

Environment Act Proposal Form



Name of the development: Community of Oak Bluff Wastewater Treatment Lagoon	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Class 2 Development - Wastewater Treatment Lagoon	
Legal name of the applicant: Rural Municipality of Macdonald	
Mailing address of the applicant: Box 100, 161 Mandan Drive	
Contact Person: Daryl Hrehirchuk	
City: Sanford	Province: MB Postal Code: R0G 2J0
Phone Number: (204) 736-2255 Fax:	email: daryl@rmofmacdonald.com
Location of the development: Southeast of the Community of Oak Bluff	
Contact Person: Daryl Hrehirchuk	
Street Address: Road 7E, 600 m south of Road 51 NE	
Legal Description: Parts of NW and SW 17-9-2 EPM	
City/Town: Oak Bluff	Province: MB Postal Code: R0G 2J0
Phone Number: (204) 736-2255 Fax:	email: daryl@rmofmacdonald.com
Name of proponent contact person for purposes of the environmental assessment: Dana Bredin, P.Eng.	
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Webpage address: wsp.com	
Date: 2026-04-17	Signature of proponent, or corporate principal of corporate proponent: 
Printed name: Dana Bredin	

RESET

A complete **Environment Act Proposal (EAP)** consists of the following components:

- ☒ **Cover letter**
- ☒ **Environment Act Proposal Form**
- ☒ **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information)
- ☒ **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):	
Class 1 Developments	\$1,000
Class 2 Developments	\$7,500
Class 3 Developments:	
Transportation and Transmission Lines ..	\$10,000
Water Developments	\$60,000
Energy and Mining.....	\$120,000

Submit the complete EAP to:

Director
Environmental Approvals Branch
Environment and Climate Change
Box 35, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6
EABDirector@gov.mb.ca

For more information:

Toll-Free: 1-800-282-8069
Phone: 204-945-8321
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April 17, 2026

Project No. CA-WSP-221-01415-00

Agnes Whittman, Director

Environmental Approvals Branch, Manitoba Environment and Climate Change

Box 35, 14 Fultz Boulevard

Winnipeg MB R3Y 0L6

FILE 3138.00 – ENVIRONMENT ACT PROPOSAL – OAK BLUFF LAGOON, RURAL MUNICIPALITY OF MACDONALD

Dear Madam

The Rural Municipality of Macdonald (RM) operates two existing two-cell wastewater treatment lagoons southeast of the Community of Oak Bluff, operating under Environment Act Licence No. 2898, dated September 15, 2009, a small facility in NE 18-9-2 EPM and a large facility in W 17-9-2 EPM.

The RM proposes to continue to use the existing small facility in NE 18-9-2 EPM, servicing the original Oak Bluff development (Oak Bluff Estates and adjacent commercial development, known as “old Oak Bluff”), while expanding the larger facility in W 17-9-2 EPM, that services all the new development in Oak Bluff (Oak Bluff West and new commercial development), the McGillvray Commercial District and truck hauled wastewater from the rural areas of the RM and low-pressure sewer pump outs in Oak Bluff Estates and adjacent commercial development. The proposed development includes the construction of two new primary aerated cells, situated within the existing primary cell, and a new storage cell south of the lagoon.

The enclosed Environment Act Proposal Report provides the details and information on the proposed development. It is accompanied by the signed Application Form and a cheque in the amount of \$7,500.00. We request the opportunity to review the draft Environment Act Licence when it is issued. Please contact the undersigned if further information is required.

Regards,

WSP Canada Inc.



Dana Bredin, P.Eng.

Director, Water and Wastewater

DB/mw

CC: Daryl Hrehirchuk, RM of Macdonald

WSP Canada Inc.
1600 Buffalo Place, Winnipeg, MB
R3T 6B8 Canada

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Manitoba Water Services Board **RM of MacDonald – Oak Bluff Lagoon Expansion**

Environmental Act Proposal

2026-04-17

221-01415-00



Document distribution

RM of MacDonald – Oak Bluff Lagoon Expansion

Environmental Act Proposal

2026-04-17

221-01415-00

Prepared for

Rural Municipality of Macdonald
Box 100
Sanford, MB R0G 2J0

Submitted to

Environmental Approvals Branch
Box 35, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6 Canada

Prepared by

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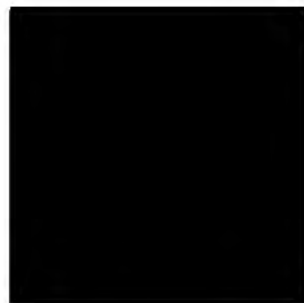
Quality control	Name	Date	Signature
Prepared by:	Dana Bredin, P.Eng.	April 17, 2026	
Reviewed by:	Jason Bunn, P.Eng.	April 17, 2026	

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Appendix A – Status of Titles

Appendix B – Environment Act Licence

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Appendix D – Proposed Development Plans

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Executive Summary

WSP Canada Inc. (WSP) was retained by the Manitoba Water Services Board (MWSB) and the Rural Municipality (RM) of Macdonald to obtain the approvals necessary to expand the current wastewater treatment lagoon, The Oak Bluff Lagoon, by constructing new aerated primary cells and a new secondary cell.

The community of Oak Bluff is located at the intersection of the Perimeter Highway (PTH #100), PTH #2, and PTH #3, and the McGillivray Commercial District (MCD) is located along McGillivray Boulevard (PTH #3) between Brady Road and extends 800 m west of Loudon Road. Oak Bluff has seen significant growth in the past decade with the development of the Oak Bluff West neighbourhood, while the MCD has also seen significant commercial development in the past decade. There are currently two lagoons in use to service Oak Bluff and the MCD. The Original Oak Bluff Lagoon is a small two-cell facultative lagoon and services the existing low-pressure sewers (LPS) within Oak Bluff, including the original residential development of Oak Bluff Estates, the school, and the adjacent commercial and industrial developments. The second existing lagoon, referred to as the Oak Bluff Lagoon, is also a two-cell facultative lagoon, and services the development of Oak Bluff West, commercial and industrial development north of Agri Park Road and the MCD, both via their own lift stations and forcemains.

The main driver for the wastewater treatment lagoon expansion is the rapidly growing development of the MCD and the community of Oak Bluff. The Oak Bluff Lagoon is projected to reach its treatment capacity in the design year 2032 and storage capacity in the design year 2028. The proposed work includes converting the existing facultative primary cell of the Oak Bluff Lagoon into two (2) aerated primary cells and a converted secondary cell, the construction of a new secondary cell, and the twinning of the existing forcemain to the lagoon from Oak Bluff West.

Upon approval from Manitoba Environment and Climate and the issuance of an Environment Act Licence, it is anticipated that the tender and construction will begin in 2027.

1. Development Information

Community of Oak Bluff Wastewater Treatment Lagoon

Name of development

Rural Municipality of Macdonald

Legal name of the proponent of the development

Southeast of Oak Bluff, MB within SW 17-9-2E

Location of development

Contact Person for Proponent:

Mr. Daryl Hrehirchuk, CAO
Rural Municipality of Macdonald
161 Mandan Drive
Sanford, MB
R0G 2J0

Contact Person for Environmental Assessment:

Mr. Dana Bredin, P.Eng., PMP
WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB
R3T 6B8

1.1 Proposal Contents

Table 1.1 Proposal Contents

Section of Environment Act Proposal Form	Section Number in Reports
DESCRIPTION OF DEVELOPMENT	
(i) Legal description and map of development	2.1
(ii) Mineral rights	2.2
(iii) Existing land use	2.3
(iv) Previous studies	2.4
(v) Proposed development	5
(vi) Storage of gasoline or associated products	6.3.1
(vii) Potential impacts	6
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SCHEDULE	8
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Table 1.2 CEAA Proposal Contents

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3.2 Local Soils, Topography, Geology	5.2
3.3 Hydrology / Hydrogeology	5.2.3, 6.3
3.4 Vegetation Communities	6.7
3.5 Fish, Wildlife, and Habitat	6.5, 6.6, 6.7
3.6 Endangered or Threatened Species	6.5
3.7 Historic and Cultural Sites	6.8
4. Environmental Impacts and Mitigation	
4.1 Water Quality	6.3
4.2 Odour	6.1
4.3 Fisheries	6.3, 6.6
4.4 Wetland / Wildlife Habitat	6.3
4.5 Soils and Vegetation	6.2, 6.5
4.6 Heritage Resources	6.8
4.7 Navigable Waters	6.3

2. Description of Development

2.1 Certificate of Title

The existing wastewater treatment lagoon (WWTL) is located within the west half of 17-9-2 EPM. The proposed development is to be located within SW 17-9-2 EPM northeast of the adjacent drain (Plan 1356 WLTO), as shown in Figure 2-1.

The Rural Municipality of Macdonald (RM) is the registered owner of the existing lagoon land, Title Number 2404237/1. The Status of Title is included in **Appendix A**.



Figure 2-1: Aerial Photo of the Proposed Development

2.2 Mineral Rights

The Real Estate Services Branch of the Manitoba Department of Finance was contacted to provide information on the mines and minerals and sand and gravel ownership of the applicable purchased lands discussed in the previous section. It has been confirmed that the mines, minerals, sand and gravel for SW 17-9-2 EPM was transferred by the Dominion of Canada in 1881. Correspondence is included in Appendix F.

2.3 Description of Existing Land Use

The RM of Macdonald Zoning By-Law No. 5/18 indicates the land intended for lagoon development is zoned Environmental Policy Area. The land proposed for the construction of the new secondary cell is currently utilized for agriculture.

2.4 Previous Studies

2022 “RM of Macdonald – Oak Bluff Forcemain & Lagoon Study – Preliminary Design Report” prepared by WSP for the Rural Municipality of Macdonald

This report recommends the RM of Macdonald converts the existing facultative primary cell to an aerated cell and the construction of a new secondary cell. Three options were provided for the lagoon expansion in this report. The expansion is necessary due to the continued growth of the community.

2019 “Oak Bluff – McGillivray Infrastructure Review – Water & Sewer Capacity and Upgrading Study Final Report” prepared by WSP for the Rural Municipality of Macdonald

This report identified the short and long-term needs of the Community of Oak Bluff and the commercial district along McGillivray Boulevard. The report provided two options for the lagoon expansion – facultative or aerated.

3. Existing Wastewater Treatment Lagoon

3.1 Description

There are currently two lagoons in use to service the Oak Bluff communities and the McGillivray Commercial District (MCD). The original facultative lagoon, referred to as the Original Oak Bluff Lagoon (or Old Oak Bluff Lagoon), is a two-cell facultative lagoon built in 1989 and is located within NE 18-9-2 EPM. A second lagoon was constructed in 2010, referred to as the Oak Bluff Lagoon, and is also a two-cell facultative lagoon located within NW and SW 17-9-2E. The two lagoons are shown in **Figure 3-1**.



Figure 3-1: Aerial Photo of Original Oak Bluff Lagoon and Oak Bluff Lagoon



Wastewater from Oak Bluff West is collected via gravity sewer and conveyed to the Oak Bluff Lagoon via a centrally located lift station and forcemain. Both lagoons operate under Environment Act Licence (EAL) no. 2898, dated September 15, 2009.

3.2 Existing Capacity

When discussing the capacity of a WWTL, we will review its treatment capacity and storage capacity. Information regarding the actual dimensions and elevations of the Oak Bluff Lagoon is based on the 2010 As-Built drawings.

3.2.1 Treatment Capacity

Table 3-1 lists the relevant information concerning the existing primary cell in the Oak Bluff Lagoon. Since Manitoba Environment and Climate (EC) stipulates that only half of the total volume for primary cells contribute to the hydraulic storage of the WWTL, the storage volume of the existing primary cell is half of its total volume.

Table 3-1: Existing Primary Cell Parameters

Parameter	Oak Bluff Lagoon Primary Cell
Bottom Cell Dimensions	262.0 m x 288.0 m
Interior Side Slopes	4H:1V
Operating Depth	1.5 m
Freeboard	1.0 m
Liquid Surface Area (at operating depth)	82,200 m ²
Treatment Capacity	460.3 kg BOD ₅ /d
Total Volume (at operating depth)	118,200 m ³
Storage Volume	59,100 m ³

The current organic treatment capacity is **460.3 kg BOD₅/d**.

3.2.2 Storage Capacity

In a facultative lagoon, all cells contribute to the storage capacity of the facility. The primary cell contributes half of its total volume to storage, accounting for the fact that this cell can only be lowered by equalizing with a secondary cell, as well as the fact that the primary cell continues receiving incoming wastewater while the secondary cells are discharging.

A secondary cell, also referred to as a storage cell, contributes the volume of the cell above the invert of the discharge pipe up to the normal operating level. The volume below the cell cannot be discharged by gravity flow and is referred to as the dead storage volume. Typically, the invert of a pipe is set at 0.30 m above the cell bottom. **Table 3-2** summarizes the relevant information concerning the existing secondary cell in the Oak Bluff Lagoon.

Table 3-2: Existing Secondary Cell Parameters

Parameter	Oak Bluff Lagoon Secondary Cell
Bottom Cell Dimensions	325.0 m x 288.0 m
Interior Side Slopes	4H:1V
Operating Depth	1.5 m
Freeboard	1.0 m
Deadspace Depth	0.3 m
Total Volume	146,000 m ³
Dead Space Volume	28,300 m ³
Storage Volume	117,700 m³

The current lagoon total storage capacity is:

$$59,100 + 117,700 = 176,800 \text{ m}^3.$$

3.3 Existing Discharge Route

The Oak Bluff lagoon secondary cell is typically discharged one or two times over the course of the allowable discharge period from June 15th to October 31st. Currently, the effluent is discharged from the secondary cell via 300 mm diameter pipe. The effluent flows through the Atchison Drain which flows southeast into the La Salle River. The existing discharge routes are illustrated in **Figure 3-2**.

The Oak Bluff Lagoon facility is in the Lower La Salle Watershed (No.22).



Figure 3-2: Effluent Discharge Route from the Oak Bluff Lagoon Secondary Cell

4. Population Serviced and Design Loadings

The design loadings presented in the section below are summarized from the RM of Macdonald – Oak Bluff Forcemain and Lagoon Preliminary Design Report (WSP, 2023). Refer to the Preliminary Design Report in **Appendix E** for further information.

4.1 Sources of Wastewater

The Oak Bluff Lagoon services the following areas:

- The MCD; bounded by the City of Winnipeg to the north and east sides (Wyper Road and Brady Road), Road 54N to the south, and the quarter section line 800 m (half mile) west of Loudon Road to the west. The MCD consists of commercial and light industrial developments. The area is served by a low pressure sewer (LPS) which is pumped to the Oak Bluff Lagoon via a 250 mm forcemain.
- Oak Bluff West is the new residential development and is serviced by a gravity sewer which is conveyed to the lagoon via a 250 mm forcemain.
- Oak Bluff Estates, the original residential development, is served by an LPS. The Oak Bluff Lagoon receives the solids portion of wastewater, and the Original Oak Bluff Lagoon receives the liquid portion.
- Truck hauled wastewater (holding and septic tanks) from rural residences in the RM not connected to a municipal sewer.

Based on the anticipated construction date, the year 2047 was selected as the design year for sizing the expansion of the Oak Bluff Lagoon.

4.2 Population

The current and projected 2047 population serviced by the Oak Bluff Lagoon is summarized in **Table 4-1**. Based upon our review of the water consumption records of the residential and commercial users in Oak Bluff and the MCD, it was determined that one lot or connection is equivalent to 9 people.

Table 4-1: Oak Bluff Existing and Projected Population

Area	Existing Equivalent Population (2022)	Projected Equivalent Population (2047)
Oak Bluff West Residential	993	3,045
Oak Bluff Future Residential	0	900
Oak Bluff Future Commercial	0	396
MCD Residential	120	120
MCD Commercial	432	5,094
TOTAL – OAK BLUFF LAGOON	552	9,555
Old Oak Bluff Residential ¹	558	558
Old Oak Bluff Commercial ¹	252	252
TOTAL – ORIGINAL OAK BLUFF LAGOON¹	810	810

¹ Only the solids portion of the wastewater contributes to the Oak Bluff Lagoon.

4.3 Organic Loading

Organic loading refers to the quantity of organic material present in the incoming wastewater and is measured as the five-day Biochemical Oxygen Demand (BOD₅). The organic loading becomes the total mass of BOD₅ in kg/d in the wastewater discharged to a lagoon. The following considerations have been applied in order to estimate the future organic loading:

- The hydraulic portion of the existing residential and commercial LPS connections from old Oak Bluff will continue to flow to the Original Oak Bluff Lagoon, only the solids portion will be considered. This will not increase over the 25-year design period.
- New commercial development in Oak Bluff will be connected to the expanded Oak Bluff Lagoon.
- The residential population within the MCD will not change during the 25-year design.
- There are currently 660 rural residences that have septic or holding tanks.

When calculating the projected organic loading of the lagoon, the following criteria is applied:

- Average daily BOD₅ per person = 0.077 kg.
- Solid's portion of the LPS wastewater = 60% of the total BOD₅ per person, hauled annually.
- Rural truck hauled wastewater increases by 2% per year.

Table 4-2: Current and Projected Organic Loadings

AREA	ORGANIC LOADING FOR DESIGN YEAR (kg-BOD ₅ /d)	
	2022	2047
Old Oak Bluff ¹	37.4	37.4
Oak Bluff West & Future Residential	76.5	303.8
Oak Bluff New Commercial	0	30.5
MCD Residential	9.2	9.2
MCD Commercial	33.3	392.2
Rural Truck Hauled Wastewater	55.3	90.8
TOTAL	211.7	863.9

¹ Solids portion to be hauled to the lagoon once annually

The projected 2047 organic loading is **863.9 kg-BOD₅/d**.

4.4 Hydraulic Loading

Hydraulic loading refers to the volume of wastewater directed to the lagoon. Lagoons are presently designed for a 227-day storage period beginning November 1st and ending June 15th of the following year. Hydraulic loading over the storage period is used to calculate the volume of storage required in the lagoon facility. The following considerations have been applied in order to estimate the future organic and hydraulic loadings:

- The hydraulic portion of the existing residential and commercial LPS connections from old Oak Bluff will continue to flow to the Original Oak Bluff Lagoon, only the solids portion will be considered. This will not increase over the 25-year design period.
- New commercial development in Oak Bluff will be connected to the expanded Oak Bluff lagoon.
- The residential population within the MCD will not change during the 25-year design.
- There are currently 660 rural residences that have septic or holding tanks.

When calculating the projected hydraulic loading of the lagoon, the following criteria were used:

- Average per capita demand for Oak Bluff residential = 200 L/c/d
- Average per capita demand for the MCD and Oak Bluff future commercial = 250 L/c/d
- Storage period = 230 days
- Rural truck hauled wastewater increases by 2% per year.

Table 4-3: Current and Projected Hydraulic Loadings

AREA	HYDRAULIC LOADING FOR DESIGN YEAR (m ³)	
	2022	2047
Old Oak Bluff ¹	0	0
Oak Bluff West Residential	45,678	181,470
Oak Bluff New Commercial	0	22,770
MCD Residential	6,900	6,900
MCD Commercial	24,840	292,905
Truck Hauled WW	1,063	1,795
TOTAL	78,481	505,840
¹ No hydraulic loading is considered from Old Oak Bluff, as wastewater is conveyed to the Original Oak Bluff Lagoon.		

The resulting hydraulic loading over the 230-day storage period is **505,840 m³**.

5. Proposed Development

The details on the proposed development presented in the section below are summarized from the RM of Macdonald – Oak Bluff Forcemain and Lagoon Preliminary Design Report (WSP, 2023). Refer to the Preliminary Design Report in **Appendix E** for further information.

5.1 Description of Project

The RM of Macdonald owns land in (SW-17-9-2) for the purpose of expanding the Oak Bluff Lagoon. The available area totals 48.6 ha (120.1 acres).

The proposed development consists of:

- Two new aerated primary cells with 4.0 m operating depths to be constructed within the footprint of the existing primary cell.
- Forcemain extensions to the new primary cells.
- Blower and chemical storage/dosing building.
- Two 125 hp blowers.
- Chemical dosing system with slip stream mixing system.
- Conversion of the south half of the existing primary cell into a secondary cell, complete with the requirement to raise the existing cell berms 0.6 m in height (referred to as secondary cell #2).
- Raise the existing secondary cell #1 berms 0.6 m in height.
- Piping connections between the new primary cells and all three secondary cells.
- Construction of one (1) new secondary cell with a 2.1 m operating depth to be constructed to the south of the existing cells (referred to as secondary cell #3).
- Removal of the existing truck dump station and construction of a new station.
- Fencing and signage.
- Removal of accumulated residuals (sludge) in the existing primary cell for future land application.

The EAP design drawings are included in **Appendix D**. The expansion work is to be completed while the facility remains in operation. The expanded lagoon will provide adequate organic loading (treatment) and hydraulic loading (storage) capacity for the anticipated 2047 wastewater loadings.

5.2 Site Conditions

On April 8, 2022, WSP conducted a geotechnical investigation at the proposed development area, during which a drill rig was used to drill a total of three test holes. Drilling depths were between 5.1 meters below grade (mbg) to 6.7 mbg. The complete Geotechnical Report is included in **Appendix C**.

5.2.1 Local Topography

Based on a review of available surficial geology mapping, offshore glaciolacustrine sediments are present on site. The sediments are estimated to be up to 2 m thick consisting of clay, silt, and minor sand with low relief massive, laminated deposits.

5.2.2 Soil Conditions

The general soil profile encountered at the test hole locations generally consisted of 250 mm to 300 mm topsoil followed by native clay to the depth explored. The native clay was described as highly plastic, brown to dark grey, moist, and contained trace sand and trace silt. The frost depth encountered at test hole locations was typically 1.83 m below grade.

Detailed descriptions of the soil conditions are available in the test hole logs, attached in **Appendix C** of the Geotechnical Report.

5.2.3 Site Investigation

Selected samples were submitted for moisture content and hydraulic conductivity testing. The test results are shown in the Geotechnical Report.

As classified during the field investigation, the clay encountered at the site is highly plastic, and the hydraulic conductivity of the clay was 6.5×10^{-9} cm/s. Based on the field investigation the proposed cell liner should be constructed as a clay core with a minimum width of 2.0 m.

5.3 Summary of Proposed Development

The following sections describe the construction and modifications proposed for the development.

5.3.1 Existing Primary Cell Modifications

The proposed design includes two new deep primary aerated cells to be constructed within the north half of the existing footprint of the primary cell, the raising of the existing perimeter and intercell berms by 0.6 m, and the construction of a new secondary cell south of the existing lagoon. Furthermore, the south half of the existing primary cell will be converted into a secondary cell.

5.3.1.1 Aerated Primary Cell

An OPTAER™ fine bubble partial mix aeration system, designed and installed by Nexom Inc., will provide the necessary aeration to the proposed aeration cells. Construction involves the installation of a header pipe from the new blower building to the new cells that will connect with floating laterals and suspended membrane diffusers.

The proposed cells will be constructed with 5:1 interior side slopes and 4:1 exterior side slopes, and will have a normal operating depth of 4.0 m with a minimum 1.0 m freeboard. The interior dykes will be armoured with rip rap (or equivalent) to prevent erosion, but only for a 4.0 m length centred around the normal operating level. Rip rap currently on the existing primary cell berms can be salvaged and reused during construction. **Table 5-1:** provides the details for the preliminary design specifications for the new cells. The aerated primary cells do not contribute to the storage volume of the lagoon.

Table 5-1: Preliminary Design Specifications for Aerated Cell 1 & 2

Parameter	Aerated Cell 1 & 2
Bottom Cell Dimensions	89.5 m x 106.4 m
Cell Bottom Area	9,523 m ²
Liquid Surface Dimensions (at operating depth)	129.5 m x 146.4 m
Liquid Surface Area (at operating depth)	18,959 m ²
Operating Depth	4.0 m
Freeboard Height	1.0 m
Interior Side Slopes	5H:1V
Exterior Side Slopes	4H:1V
Hydraulic Retention Time (at 2047 design flows)	230 days
Total Volume	55,900 m ³
Liner System	Clay Core

5.3.1.2 Converted Secondary Cell

The converted secondary cell will be constructed with 4:1 interior and exterior side slopes and will have a normal operating depth of 2.1 m with a minimum 1.0 m freeboard. Since the existing primary cell has a total depth of 2.5 m, construction will include raising the existing berms of this cell approximately 0.6 m to accommodate the higher operating level. The new interior dykes will be armoured with rip rap and the rip rap on the existing berms will be modified to suit the higher operating level. **Table 5-2** provides the details for the preliminary design specifications for the new cell.

Table 5-2: Preliminary Design Specifications for Converted Secondary Cell #2

Parameter	Converted Secondary Cell #2
Bottom Cell Dimensions	256.6 m x 128.30 m
Cell Bottom Area	32,922 m ²
Liquid Surface Dimensions (at operating depth)	273.4 m x 145.1 m
Liquid Surface Area (at operating depth)	39,670 m ²
Interior Side Slopes	4H:1V
Exterior Side Slope	4H:1V
Operating Depth	2.1 m
Freeboard Height	1.0 m
Deadspace Depth	0.3 m
Total Volume (at operating depth)	302,400 m ³
Dead Space Volume (0.3 m depth)	41,500 m ³
Storage Volume	260,900 m ³
Liner System	Clay Core

5.3.2 Upgrading Existing Secondary Cell #1

The existing secondary cell 1 upgrades include increasing the normal operating depth to 2.1 m with a minimum 1.0 m freeboard. Since the existing secondary cell 1 has a total depth of 2.5 m, construction will include raising the existing berms of this cell approximately 0.6 m to accommodate the higher operating level. The rip rap will be modified to suit the higher operating level. **Table 5-3** provides the details for the preliminary design specifications for the upgraded cell.

Table 5-3: Preliminary Design Specifications for New Secondary Cell #1

Parameter	Oak Bluff Lagoon Secondary Cell #1
Bottom Cell Dimensions	288.0 m x 325.0 m
Cell Bottom Area	93,600 m ²
Liquid Surface Dimensions (at operating depth)	304.8 m x 341.8 m
Liquid Surface Area (at operating depth)	104,180 m ²
Interior Side Slopes	4H:1V
Exterior Side Slopes	4H:1V
Operating Depth	2.1 m
Freeboard Height	1.0 m
Deadspace Depth	0.3 m
Total Volume (at operating depth)	207,600 m ³
Dead Space Volume (0.3 m depth)	28,300 m ³
Storage Volume	179,300 m ³
Liner System	Clay Core

5.3.3 New Secondary Cell

A new secondary cell will be constructed to the south of the existing primary and secondary cells.

The new secondary cell is designed with a 2.0 m (min.) wide clay core situated within the perimeter dyke of the expanded Oak Bluff Lagoon footprint that will tie into the clay core of the existing cells. The finished clay core will be continuous and have a permeability of 1×10^{-7} cm/s or less, meeting the EC Guidelines. The remainder of the dykes will be constructed with in-situ material. All embankments will be constructed in 150 mm lifts compacted to 95% Standard Proctor Dry Density.

The proposed cell will be constructed with 4:1 interior and exterior side slopes and will have a normal operating depth of 2.1 m with a minimum 1.0 m freeboard. The interior dykes will be armoured with rip rap to prevent erosion. **Table 5-4** provides the details for the preliminary design specifications for the new cell.

Table 5-4: Preliminary Design Specifications for New Secondary Cell #3

Parameter	Oak Bluff Lagoon Secondary Cell #3
Bottom Cell Dimensions	430.00 m x 320.00 m
Cell Bottom Area	137,600 m ²
Liquid Surface Dimensions (at operating depth)	446.8 m x 336.8 m
Liquid Surface Area (at operating depth)	150,482 m ²
Interior Side Slopes	4H:1V
Exterior Side Slopes	4H:1V
Operating Depth	2.1 m
Freeboard Height	1.0 m
Deadspace Depth	0.3 m
Total Volume (at operating depth)	76,100 m ³
Dead Space Volume (0.3 m depth)	10,000 m ³
Storage Volume	66,100 m ³
Liner System	Clay Core

5.3.4 Proposed Discharge Route

Secondary cell #1 and #3 will discharge on the east side and flow to the Atchison Drain via perimeter ditch along the east and south side of the proposed development. Secondary cell #2 will discharge at its southwest corner directly to the Atchison Drain. The Atchison Drain flows southeast into the La Salle River. The proposed drainage route is illustrated in **Figure 5-1**.



Figure 5-1: Proposed Effluent Discharge Route

5.3.5 Effluent Quality

According to the Federal Wastewater Systems Effluent Regulations (WSER), the Oak Bluff lagoon is considered an *Intermittent Wastewater System* as it has a hydraulic retention of at least 90 days, discharging at most four periods per calendar year.

This type of wastewater system treatment lagoon must manage the release of the following deleterious substances:

- (a) carbonaceous biochemical oxygen demanding matter;
- (b) suspended solids;
- (c) total residual chlorine; and
- (d) un-ionized ammonia.

The discharge of treated effluent must comply with the following conditions:

- (a) the average carbonaceous biochemical oxygen demand due to the quantity of CBOD matter in the effluent does not exceed 25 mg/L;
- (b) the average concentration of suspended solids in the effluent does not exceed 25 mg/L;
- (c) the average concentration of total residual chlorine in the effluent does not exceed 0.02 mg/L, if chlorine, or one of its compounds, is used in the treatment of wastewater; and
- (d) the maximum concentration of un-ionized ammonia in the effluent does not exceed 1.25 mg/L, expressed as nitrogen (N), at $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

5.3.6 Phosphorus Removal

The RM desires an upgrade to a chemical injection system for phosphorus removal. Chemical precipitation and flocculation of orthophosphate will be performed by dosing aluminum sulfate or ferric chloride. A new blower building will be sized to house chemical storage and be situated in a location that satisfies the aeration needs and in close vicinity to the dosing location. To effectively mix the chemical into the wastewater, a side stream of wastewater will be pumped from the lagoon into the process building. Chemicals will be injected into the line prior to a static mixer for rapid mixing and chemical dispersion. The wastewater mixture will return to the front of aeration cell #2. The aeration system will allow for slow mixing and facilitate flocculation, the flocs will settle in the lagoon.

5.3.7 Construction Details

The new facility will be constructed as detailed in the drawings and in accordance with the Information Bulletin – Design Objectives for Wastewater Treatment Lagoon (March 2022) published by Manitoba Environment and Climate.

WSP's lagoon design includes the following details, which are based on the Geotechnical Report:

- The excavated topsoil at depths between 250 mm and 300 mm should be stockpiled during construction and reused later for the outer slopes and the top dykes.

- During earthen cell construction, the backfill material used for the liner and key should be high plastic impervious clay and placed in layers not to exceed 200 mm non-compacted thickness at moisture content within -1 and +3 percent of the optimum moisture content and compacted at least 95% of Standard Proctor Maximum Dry Density (SPMDD). If any pockets or seams of unsuitable material are encountered during the pond construction, the unsuitable material must be removed and replaced with suitable high plastic clay soils.
- A well-developed and maintained grass cover above the rip rap should add integrity to the dykes.
- In the primary cells a 4 m wide rip rap blanket with an average thickness of 300 mm and centered on the maximum operating depth of the cell will be placed.
- In the secondary cells a rip rap blanket should start slightly from normal water high and extend into the cell base with an average thickness of 300 mm.
- A perimeter fence will surround the proposed lagoon with a main access gate and signage.

6. Environmental Impacts

6.1 Odour Considerations

It is expected that the proposed facility will operate without causing any significant odour problems.

The only time of the year that some minor odours may be present is during the spring while the ice thaws. During the winter, ice cover largely prevents free oxygen from entering the water. This condition leads to the production of hydrogen sulphide gas during the winter by bacteria that do not require free oxygen. These accumulated gases dissipate quickly into the atmosphere during ice breakup and the pond returns to a non-odorous condition.

The closest residence to the Oak Bluff lagoon is located approximately 550 m away (to the east), which meets the EC minimum setback distance of 300 m.

6.2 Land Impact

The land selected for development is currently utilized for agriculture. No undeveloped land will be disturbed in the construction.

6.3 Surface Water

From the discharge point (end of pipe), the treated effluent will flow approximately 7 km before reaching the La Salle River.

Perimeter ditching will be established, where required, and maintained in the development area to provide positive drainage for surface water around the Oak Bluff lagoon. Any local field drains that are interrupted by construction will be acceptably re-established or rerouted if no other alternative exists.

The proposed expanded Oak Bluff lagoon is in the Lower La Salle Watershed (No. 22). The discharge route is illustrated in **Figure 5-1**.

The Water Licensing Branch of Manitoba Water Stewardship was consulted to provide a list of water users along the drainage route. There are two licensed water users downstream of the La Salle River. Correspondence is included in **Appendix F**.

6.3.1 Fuel Storage Onsite

The proposed facility does not require the onsite storage of gasoline or diesel fuel. During construction and upgrading, the contractor will be required to ensure that all equipment is properly maintained to prevent leaks and spills of fuel and motor fluids. Refuelling of equipment will not be within 100 m of a water body, stream, or wetland.

6.4 Groundwater

Refer to **Section 5.2** for information relating to groundwater.

6.5 Species Impact

A file search with the Wildlife, Fisheries, and Resource Enforcement Branch of the Manitoba Conservation Data Centre was completed. The results are presented in **Table 6-1**. Correspondence is included in **Appendix F**.

Table 6-1: Wildlife, Fisheries, and Resource Search

Parameter	Converted Secondary Cell #2
Found in the footprint of the development site	Northern Leopard Frog (<i>Lithobates pipiens</i>)
Found in 2 km radius of development site	Yellow-banded Bumble Bee (<i>Bombus terricola</i>)
	Northern Leopard Frog (<i>Lithobates pipiens</i>)
	Monrach (<i>Danaus plexippus</i>)
Broader Area with Similar Habitat	Yellow-banded Bumble Bee (<i>Bombus terricola</i>)
	Short-eared Owl (<i>Asio flammeus</i>)
	Prairie Blue-eyed-grass (<i>Sisyrinchium campestre</i>)
	Northern Leopard Frog (<i>Lithobates pipiens</i>)
	Narrow-leaved Agalinis (<i>Agalinis tenuifolia</i>)
	Monrach (<i>Danaus plexippus</i>)
	Bobolink (<i>Dolichonyx oryzivorus</i>)

6.6 Fisheries

According to the 2013 Milani Report, the receiving watercourse (La Salle River) is considered type A habitat (complex habitat, indicators present). The Atchison Drain is considered type D habitat (simple habitat, no indicators present). A map of the area is included in **Appendix F**.

In order to protect any potential fish in the critical springtime spawning season, when effluent un-ionized ammonia tends to be high, the Oak Bluff lagoon will discharge after June 15th and will allow for significant conversion of toxic un-ionized ammonia into relatively benign nitrates.

6.6.1 Fisheries Act Information

The *Fisheries Act* controls and regulates the deposit of deleterious substances into water frequented by fish. According to Subsection 36(3) of the *Fisheries Act*:

“no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious

substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.”

6.7 Forestry

There is no forestry activity in the area. No treed areas should be affected by the construction associated with the development.

6.8 Heritage Resources

In correspondence dated April 20, 2022, from the Historic Resources Branch of the Sport, Culture and Heritage Department of the Government of Manitoba (**Appendix F**), it was stated that the potential to impact significant heritage resources has been deemed low in the area, therefore, the Historic Resources Branch has no immediate concerns with the proposed development.

If at any time heritage resources, human remains, or palaeontological resources are accidentally encountered in the planning and construction on the developmental footprint, a Heritage Resource Protection Plan (HRPP) will be executed. The HRPP consists of operational procedures to limit damage or destruction of heritage resources accidentally found during site work.

6.9 Socio-Economic Impacts

The lagoon construction will result in a short-term boost to the construction industry in the area.

The construction equipment will be operated within the noise by-law restrictions of the Rural Municipality of Macdonald, if applicable.

6.10 Public Involvement

Comments from concerned members of the public will be solicited as part of the EC review, prior to issuing a Licence.

7. Management Practice

After expansion, the Oak Bluff lagoons will be a five-cell facility. Two primary cells will provide adequate treatment for the projected 20-year needs of the Community and MCD. Three secondary cells will provide storage for the 20-year projected needs.

In total, the new lagoon facility will provide treatment for 863.9 kg BOD₅/d and storage for 506,200 m³.

The facility will be discharged during the allowable period from June 15th to October 31st.

The proposed management and operation of the facility is discussed in the following sections.

7.1 Operation

Operation of the Oak Bluff Lagoon system must comply with the specifications, limits, terms and conditions of the new Environment Act Licence. The RM of Macdonald must also be in compliance with Wastewater Systems Effluent Regulations (WSER) and the associated reporting.

7.1.1 Commissioning

After the construction involved in expanding the lagoon is completed, all of the new or modified systems will be commissioned. Commissioning will involve the aeration system, phosphorus reduction system, and overall lagoon system operation.

For the aeration system, when the new blowers are brought online, the dissolved oxygen levels in each of the primary cells will be tested to confirm 2.0 mg/L of dissolved oxygen in the top 2.0 m of the liquid.

Commissioning of the phosphorus reduction system will occur once the cells are approved to receive wastewater. It is reasonable to expect that it will take time to link the chemical dosing to the wastewater to bring the total phosphorus levels consistently below 1.0 mg/L.

The overall lagoon system will be commissioned once all components are fully installed and operational.

7.1.2 Discharge

The planned seasonal discharge from any of the secondary cells will be from June 15th through to October 31st. With three secondary cells, the RM of Macdonald has considerable flexibility in the management of the liquid levels in the cells in preparation for the first discharge. Even though it is preferable to lengthen a cell's isolation time as much as circumstances allow valve manipulation to isolate one or more of the secondary cells must take place a minimum of three weeks prior to June 15th. This schedule allows cell isolation for two weeks (min.) prior to testing, and one week to obtain the laboratory results. The other non-isolated secondary cells will continue to receive the primary treated

effluent. Testing shall be conducted according to the current Environment Act Licence and the Wastewater Systems Effluent Regulation as outlined in **Section 5.3.5**.

EC generally requires treated effluent to have total suspended solids < 25 mg/L, BOD₅ < 25 mg/L, fecal coliform MPN of < 200 organisms/100 mL, and some nutrients removal requirements, which will be tested within the isolated cell(s). Once the test results of the effluent meet or exceed all requirements that should be satisfied prior to discharge, instituted by the new Environment Act Licence, the discharge of the isolated cell(s) will begin, no earlier than June 15th. The discharge of the secondary cells will be stopped at or before the November 1st deadline.

7.1.3 Record Keeping and Inspection Routine

The RM of Macdonald already has a routine maintenance, record keeping and inspection schedule in place. There will be some supplemental maintenance activities with the new EAL. Generally, the maintenance list will include but is not limited to:

1. Lift station – regular operational checks along with routine pump maintenance and servicing.
2. Gate valves – exercised on an annual basis.
3. Aeration blowers: weekly operational checks along with routine maintenance and servicing.
4. Aeration diffusers: weekly sight checks to make sure bubble patterns are similar, weekly system pressure checks, monthly purging of condensate out of aeration headers, seasonally adjust winches on lateral tension weights, and annually lift diffusers to inspect condition and remove debris.
5. Cleaning of the aeration building intakes, as required.
6. Chemical: daily check on dosing system and weekly tank level check; reordering of chemical.
7. Level control manhole: weekly check during winter to remove any ice build up.
8. Maintaining the supply of spare consumable parts, accessories and equipment (filters, diffusers, etc.).

The record keeping and inspection list will include but is not limited to:

9. Daily Records – Collection and retaining of:
 - 1.1 water consumption and lift station pumping records for future estimation of flows to the wastewater treatment lagoon
 - 1.2 septic hauling records (dates and volumes) from the individual haulers trucking to the lagoon.
10. Weekly Records:
 - 1.3 The summer inspection would consist of recording the following:
 - 1.3.1 the water level;
 - 1.3.2 presence of odours and their source; and
 - 1.3.3 presence of floating objects (removal).

The summer maintenance should also include grass cutting on the dykes, if necessary, elimination of emergent vegetation, extermination of burrowing animals, repair of the dykes and rip rap if damaged by wind erosion and wave action, and repair of the fence and gate.

1.4 Year-round inspection would consist of recording the following:

- 1.4.1 levels in the chemical and water supply tankage;
- 1.4.2 chemical usage and dosing rates;
- 1.4.3 blower hour readings; and
- 1.4.4 appearance of aeration bubbles.

- 11. Periodic winter inspection is confined to inspecting for frozen piping and checking if the water level in the cells is as it should be.
- 12. Discharge Records - The records should contain all treated effluent quality analyses, dates of discharge, discharge procedure followed, estimated discharge volumes, water levels and other pertinent data.

8. Schedule and Funding

It is anticipated that the EAP review process will be finalized by Q1 2027, and a draft licence issued for review and then finalized. Construction is proposed in spring 2027. The proposed schedule is presented in **Figure 8-1**.

Project funding will be sourced from the Manitoba Water Services Board and designated municipal reserves.

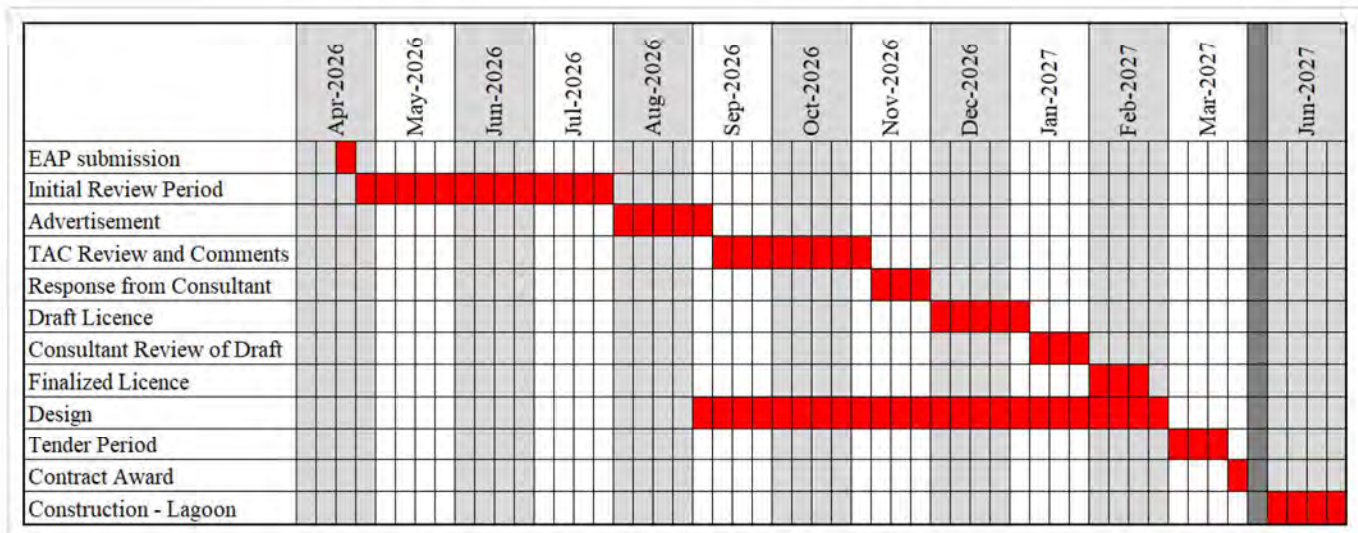


Figure 8-1: Schedule – EAP Submission

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- WSP Canada Inc., "Oak Bluff-McGillivray Infrastructure Review - Water & Sewer Capacity & Upgrading Study," WSP Canada Inc., Winnipeg, MB, 2019.
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