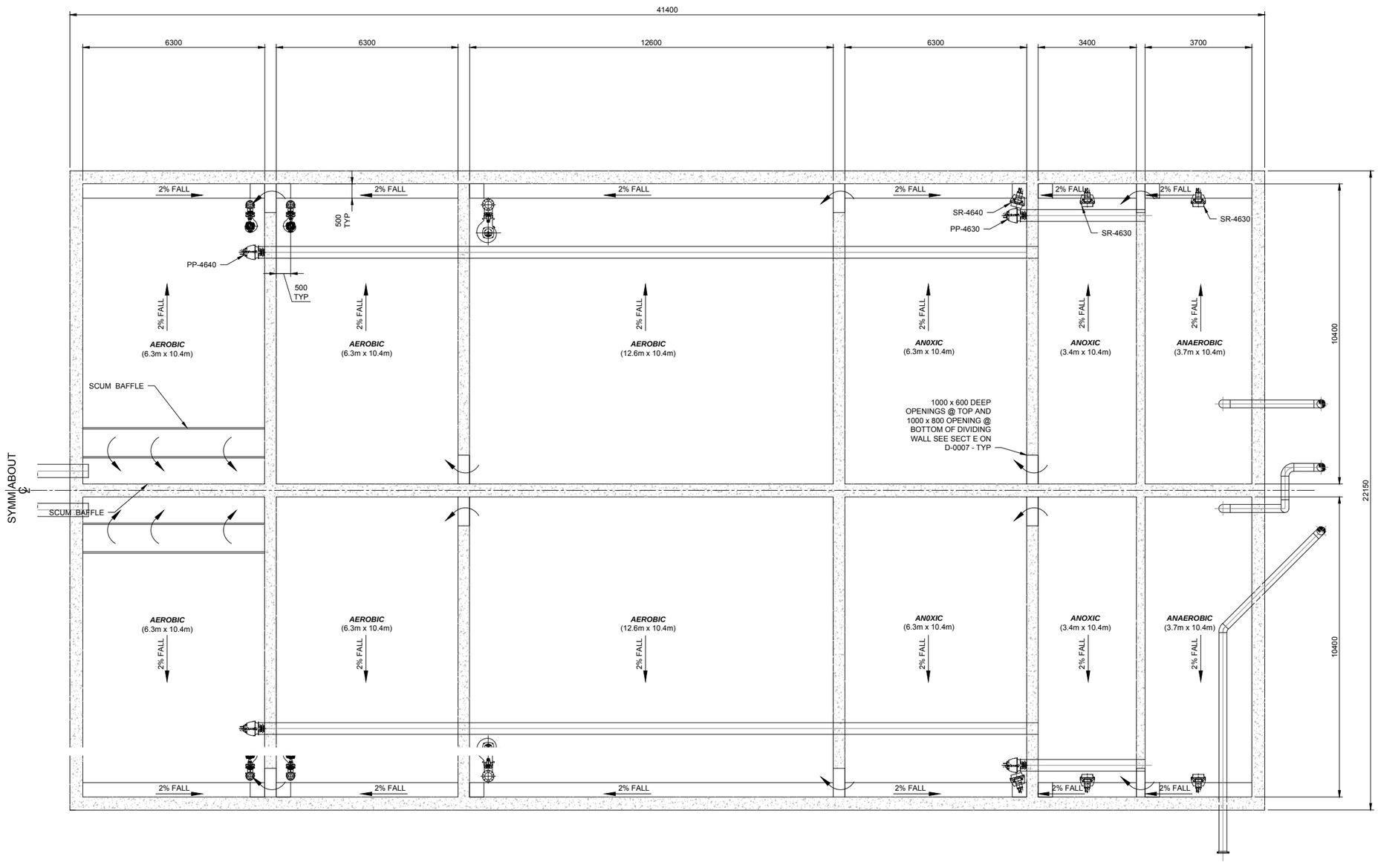
60530834

SHEET TITLE

PLANT LAYOUT

SHEET NUMBER

D-0001



PLAN VIEW ON BIOREACTOR FLOOR LEVEL

Scale 1:75

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PROJECT

CITY OF SELKIRK
WASTEWATER TREATMENT PLANT

Selkirk, MB
MWSB Project # XXXX

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B	2017-06-22	ISSUED FOR INFORMAT
A	2017-05-25	ISSUED FOR INFORMAT

PROJECT NUMBER

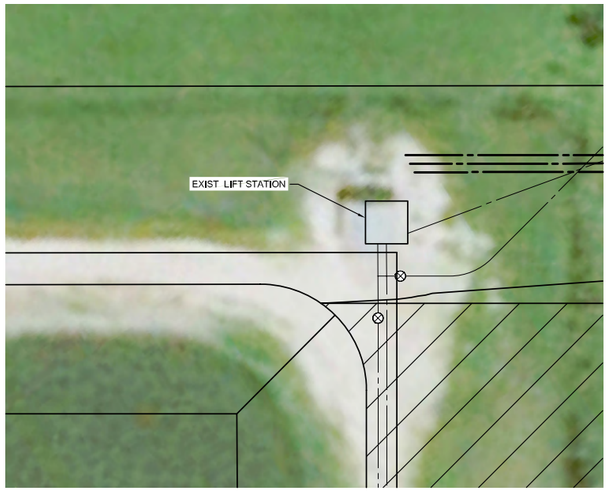
60530834

SHEET TITLE

BIOREACTOR FLOOR LEVEL

SHEET NUMBER

D-0005



LIFT STATION
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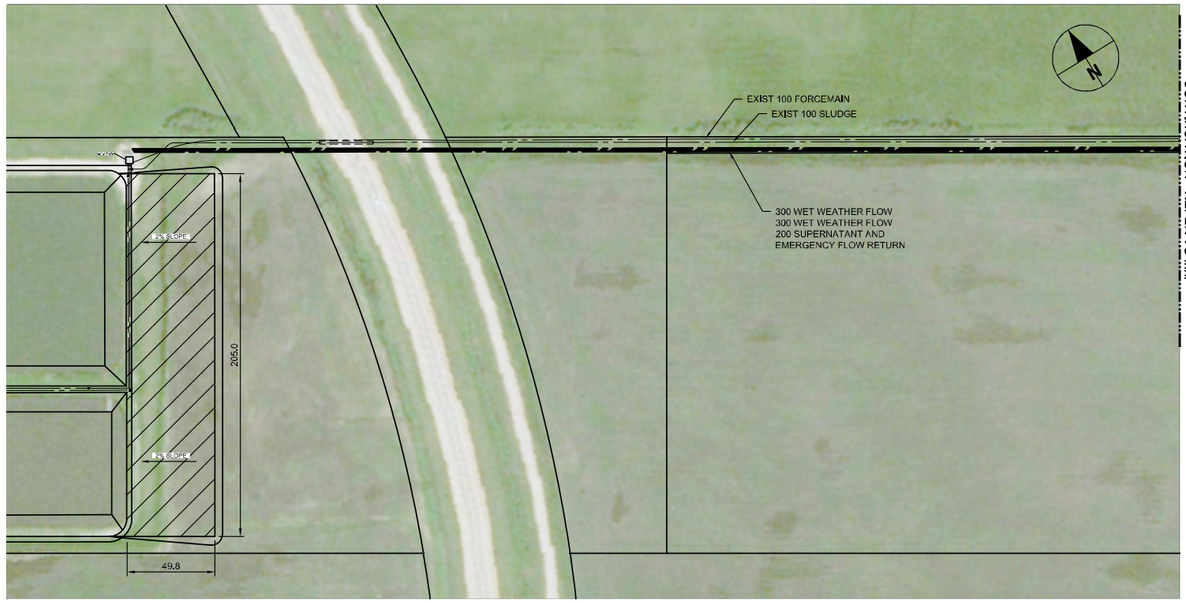

PLAN
Scale 1:1500

CONTINUATION - REFER TO ###

CONTINUATION - REFER TO ###

EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED
150 mm W.M.	WATERMAIN	150 mm W.M.		HYDRO			LIGHT STANDARD	
	HYDRANT			M.T.S.		←	ANCHOR	
⊗	VALVE	⊗		GRAVEL			POLE	
E	PLUG	E		ASPHALT			CONTOURS	
300mm L.D.S.	LAND DRAINAGE SEWER	300mm L.D.S.		PROPERTY LINE			RAIL X-ING SIGNAL	
250mm W.W.S.	WASTEWATER SEWER	250mm W.W.S.		SURVEY BAR			℄ RAILWAY TRACK	
100mm SLUDGE	SLUDGE	100mm SLUDGE	232.750	ELEVATION	32.750		DITCH	
100mm SUPERNATANT	SUPERNATANT	100mm SUPERNATANT	○	MANHOLE	●	8000	TREE	
	JUNCTIONS		□	CATCH BASIN	■		ANODE	
	CULVERT		▽	CURB INLET	▼		LANDSCAPED AREA	
	GAS		TH 1	TEST HOLE			FENCE	

PLAN
Scale 1:1500

AECOM

PROJECT

CITY OF SELKIRK
WASTEWATER TREATMENT FACILITY

Selkirk, MB
MWSB Project # XXXX

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PROJECT NUMBER

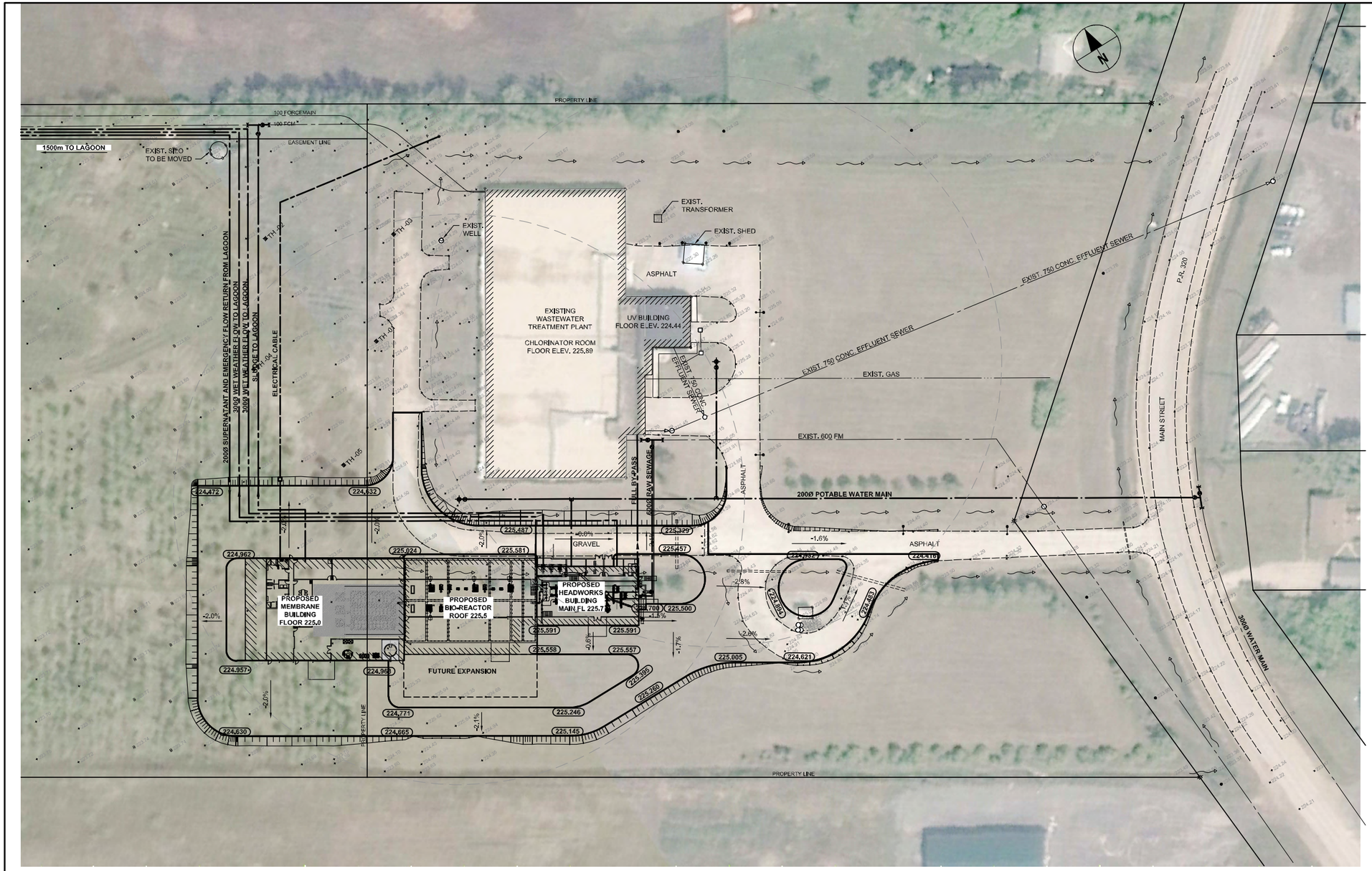
60530834

SHEET TITLE

CIVIL
OVERALL SITE PLAN

SHEET NUMBER

C-0001



EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED
150 mm W.M.	WATERMAIN	150 mm W.M.		HYDRO			LIGHT STANDARD	
	HYDRANT			M.T.S.			ANCHOR	
	VALVE			GRAVEL			POLE	
	PLUG			ASPHALT		362	CONTOURS	
300mm LDS.	LAND DRAINAGE SEWER	300mm LDS.		PROPERTY LINE			RAIL X-ING SIGNAL	
250mm WWS.	WASTEWATER SEWER	250mm WWS.		SURVEY BAR			℄ RAILWAY TRACK	
100mm SLUDGE	SLUDGE	100mm SLUDGE	232,750	ELEVATION	32,750		DITCH	
100mm SUPERNATANT	SUPERNATANT	100mm SUPERNATANT		MANHOLE		8000	TREE	
	JUNCTIONS			CATCH BASIN			ANODE	
	CULVERT			CURB INLET			LANDSCAPED AREA	
	GAS		TH-1	TEST HOLE			FENCE	

0 12.5 25 m
1:500

NOTES:
HIGHEST RIVER LEVEL RECORDED BY CITY
1996 - ELEV. 223.42m

Project Management Initials: Designer: Checked: Approved: ANSI D 864mm x 559mm

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PROJECT

CITY OF SELKIRK
WASTEWATER TREATMENT FACILITY

Selkirk, MB
MWSB Project # XXXX

CLIENT

MANITOBA WATER SERVICES BOARD

PO Box 22080
2010 Currie Boulevard
Brandon, Manitoba R7A 6Y9
204.726.6076 tel 204.726.7196 fax

CONSULTANT

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REGISTRATION

PRELIMINARY
NOT FOR CONSTRUCTION
Date: [Enter Date]

ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

60530834

SHEET TITLE

CIVIL
SITE PLAN

SHEET NUMBER

C-0002

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Appendix B
Historic Resources Branch Correspondence

Manitoba
Sport, Culture and Heritage

Memorandum

DATE: 2017-06-26

TO: **Kristiina Cusitar**
Environmental Assessor
Impact Assessment and Permitting
99 Commerce Drive
Winnipeg, MB
R3P 0Y7

CC: **Christina NESBITT**
Impact Assessment Archaeologist
Historic Resources Branch

FROM: **Suyoko TSUKAMOTO**
Impact Assessment Archaeologist
Historic Resources Branch
Main Floor – 213 Notre Dame Avenue
Winnipeg, Manitoba
R3B 1N3

PHONE NO: (204) 945-3893
FAX: (204) 948-2384
E-MAIL: Suyoko.Tsukamoto@gov.mb.ca

SUBJECT: Heritage Screening Request for the Wastewater Treatment Facility in Selkirk
HRB-20131007-Response
HRB File #: AAS-17-11954

No concerns at this time.

Further to your general inquiry regarding the above noted wastewater treatment facility, the Historic Resources Branch has examined the location in conjunction with Branch records for areas of potential concern. The potential to impact significant heritage resources has been deemed low in the identified area, therefore, the Historic Resources Branch has no immediate concerns with the project.

If at any time, however, heritage resources are encountered in association with these lands during testing and development, the Historic Resources Branch must be immediately contacted. The Historic Resources Branch may require that an acceptable heritage resource management strategy be implemented by the developer to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please feel free to contact the Branch as above.

Manitoba Historic Resources Branch
Archaeological Assessment Services

DeFoort, Tammera

From: Sitchon, Myra (CHT) <Myra.Sitchon@gov.mb.ca>
Sent: Monday, October 07, 2013 2:08 PM
To: Sadiq, Somia
Subject: No heritage concerns - Selkirk NOA for WWTF

Good afternoon,
In response to your memo regarding the above-noted proposed project, I have examined Branch records for areas of potential concern. The potential to impact significant heritage resources is low, and, therefore, the Historic Resources Branch has no concerns with the project.

If at any time however, significant heritage resources are recorded in association with these lands during development, the Historic Resources Branch may require that an acceptable heritage resource management strategy be implemented by the developer to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please contact me at 945-6539.

Thanks,
Myra

Myra L. Sitchon, *Ph.D.*
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Archaeological Assessment Services Unit,
Historic Resources Branch
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Manitoba
Culture, Heritage and Tourism