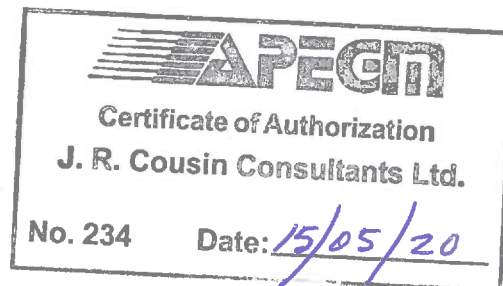




## Brereton Lake Campground Environment Act Proposal for Water Treatment Plant Reject Water and Backwash Disposal



Prepared by:

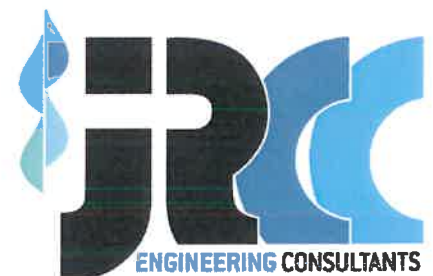
Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-In-Training



Reviewed by:

Jerry Cousin, P.Eng.  
President

May 2015



## **REMARKS**

JR Cousin Consultants Ltd. has conducted this environment act proposal in accordance with generally accepted professional engineering principles and practices for the purpose of identifying conditions that may have an environmental impact on the site. The findings and recommendations reached in this report are based on information made available to JRCC during the investigation and conditions at the time of the site investigation. Conclusions derived in this report are intended to reduce, but not wholly eliminate the uncertainty regarding potential environmental concerns on the site, and recognizes reasonable limitations with regards to time, accuracy, work scope and cost. It is possible that environmental conditions may change from the date of this report. If conditions appear different from those encountered and expressed in this report, JRCC should be informed so that mitigation recommendations can be reviewed and adjusted as required. Historical data and information obtained from personal communication used in this report, are assumed to be correct, however JRCC has not conducted further investigations into the accuracy of this data. JRCC has produced this report for the use of the client, and takes no responsibility for any third party decisions or actions based on information contained in this report.

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**Appendix A**

Crown Lands and Property Agency, Mines and Minerals Email Correspondence, April 4, 2015

**Appendix B**

Heritage Resources Email Correspondence, May 15, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 22, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 23, 2015

Fisheries Inventory & Habitat Classification System (FIHCS)

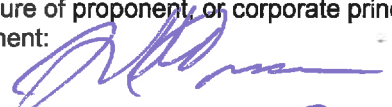
**Appendix C**

Plan 1: Proposed Water Treatment Plant Location

Plan 2: Water Treatment Plant Process Flow Chart

Environment Act Proposal Form



Name of the development: <b>Brereton Lake Campground and Resort Water Treatment Plant</b>	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): <b>Class 1</b>	
Legal name of the applicant: <b>Manitoba Conservation - Parks and Protected Spaces Branch</b>	
Mailing address of the applicant: <b>Box 53, 200 Saulteaux Crescent</b>	
Contact Person: <b>Ms. Prachi Dey</b>	
City: <b>Winnipeg</b>	Province: <b>Manitoba</b> Postal Code:
Phone Number: <b>(204) 945-4370</b>	Fax:      email: <b>prachi.dey@gov.mb.ca</b>
Location of the development: <b>Brereton Lake Campground</b>	
Contact Person: <b>Ms. Prachi Dey</b>	
Street Address:	
Legal Description: <b>SW 17-11-15 E1</b>	
City/Town: <b>Whiteshell Prov. Park</b>	Province: <b>Manitoba</b> Postal Code:
Phone Number: <b>(204) 945-4370</b>	Fax:      email: <b>prachi.dey@gov.mb.ca</b>
Name of proponent contact person for purposes of the environmental assessment: <b>Jerry Cousin, JR Cousin Consultants Ltd.</b>	
Phone: <b>204-489-0474</b>	Mailing address: <b>91 A Scurfield Blvd</b>
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	<b>R3Y1G4</b>
Email address: <b>jcousin@jrcc.ca</b>	
Webpage address: <b>www.jrcc.ca</b>	
Date: <b>2015/05/20</b>	Signature of proponent, or corporate principal of corporate proponent: 
	Printed name: <b>J. R. Cousin</b>

## EXECUTIVE SUMMARY

### General

From the new water treatment plant (WTP), at the Brereton Lake Campground, it is proposed to construct a reject and backwash disposal line to send approximately 11,503 m<sup>3</sup>/year of membrane concentrate water and backwash water into the Brereton Lake. An Environment Act License will be required from Manitoba Conservation for the construction and operation of the proposed disposal line. JR Cousin Consultants Ltd. (JRCC) was retained for the engineering services.

### Description

A reject and backwash disposal line from the WTP to Brereton Lake is being proposed. Brereton Lake Campground is located in the Whiteshell Provincial Park at SW 17-11-15 E1, approximately 135 km east of Winnipeg, Manitoba. The park is accessed via PR 307, which bisects the campground. The campground is seasonal, operating from May to October.

A series of upgrades have been proposed for the current water treatment system, including media and disposable cartridge filters for removing turbidity, iron and manganese; nanofiltration by a spiral wound membrane system (Hydracore membrane treatment units); and Ultra Violet (UV) disinfection plus chlorination to provide a multibarrier disinfection system. The treatment system will produce 117 m<sup>3</sup> of potable water per day. From the daily operation and maintenance of the plant an estimated flow of 0.24 L/s of reject and backwash water will be produced.

## 1.0 INTRODUCTION AND BACKGROUND

The development described herein is for a reject and backwash disposal line to the Brereton Lake from the new water treatment plant (WTP) servicing the Brereton Lake Campground in the Whiteshell Provincial Park.

### 1.1 Introduction

From the new water treatment plant (WTP), at the Brereton Lake Campground, it is proposed to construct a reject and backwash disposal line to the Brereton Lake. An Environment Act License will be required from Manitoba Conservation for the construction and operation of the proposed line.

### 1.2 Contact Information

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Phone: (204) 945-4370

### 1.3 Background Information

Brereton Lake Campground is located in the Whiteshell Provincial Park at SW 17-11-15 E1, approximately 135 km east of Winnipeg. It is accessed via PR 307, which bisects the campground and resort. The campground area is located on the eastern shore of Brereton Lake. The Trans Canada Trail is located to the east of the Brereton Lake Resort and runs north/south along a bedrock ridge. The campground is seasonal and operates from May to October, while the resort is operational year round. The campground has an office, two serviced washroom buildings, 62 seasonal sites and 29 transient sites. The resort has 12 serviced cottages, a Laundromat, a restaurant and a private residence.

The campground currently distributes non potable water from Brereton Lake. A series of water treatment upgrades have been proposed including filtration (physical (media and disposable cartridge) and membrane), Ultra Violet (UV) disinfection followed by chlorination.

## 1.4 Description of Previous Studies

JR Cousin Consultants Ltd. (JRCC) completed a pre-design letter report discussing upgrades to the South Beach well groundwater system and the installation of a 2 km pipeline to service the Brereton Lake Campground. JRCC also completed a letter report on treating the surface water of Brereton Lake as an alternative to the piping from the groundwater source. The surface water source was selected hence this document includes a technical review of the treatment system and discusses the disposal of the backwash and reject flows to Brereton Lake.

## 1.5 Project Description

A reject and backwash disposal line to Brereton Lake from the new water treatment plant is being proposed for the Brereton Lake Campground.

The new water treatment plant will treat water from the lake (an intake will be placed approximately 45 m from the shore) and the reject water and backwash line will be discharged back into the lake through a submerged pipe. The discharge from the water treatment plant will have similar parameters to the fresh water from the lake, as treated water (permeate) will be used for backwashing the next-sand filters. Cartridge filters after the next-sand filters once exhausted will be replaced with new cartridge filters. The chemicals used to clean the membranes (only done once a season) will be neutralized during the service, prior to discharge.

A series of water treatment upgrades have been proposed including filtration (physical (media and disposable cartridge) and membrane), Ultra Violet (UV) disinfection followed by chlorination. The treatment will address the levels of color, turbidity, iron and manganese, and hardness. The treatment system will treat 2.32 L/s of raw water from the lake, producing 1.63 L/s of drinking water, a total of 117,000 L/day. From the daily operation and maintenance of the plant an estimated flow of 11,503 m<sup>3</sup> of reject and backwash water will be produced per year as well.



## 2.0 DESCRIPTION OF THE DEVELOPMENT

For each heading there is an information request from the Environment Act Proposal Form. These requests are repeated herein in italics followed by the pertaining response.

### 2.1 Land Title/Location

*Certificate of Title showing the owner(s) and legal description of the land upon which the development will be constructed; or, in the case of highways, rail lines, electrical transmission lines, or pipelines, a map or maps at a scale no less than 1:50,000 showing the location of the proposed development:*

The new WTP will be located in SW 17-11-15 E, within the Whiteshell Provincial Park. Based on information provided by Manitoba Conservation Parks and Natural Areas Branch, as well as the Crown Lands and Property Agency, the land is currently owned by the Crown (Province of Manitoba).

### 2.2 Owner of Land and Mineral Rights

*Owner of land upon which the development is intended to be constructed, and of mineral rights beneath the land, if different from surface owner:*

The Crown Lands and Property Agency informed that the mineral resources on the proposed development site are owned by the Province (see Crown Lands and Property Agency, Mines and Minerals Email Correspondence, April 4, 2015, attached in Appendix A).

### 2.3 Existing Land Use

*Existing land use on the site and on land adjoining it, as well as changes that will be made in such land use for the purposes of the development:*

The land at the proposed development generally consists of Canadian Shield landscape features with low lying wetlands, bedrock outcrops and forested land. The area is considered to be in the Boreal Shield Ecozone, within the Lake of the Woods Ecoregion. The majority of the campground area has been previously cleared for campsites and infrastructure.

The new WTP will be located to the northwest of the campground. The WTP will be bordered to the north by a treed area and cottages, to the east by PR 307 and further east a bedrock ridge, to the south by trees and cottages and to the west the by the Brereton Lake (see Plan 1 attached in Appendix C).

### 2.4 Land Use Designation/Zoning Designation

*Land use designation for the site and adjoining land as identified in a development plan adopted under the Planning Act or the City of Winnipeg Act and the zoning designation as identified in a zoning by-law, if applicable:*

Based on information obtained from Manitoba Conservation Parks and Natural Areas Branch, the entire campground, which includes the proposed development, has a land designation of Recreational

Development (RD). This designation permits commercial resource use while recognizing the recreational values of the park.

## **2.5 Description of Development**

*Description of proposed development and schedule for stages of the development, including proposed dates for planning, design, construction, commissioning, operation, and decommissioning and/or termination of operation (if known), identifying major components and activities of the development as applicable (e.g. access road, airstrip, processing facility, waste disposal area, etc.).*

### **2.5.1 Project Schedule**

Construction works of the WTP are proposed to begin in early August 2015 upon receipt of an Environment Act Licence for the reject and backwash line. Commissioning and operation of the WTP is proposed to begin upon completion of construction and upon approval from the Office of Drinking Water.

### **2.5.2 Population and Water Demand**

A review of the population (occupancy) of the Brereton Lake Campground was conducted to assess the water demand. The assessment was utilized to determine the requirements of the water treatment and distribution systems.

#### **2.5.2.1 Campground**

According to information provided by local Parks officials, the campground has 62 seasonal sites and 29 transient sites. Based on a maximum permissible capacity of 6 people per campsite/per day, as provided by Park officials, the peak day occupancy of the campground would be 546 people.

#### **2.5.2.2 Resort**

The population from the Brereton Lake Resort includes restaurant patrons and cabin residents. The restaurant has a seating capacity for 70 patrons during the operating season. The source of restaurant patrons, for wastewater loading purposes, is expected to be resort daily visitors only, as wastewater loadings for campground and cabin residents are accounted for separately. Based on the assumption that the restaurant would fill to capacity with daily visitors three times a day (breakfast, lunch, and supper) during the operating season, the estimated contributing population would be 210 patrons/day.

The Brereton Lake Resort has 12 rental cabins for use during the operating season, with a maximum occupancy of 57 people (4.75 people/cabin), as discussed with the resort owner. There is also one residence onsite for the resort owner, with a current occupancy of three people. Therefore the maximum occupancy from the resort cabins and residence is currently 60 people. This occupancy was utilized for

conceptual design purposes to represent the conditions during the peak operating season in design year one.

### **2.5.2.3 Projected Growth**

Expansion of the Brereton Lake Campground and the Brereton Lake Resort was discussed with local Parks officials and the resort owner. It was determined that no population growth is expected for the campground and resort restaurant over the next 20 years, however, additional resort cabins are possible. A growth rate of four cabins over the next 20 years (one cabin every five years) based upon land availability was estimated by local Parks officials to be the peak capacity of the resort. This would increase the resort cabin and single residence population to a total of 80 people during the operating season.

### **2.5.2.4 Campground Peak Hour Flow Based on Peak Day Flow**

The Brereton Lake Public Water System Assessment completed by the Manitoba Water Services Board (MWSB) in April 2010 reports the maximum day water usage in the Park to be 118,000 L/day. During a maximum day of loadings there will be three, approximately one and a half hour peaks occurring in the morning, lunch time, and in the evening. It can be assumed that 75% of the total daily loadings would occur during the 4.5 peak hours in the day. Based on these assumptions, to address the peak hour flow rate of 19,666 L/hour ( $118,000/4.5 \times 0.75$ ) for the campground it would require a pumping capacity of 325 L/min.

### **2.5.2.5 Projected Peak Hour Flow Rate for the Campground and the Resort**

The projected peak flow will be based on the water system meeting the projected design year 20 water demand of the campground and resort. The system will be required to meet the existing water demand with the following changes:

- a proposed shower building within the campground
- four additional cabins at the Resort
- replacing all existing washrooms with automatic sensor low-flow urinals, toilets and sink taps.

The shower building and additional cabins will increase the water demand, but it will be offset by the water savings from the automatic sensor low-flow devices. The projected peak hour flow rate from the campground and resort in design year 20 would be 325 L/min. The maximum day water use is 117,000 L/s.

### **2.5.2.6 Summary of Flow Rate for the Campground and the Resort**

A summary of the water demand is shown below:

- Peak hour water demand is approximately 325 L/min
- Maximum day water use is approximately 117,000 L/day
- Approximate annual treated water volume is 3,415 m<sup>3</sup>.

### 2.5.3 Membrane Reject and Filters Backwash

The side stream water will be comprised mostly of the membrane reject water, around 95%. The remaining 5% is the sum of the two next-sand and Orival filters plus the small volume of the Clean-In-Place (CIP) tank for the membrane. Assuming a worst case scenario where the maximum day water demand is applied to every day of the season for a plant operation of 215 days, (from May 1 to November 30), the total volume of membrane reject and filters backwash is estimated at 11,503 m<sup>3</sup>. A detailed plant flow chart can be found in Appendix C. The individual sources are described next.

#### 2.5.3.1 Membrane Reject

Water treatment by membrane filtration usually generates a mineralized concentrate flow. For this plant, the system is expected to operate between 70 to 90% efficiency, with a raw water flow of 1.81 L/s to 2.33 L/s and a reject rate of 0.18 L/s to 0.70 L/s. For the total volume calculations, an efficiency of 70% was employed. This flow rate translates into 50.14 m<sup>3</sup> per day and a total of 10,780 m<sup>3</sup> in a 215 day season.

#### 2.5.3.2 Next-sand Filter Backwash

The backwash rate for the filters was indicated by the supplier at 75 GPM/unit/flush. Considering two units, backwash flushes twice a week during summer and a 20 minute duration of the flush cycle, the total volume of backwash water from the next-sand filters is estimated to be around 3.25 m<sup>3</sup> per day.

The next-sand filtering systems will use permeate (treated water) for the backwash cycle, reducing the load to only the filters residuals.

#### 2.5.3.3 Orival Filter Backwash

Following a similar procedure, the backwash rate for the Orival filter was indicated by the supplier to be around 11 GPM/flush. Considering one unit with a backwash flush every two hours and a maximum flush duration of 15 minutes, the total volume of backwash water from the Orival filter is estimated at 0.11 m<sup>3</sup> per day.

#### 2.5.3.4 CIP Tank Flush

The cleaning process of the membrane units, according to the supplier, will happen once per season. Considering that the CIP tank volume is 0.511 m<sup>3</sup> and assuming three cleaning batches (chlorine, acid, and a base) to fully clean the membranes, the estimated volume is 1.53 m<sup>3</sup> per year.

#### 2.5.3.5 UV Disinfection System

The UV disinfection units are equipped with temperature sensors that allow for treated water to flush the tubes and purge them in case the temperature increases above a set point. This process cleans the tubes as part of the operation and

maintenance of the system. The volume of water used in this process is minimal and considered insignificant for the total volume of water rejected by the overall system back into the lake. Additionally, the flushed water from these units will be very close to the final effluent of the plant.

#### 2.5.4 Water Quality

Table 1, below, presents the parameters of Brereton Lake that require treatment and the treatment objectives according to the *Guidelines for Canadian Drinking Water Quality (GCDWQ)*:

**Table 1: Brereton Lake average and maximum parameters with treatment objectives.**

Parameter	Brereton Lake (average concentration)	Brereton Lake (maximum concentration)	Treatment Objective (GCDWQ)
Colour (CU)	114.9	250	< 5
Turbidity (NTU)	2.49	5.02	< 0.1 NTU for membrane treatment
pH	7.01	7.5	7.2-8.0
Total Organic Carbon, TOC (mg/L)	19.90	24	< 3
Iron, Fe (mg/L)	0.78	1.20	< 0.3
Manganese, Mn (mg/L)	0.025	0.053	< 0.05

#### 2.5.5 Fish Species Information

The following fish species have been identified in Brereton Lake according to the Fisheries Inventory Habitat and Classification System (FIHCS): Yellow Perch, Walleye, White Sucker, Black Crappie, Northern Pike, Log Perch, Spottail Shiner, Johnny Darter, Central Mudminnow, Trout Perch, and Mottled Sculpin.

According to the FIHCS, Brereton Lake is rated as a Class 1 water body that has high capability for the production of fish. Email correspondence with Manitoba Conservation and Water Stewardship – Fisheries Branch (included in Appendix B), indicates that general use on Brereton Lake include commercial sport (lodges) and recreational angling. Additional information is included in Appendix B.

## 3.0 POTENTIAL ENVIRONMENTAL IMPACTS

*The biophysical and socioeconomic environment as related to the development, and potential impacts of the development on the environment.*

### 3.1 Releases to Air, Water, Land

#### 3.1.1 Air

During construction, emissions from heavy equipment and transport vehicles are expected. These emissions will be minimized by keeping machinery in good working condition. Minimal work is required by heavy equipment as the piping is shallow burial therefore reducing disturbance. The effects would be localized, temporary and insignificant. Impacts from dust generation are not expected to be significant, but can be mitigated with water spraying. During operation, there will be no release of pollutants to the air.

#### 3.1.2 Water

Short term impacts on surface water may occur as a result of construction activity. Related impacts may include: sediment eroded from excavation zones and potential engine leaks and fuel spills on land that would be carried to the lake by runoff.

Regarding the operation of the plant, Table 2 below presents the main parameters of the surface water from Brereton Lake, the water treatment plant effluent (potable water) and the system's side stream (membrane reject plus the filter's backwash). As explained in Section 2.5.3, the WTP will be operational for an approximate of 215 days (from May 1 to November 30). The influent flow rate from Brereton Lake into the plant (Column B) is calculated from the estimated flow rate of 2.32 L/s during a 20 hour operation day for a season of 215 days. The parameters concentrations are those of the lake. It should be noted that the maximum concentrations and the maximum water demand were considered throughout the season, providing a worst case scenario. In reality, the concentrations would probably be closer to the average values presented in Table 1, and the average flow treated by the plant would be much lower as well.

For Column C, the maximum water demand was also considered. The volume of water was calculated based on the 1.63 l/s flow rate during a 20 hour day for a season of 215 days. The concentrations are those of the required treatment limits according to GCDWQ.

Finally, Column D presents the plants' side stream (membrane reject plus the filters' backwash) flow. The concentrations are calculated as the weighted average of the influent parameters minus the effluent parameters of the plant.

**Table 2: Concentrations on Brereton Lake Raw Water, Treated Water from the Plant and Membrane Reject and Filter Backwash**

Parameter	Influent from Brereton Lake	Treated water (permeate)	Membrane Reject and Filter Backwash
Column A	Column B	Column C	Column D
<b>Volume (m<sup>3</sup>) (May 01 to November 03)</b>	<b>35,914</b>	<b>25,232</b>	<b>11,503</b>
Colour (CU)	250	5	769.56
Turbidity (NTU)	5.02	0.10	15.45
pH	7.5	7.5	6.96
Total Organic Carbon, TOC (mg/L)	24	3	68.35
Iron, Fe (mg/L)	1.2	0.3	3.09
Manganese, Mn (mg/L)	0.053	0.05	0.06

Table 3 presents the effect the side stream will have on the lake. For the volume of the lake, an approximation of the lake's perimeter was estimated using aerial images and AutoCAD multiplied by an average depth of 4.3 m (obtained from the Brereton Lake depths map). Additionally, considering that the plant will be located on the east bank of the lake and the overall flow of the water (entering the lake from the south and exiting from the north), only half of the total lake's volume is used for the calculations. The membrane reject and filters' backwash total volume in the season (11,503 m<sup>3</sup>) represents 0.06% of the estimated volume of half the lake.

The membrane's reject and filters' backwash total volume considers the side stream using the maximum water demand. The volume of water was calculated based on the 1.63 L/s flow rate during a 20 hour day for a season of 215 days. Again, this is a worst case scenario assumption as the maximum water demand would not be required for the entire season.

As can be seen in the last column of Table 3, the effect of the side stream on the overall concentrations of the entire lake are insignificant, even when considering worst case scenarios.

**Table 3: Effect of Membrane Reject and Filters' Backwash on Brereton Lake Water Quality**

Parameter	Brereton Lake	Membrane Reject and Filter Backwash	TOTAL
<b>Volume (m<sup>3</sup>) (May 1 to November 03)</b>	<b>19,891,237</b>	<b>11,503</b>	<b>19,902,740</b>
Colour (CU)	250	769.56	250.3
Turbidity (NTU)	5.02	15.45	5.03
pH	6.29	6.96	6.29
Total Organic Carbon, TOC (mg/L)	24	68.35	24.03
Iron, Fe (mg/L)	1.2	3.09	1.2
Manganese, Mn (mg/L)	0.053	0.06	0.053

### 3.1.3 Land

Pollutants that may be released to the land are predominantly petroleum hydrocarbons (PHCs), which could be released during construction activities. Equipment leaks, and/or re-fuelling

incidences could result in impacts to the soils/land as a result of construction activities. Standard construction spill cleaning procedures will be implemented. During operations potential impact to the land is considered low.

### **3.2 Wildlife**

The typical concern on any construction project is that wildlife species would be displaced through the construction works. Construction and operation activities will be limited to areas already developed. The potential adverse effects of wildlife habitat loss were considered to be low.

### **3.3 Fisheries**

Fish species identified in Brereton Lake, according to correspondence with Manitoba Conservation and Water Stewardship Fisheries Branch, were described in Section 2.5.4.

The typical concerns with impacts to fish and fish habitat are from sediments released during construction, potential engine (i.e. fuel, lubricants) and the water treatment backwash and reject effluent discharge into a body of surface water utilized by fish species. These impacts could include the reduction of water quality or physical disturbances that would create an unfavourable environment for fish or fish eggs.

### **3.4 Forestry**

There would be minimal impact to forestry. A few trees would be cleared for the construction phase i.e. part of the area for the water plant (less than 160 m<sup>2</sup>) and for an access route for the intake piping, discharge piping and distribution piping (less than 100m by 6m). The site is not utilized for commercial timber harvesting. Parks Branch may arrange for salvaging timber during the clearing works.

### **3.5 Vegetation**

The vegetation in the Lake of the Woods ecoregion consists of trembling aspen, paper birch, jack pine, white spruce, black spruce and balsam fir. The disturbance to trees is discussed above. This area is regularly managed and consists primarily of grasses. The area is unlikely to contain rare plant species. The amount of vegetation disturbance is expected to be low.

### **3.6 Noise Impacts**

There is currently very little ambient (70 decibels) noise near the project area, other than occasional traffic along PR 307. There is a potential for noise impacts in the immediate area due to equipment utilized during construction. Other than Parks maintenance vehicles (for treatment system sampling and maintenance, and occasionally mowing grass) the operation of the water treatment system itself, will have minimal noise impacts.



### **3.7 Health and Safety**

The existing site does not have any exceptional health and safety hazards. There is a potential for impacts to the health and safety of workers and the public during the construction activities, such as falling trees during site clearing and hazards from heavy construction equipment (i.e. backhoe, dump trucks, and cement trucks). Mitigation measures described in Section 4.6 below will be in place during the construction works to prevent injuries.

### **3.8 Heritage Resources**

The Manitoba Historic Resources Branch was contacted regarding the proposed site. The Historic Resources Branch indicated that they have no concerns with the project (see correspondence with Manitoba Historic Resources Branch, May 15, 2015 in Appendix B).

While impacts to historic or heritage resources are not expected at the site, there is always potential for an unexpected discovery when excavating an area that has not recently been excavated.

### **3.9 Socio-Economic Implications**

The water treatment plant system is not expected to have adverse socio-economic impacts. In fact, construction related economic activity is likely to have a positive economic impact on local business and employment opportunities during the construction phase. In addition, the campground and resort will have a reliable, good quality potable water supply upon completion of the project.

## 4.0 MANAGEMENT PRACTICE

*Proposed environmental management practices to be employed to prevent or mitigate adverse implications from the impacts identified above.*

### 4.1 Mitigation of Impacts to Air

Emissions from construction equipment and transport vehicles will be controlled through regular maintenance by the contractor, and will meet all provincial and local standards. Dust suppression methods (i.e. water spraying) will be utilized at the construction site if dry conditions create excessive dust through construction activities and transport, and becomes a nuisance.

### 4.2 Mitigation of Impacts to Water

#### 4.2.1 Surface Water

##### 4.2.1.1 Construction

Surface water runoff should be redirected away from any open trench and erosion control practices must be provided as required.

To minimize impacts from construction equipment on surface waters, the construction specifications should outline to the contractor the requirements for handling and storage of fuels and hazardous materials during construction, as per federal and provincial regulations. The construction specifications should state wording similar to the following:

- Diesel or gasoline should be stored in double walled tanks or have containment dikes around fuel containers for volumes greater than 68.2 L (15 gallons) or in compliance with provincial regulations.
- Clean up material should be available at the site, consisting of a minimum of 25 kg of suitable commercial sorbent, 30 m<sup>2</sup> of 6 mm PVC, and an empty fuel barrel for spill collection and disposal.
- Fuel storage and hazardous material areas established for project construction should be located a minimum of 100 m from a waterbody or drainage route.
- Waste hazardous materials from construction activities and equipment must be properly collected and disposed of in compliance with provincial regulations.
- In the event of spills or leaks of fuels and hazardous materials, the contractor or operator should notify the project engineer and provincial authorities (Manitoba Conservation at (204) 944-4888).

Hazardous material handling and storage are to follow all provincial and federal regulations including WHMIS and spill containment requirements.

The specifications should state that when working near water with construction equipment:

- Construction equipment is to be properly maintained to prevent leaks and spills of fuels, lubricants, hydraulic fluids or coolants
- There can be no re-fueling or servicing of construction equipment within 100 m of a water body or drainage route.

#### **4.2.1.2 Operation**

As described in Section 3.1.2, the overall effect of the side stream (membrane reject and filter's backwash) on the water quality of Brereton Lake will be insignificant, due to the characteristics of the side stream and the very high dilution ratio of the receiving water versus the side stream flow rate.

The floor drain in the building will collect water when the equipment and floors are cleaned periodically. Clean water (permeate) will be used for this process, so the effluent from the drainage will only likely include a higher turbidity.

#### **4.2.2 Groundwater**

Mitigation of potential impacts to groundwater during the reject and backwash line construction activities from fuel handling, equipment leaks or fuel spills, would follow the same procedures as described above.

### **4.3 Mitigation of Impacts to Land**

To minimize the potential for the release of Petroleum Hydrocarbon (PHC) pollutants into the soil, the mitigation measures described in Section 4.2.1 above, outlining fuel-handling procedures, should be followed.

### **4.4 Mitigation of Impacts to Vegetation**

The removal of vegetation will be limited to the construction area by clearly marking the site boundaries prior to construction. Vegetation will be re-established in the affected areas as soon as possible. Vegetation outside of this construction area will not be damaged.

### **4.5 Mitigation of Noise Impacts**

To minimize the potential for noise impacts, construction equipment and transport vehicles should have mufflers working properly, and construction activities should be limited to daylight hours only. The water treatment building will be insulated and the location is sufficiently removed from the campsite to avoid noise disturbance.

#### **4.6 Mitigation of Impacts to Health and Safety**

To minimize impacts to health and safety of workers and the public, the construction specifications should state that the contractor have a safety program in place, in accordance with all federal and provincial health and safety regulations. During construction, site access will be limited to the construction crew only. Personal protective equipment will be worn in accordance with the contractor's safety program.

#### **4.7 Mitigation of Impacts to Heritage Resources**

If any significant historic or heritage resources are discovered in the course of excavation or construction, the specifications should identify that works are to temporarily cease and an investigation of the site is to be conducted by the Parks and Natural Areas Branch, Manitoba Historic Resources Branch and any other provincial or federal authority as may be required.

#### **4.8 Mitigation of Socio-Economic Implications**

There are no known environmental socio-economical impacts that need mitigation (i.e. negative impacts). On the contrary, considering the proposed development will provide a reliable potable water supply to the campground and the resort during the season, it is expected that the quality of service and economic viability will be improved.

## 5.0 RESIDUAL AND CUMULATIVE EFFECTS

*Residual environmental effects remaining after the application of mitigation measures, to the extent possible expressed in quantitative terms relative to baseline conditions*

No negative residual effects are anticipated through the construction and operation of the proposed water treatment reject and backwash line, due to the mitigation measures described above. No other construction projects in the area are expected to create cumulative effects on the service area.

## 6.0 MONITORING AND FOLLOW-UP

*Proposed follow-up activities that will be required at any stage of development (eg. Monitoring, inspection, surveillance, audit, etc.)*

Annually the operator is to conduct sampling of WTP reject and effluent during discharge; and is to ensure water quality guidelines as described in the Environment Act Licence are met. The operator is also to maintain records of discharge events and water quality monitoring. If there are any concerns with the operation of the WTP, the owner is to contact the local environment officer to discuss options.

## 7.0 FUNDING AND APPROVALS

*Name and address of any Government Agency or program (federal, provincial or otherwise) from which a grant or loan of capital funds have been requested (where applicable). Other federal, provincial or municipal approvals, license, permits, authorizations, etc. known to be required for the proposed development, and the status of the project's application or approval.*

Funding for the project is through the budgeting process of Manitoba Conservation, Parks and Natural Areas Branch.

## 8.0 PUBLIC CONSULTATION

*Results of any public consultations undertaken or to be undertaken in conjunction with project planning.*

A public open house for the project was not conducted, due to the relatively positive nature of the project [improving water treatment], and the lack of public stakeholders affected.



## 9.0 CONCLUSION

Based on the design of the project and the implementation of the mitigation measures identified in Section 4.0 above, no significant negative environmental impacts are anticipated.

The proponent would like to complete the requirements of the Environment Act Proposal as soon as possible so that the design and construction of the discharge line can begin in a timely manner.

JR Cousin Consultants Ltd. requests that a draft copy of the Environment Act License be forwarded for review prior to the issue of the final license.

## **APPENDIX**

### **Appendix A**

Crown Lands and Property Agency, Mines and Minerals Email Correspondence, April 4, 2015

### **Appendix B**

Heritage Resources Email Correspondence, May 15, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 22, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 23, 2015

Fisheries Inventory & Habitat Classification System (FIHCS)

### **Appendix C**

Plan 1: Proposed Water Treatment Plant Location

Plan 2: Water Treatment Plant Process Flow Chart

## **Appendix A**

Crown Lands and Property Agency, Mines and Minerals Email Correspondence, April 4, 2015

**From:** [Little, Karen \(CLPA\)](#)  
**To:** "Mario Poveda"  
**Cc:** [Kibsey, Rhonda \(CWS\)](#)  
**Subject:** RE: Brereton Lake Campground and Resort - WTP reject line - Mines and Minerals  
**Date:** Monday, April 13, 2015 10:57:17 AM

---

Good morning Mario - SW 17-11-15 EPM is within the Whiteshell Provincial Park boundary (Director of Survey Plan 19828) and is under the Administration and Control of Manitoba Conservation and Water Stewardship – Parks. The Province is the owner of the land and all under-rights. <Karen>

**Karen Little**  
Supervisor of Crown Lands Registry

Crown Lands and Property Agency  
308 - 25 Tupper Street North  
Portage la Prairie MB R1N 3K1  
P 204-239-3805 F 204-239-3560  
Toll Free 1-866-210-9589  
[karen.little@gov.mb.ca](mailto:karen.little@gov.mb.ca)

*An Agency of the Manitoba Government*

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---

**From:** Mario Poveda [mailto:[mpoveda@jrcc.ca](mailto:mpoveda@jrcc.ca)]  
**Sent:** April-10-15 1:43 PM  
**To:** Little, Karen (CLPA)  
**Subject:** Brereton Lake Campground and Resort - WTP reject line - Mines and Minerals

Good afternoon Karen,

J.R. Cousin Consultants Ltd. (JRCC) is preparing an Environmental Act Proposal for the discharge of the new water treatment system (backwash from filters and reject from the membranes) for the Brereton Lake Campground and Resort. The discharge line will be placed next to the Water Treatment Plant on the shore of Brereton Lake, within SW 17-11-15 E1.

Could you please confirm the owner of the land and mineral rights for this property?

Thank you for your time,

Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-in-Training

J.R. Cousin Consultants Ltd.

Phone: (204) 489-0474

Fax: (204) 489-0487

[www.jrcc.ca](http://www.jrcc.ca)

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## **Appendix B**

Heritage Resources Email Correspondence, May 15, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 22, 2015

Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 23, 2015

Fisheries Inventory & Habitat Classification System (FIHCS)

Heritage Resources Email Correspondence, May 15, 2015

DATE: May 15, 2015

TO: Mario Poveda  
Environmental Engineer-in-  
Training  
J.R. Cousin Consultants Ltd.

FROM: Christina Nesbitt  
Impact Assessment  
Archaeologist  
Historic Resources Branch  
Main Floor 213 Notre Dame  
Avenue  
Winnipeg MB  
R3B 1N3  
Christina.Nesbitt@gov.mb.ca  
PHONE NO: (204) 945-8145

SUBJECT: Brereton Lake Campground and Resort  
Water Treatment System  
HRB Review and Comments

HRB FILE: AAS-15-9109

Further to your memo requesting a heritage screening for the above Brereton Lake Campground and Resort water treatment system(Planned Area), the Historic Resources Branch (HRB) has examined the applicable areas proposed for development in conjunction with the Branch's records for areas of potential concern, and can advise you that there are no previously recorded heritage site(s) located in the Planned Area and therefore HRB has no concerns with the project at this time.

However, please be advised that if any heritage resources are encountered in association with the Planned Area during development, the Developer is required to notify HRB and HRB may require that a heritage resource management strategy be implemented to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please feel free to contact the undersigned at the above noted address, phone number, or e-mail.

Christina Nesbitt



Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 22, 2015

**From:** [Janusz, Lauren R \(CWS\)](#)  
**To:** [Mario Poveda](#)  
**Cc:** [Kroeker, Derek \(CWS\)](#); [Long, Jeff \(CWS\)](#)  
**Subject:** Brereton Lake Campground and Resort - WTP reject line - Fisheries  
**Date:** Wednesday, April 22, 2015 11:12:29 PM  
**Attachments:** [Brereton Lake.pdf](#)

---

Hi Mario,

Sorry for the delay in responding. Attached is the information that we have from our Fisheries Inventory and Habitat Classification System. In the attached you'll see that Brereton Lake provides year round habitat for large bodied fish species – walleye, yellow perch and northern pike. It has been classified as a Class 1 waterbody which means it has a high capability for the production of fish.

Brereton has also been stocked by walleye fry in the past. The last year, according to our stocking records, was 2010.

As this is a fish bearing lake it is important any discharge meets or exceeds Manitoba Water Quality Standard, Objectives and Guidelines.

By way of this email I am including the A/Regional Fisheries Manager should he have any additional information or corrections to the attached information. Please note that information from FIHCS comes from a number of sources and as such we cannot guarantee the species listed are 100% accurate. Also the species when entered are not linked to a location so the list includes everything reported to be found in the lake.

Any questions please feel free to email.

### Lauren Janusz

Fisheries Science and Fish Culture Section  
Fisheries Branch,  
Manitoba Conservation and Water Stewardship  
Box 20, 200 Saulteaux Crescent  
Winnipeg, MB R3J 3W3

Phone: 204.945.7789

Cell: 204.793.1154

Fax: 204.948-2308

Email: [Lauren.Janusz@gov.mb.ca](mailto:Lauren.Janusz@gov.mb.ca)

---

**From:** Mario Poveda [<mailto:mpoveda@jrcc.ca>]  
**Sent:** April-20-15 3:36 PM  
**To:** Janusz, Lauren R (CWS)  
**Subject:** RE: Brereton Lake Campground and Resort - WTP reject line - Fisheries

Good afternoon Lauren.

Just wondering if you required any additional information on my part about the Brereton Lake project, mentioned in the email below? I would appreciate your comments so I can proceed with the EAP submission.

Thank you for your time and collaboration,

Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-in-Training

J.R. Cousin Consultants Ltd.

Phone: (204) 489-0474

Fax: (204) 489-0487

[www.jrcc.ca](http://www.jrcc.ca)

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---

**From:** Mario Poveda [<mailto:mpoveda@jrcc.ca>]  
**Sent:** Friday, April 10, 2015 3:10 PM  
**To:** 'Janusz, Laureen R (CWS)'  
**Subject:** Brereton Lake Campground and Resort - WTP reject line - Fisheries

Good afternoon Lauren,

J.R. Cousin Consultants Ltd. (JRCC) is preparing an Environmental Act Proposal for the discharge of the new potable water treatment system (backwash from filters and reject from the membranes) for the Brereton Lake Campground and Resort, located within SW 17-11-15 E1. The new plant will treat water from the lake (intake will be placed approximately 45 m from the shore) and the reject water and backwash line will be discharged back into the lake through a submerged 10 m long pipe. The discharge from the water treatment system will have similar parameters to the fresh water from the lake, as treated water will be used for backwashing the filters and the chemicals used to clean the membranes (only done once a month) will be neutralized during the service, prior to discharge.

Could you please respond with any comments or concerns your department may have with the proposed project as well as FIHCS data for Brereton Lake?

Thank you for your time,

Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-in-Training

J.R. Cousin Consultants Ltd.

Phone: (204) 489-0474

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Manitoba Conservation and Water Stewardship, Fisheries Branch Email Correspondence, April 23, 2015

**From:** [Kroeker, Derek \(CWS\)](#)  
**To:** [Janusz, Laureen R \(CWS\)](#); [Mario Poveda](#)  
**Cc:** [Long, Jeff \(CWS\)](#)  
**Subject:** RE: Brereton Lake Campground and Resort - WTP reject line - Fisheries  
**Date:** Thursday, April 23, 2015 9:10:00 AM

---

Hi Mario,

The most recent fisheries survey of Brereton Lake (2010) resulted in the following list of species encountered:

Yellow Perch  
Walleye  
White Sucker  
Black Crappie  
Northern Pike  
Log Perch  
Spottail Shiner  
Johnny Darter  
Central Mudminnow  
Trout Perch  
Mottled Sculpin

Please note that Kokanee (listed in the FICHS as extirpated) was the result of a short duration stocking of this non-native species.

This species was not expected persist and the 'extirpated' designation is not warranted.

Derek Kroeker

Derek Kroeker  
A/Fisheries Manager - Eastern Region  
Fisheries Biologist - Central Region  
Conservation and Water Stewardship  
Fisheries Branch  
Box 4000  
Lac du Bonnet, MB R0E 1A0  
Ph: (204) 345-1450  
Fax: (204) 345-1440  
Cell: (204) 345-3068

---

**From:** Janusz, Laureen R (CWS)  
**Sent:** April-22-15 11:12 PM  
**To:** Mario Poveda  
**Cc:** Kroeker, Derek (CWS); Long, Jeff (CWS)  
**Subject:** Brereton Lake Campground and Resort - WTP reject line - Fisheries

Hi Mario,

Sorry for the delay in responding. Attached is the information that we have from our Fisheries Inventory and Habitat Classification System. In the attached you'll see that Brereton Lake provides year round habitat for large bodied fish species – walleye, yellow perch and northern pike. It has been classified as a Class 1 waterbody which means it has a high capability for the production of fish.

Brereton has also been stocked by walleye fry in the past. The last year, according to our stocking records, was 2010.

As this is a fish bearing lake it is important any discharge meets or exceeds Manitoba Water Quality Standard, Objectives and Guidelines.

By way of this email I am including the A/Regional Fisheries Manager should he have any additional information or corrections to the attached information. Please note that information from FIHCS comes from a number of sources and as such we cannot guarantee the species listed are 100% accurate. Also the species when entered are not linked to a location so the list includes everything reported to be found in the lake.

Any questions please feel free to email.

**Laureen Janusz**

Fisheries Science and Fish Culture Section  
Fisheries Branch,  
Manitoba Conservation and Water Stewardship  
Box 20, 200 Saulteaux Crescent  
Winnipeg, MB R3J 3W3

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Email: [Laureen.Janusz@gov.mb.ca](mailto:Laureen.Janusz@gov.mb.ca)

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**From:** Mario Poveda [<mailto:mpoveda@jrcc.ca>]

**Sent:** April-20-15 3:36 PM

**To:** Janusz, Laureen R (CWS)

**Subject:** RE: Brereton Lake Campground and Resort - WTP reject line - Fisheries

Good afternoon Laureen.

Just wondering if you required any additional information on my part about the Brereton Lake project, mentioned in the email below? I would appreciate your comments so I can proceed with the EAP submission.

Thank you for your time and collaboration,

Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-in-Training

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**Sent:** Friday, April 10, 2015 3:10 PM  
**To:** 'Janusz, Laureen R (CWS)'  
**Subject:** Brereton Lake Campground and Resort - WTP reject line - Fisheries

Good afternoon Lauren,

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Could you please respond with any comments or concerns your department may have with the proposed project as well as FIHCS data for Brereton Lake?

Thank you for your time,

Mario Poveda, M.Sc., E.I.T.  
Environmental Engineer-in-Training

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## Fisheries Inventory & Habitat Classification System (FIHCS)

**FIHCS - Fisheries Inventory &  
Habitat Classification System**

---

**Waterbody: Brereton Lake**Provincial Waterbody Id #  
82.00Watershed  
5PGBRegion  
EasternDistrict  
RennieMap Sheet  
52E13

Latitude: 49 54 16

Longitude: 95 32 40

**Habitat Suitability**

Seasonal Habitat Suitability\*

All	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	None
Y													

\*The month(s) the waterbody is useable for fish Habitat (without human intervention)

**Resource Access**

Resource	Distance (km)
Aircraft on Floats	0
All Season Road	0
Boat	0
Seasonal Road	0
Walking	0

**Habitat Classifications**

Habitat Class	Class
Classification based on habitat rating	Class 1
Condition of the waterbody 5 years ago	Class 1
Intuitive classification of the waterbody	Class 2
Predicted classification in 5 years	Class 2
Predicted classification in 5 years if controlled	Class 2
Rating of the best waterbody in the same or adjacent watershed	Class 1

\*

**General Uses**

General Use	Harvest Weight
Commercial Sport	
Miscellaneous	552
Recreational Angling	3524

**Needed Improvements**

Year	Improvements	Comments
2007	1982 report by Newbury summarizes surface water data collected by the Prov. of MB during 1980 at 96 hydrometric stations. Includes water levels & discharge meas. obtained for flood forecasting, reservoir regulation, & specific surface water investigation.	

**BIOLOGY**Presence

KOKANEE <i>Oncorhynchus nerka</i>	Extirpated
NORTHERN PIKE <i>Esox lucius</i>	Unknown
WALLEYE <i>Stizostedion vitreum</i>	Abundant
WHITE SUCKER <i>Catostomus commersoni</i>	Abundant
YELLOW PERCH <i>Perca flavescens</i>	Unknown

**Creel**

Year	Species	Catch/Unit Effort*
1967	Northern Pike	0.06
	Walleye	0.06
	Yellow Perch	0.03
1968	Northern Pike	0.07
	Walleye	0.06
	Yellow Perch	0.03
1985	Northern Pike	0.06
	Walleye	0.28
	Yellow Perch	0.39
1991	Northern Pike	0.19
	Walleye	2.38
	Yellow Perch	0.39

\*Catch/Unit Effort = Catch/Hour

**Waterbody: Brereton Lake**Provincial Waterbody Id #  
82.00Watershed  
5PGBRegion  
EasternDistrict  
RennieMap Sheet  
52E13Latitude: 49 54 16  
Longitude: 95 32 40**Water Chemistry**

Code	Samples	Low	High	Average	MSWQO LO	MSWQO HI	CWQG LO	CWQG HI
<b>Sample Dates:</b> 2001-04-09								
<b>Inorganic</b>								
Calcium	7	0.0000	15.2000	7.8900				
Carbon (Total Inorganic)	2	2.0000	3.5000	2.7500				
Carbon (Total Organic)	2	21.5000	22.0000	21.7500				
Iron (Total)	3	0.5000	0.8400	0.6100		1.000 mg/L	.3000 mg/L	.3000 mg/L
Iron Ext.	2	0.5800	2.3900	1.4850				
Magnesium	7	0.6000	2.6500	1.7770				
Nitrate	1			7.5000				
NO3-NO2 Diss	2	0.0100	0.0200	0.0150				
Ph (Ph Units)	6	6.2000	8.2300	6.8300	6.500 unit	9.000 unit	6.500 unit	9.000 unit
Phosphorous Total	4	0.0400	0.1200	0.0725				
Potassium	2	5.0000	5.0000	5.0000				
Sodium	4	1.3000	11.4000	3.9625				
Sulphate	7	4.0000	16.0000	7.5429				
<b>Organic</b>								
Chlorophyll A	2	50.0000	52.0000	51.0000				
<b>Physical</b>								
Alkalinity (Total)	5	6.0000	28.0000	16.0000				
Colour	1			30.0000				
Conductivity (mho/cm)	6	35.0000	70.0000	49.6700				
Hardness (Total)	6	18.5000	38.0000	22.5000				
Residue (Filterable)	1			35.0000				
Residue (Non-Filterable)	1			10.0000			25.00 mg/L	25.00 mg/L
Residue (Total)	1			45.0000				
Secchi disc (M)	2	3.5500	4.2500	3.9000				
Temperature (C)	4	18.2000	22.8000	19.4000				
Turbidity (NTU Or JTU)	1			10.0000				

MSWQO = Manitoba Surface Water Quality Objectives  
CWQG = Canadian Water Quality Guidelines

**Waterbody: Brereton Lake**

Provincial Waterbody Id #  
82.00

Watershed  
5PGB

Region  
Eastern

District  
Rennie

Map Sheet  
52E13

Latitude: 49 54 16  
Longitude: 95 32 40

**Lake Morphology**

Survey Date	1968-06-14
Lake Area (ha)	882.20
Maximum Depth (m)	6.40
Mean Depth (m)	4.10
Volume (cu.m. X 10E6)	11.740
Shoreline Length (km)	
Island Shore Length (km)	
Total Shoreline Length (km)	21.34
Shoreline Development Index	3
Lake Elevation ASL (m)	

**Summer Temperature**

Date	Max Temp °C	Thermocline Present	Thermocline Depth (m)	Max Temp Below Thermocline °C
1969-05-29	18.30			
1968-08-12	18.50			
1957-07-12	25.00			
1944-07-16	18.10			

**Stream Morphology****Date:**

Stream Length (km):

Drainage Area (km2):

Highest Stream Order:

Average Bankfull Width (m):

Average Bankfull Depth (m):

QBF (m3/sec):

Present n:

Average Slope (%):

Pool Slope (%):

Mean Substrate Diameter (m):

Present Discharge (m3/sec):

Average Width (m):

Average Depth (m):

Average Velocity (m/sec):

Gauge Station:

TBF:

Estimated n:

Riffle Slope:

**Dissolved Oxygen**

Date	# Stations	Hi (ppm)	Low (ppm)	Average (ppm)	Conductivity (uhmos)	Temp °C	Ph Level
1978-07-20				8.20			7.60
1969-05-29					43.00	25.00	6.20
1968-08-12				7.70		18.50	
1957-07-12				9.62		22.80	8.23
1944-07-16				13.00		18.17	6.90

**Waterbody: Brereton Lake**Provincial Waterbody Id #  
82.00Watershed  
5PGBRegion  
EasternDistrict  
RennieMap Sheet  
52E13

Latitude: 49 54 16

Longitude: 95 32 40

**Land Use**

Broad Class	Sub Class	Class Number*
Fisheries	Sport fishing lodges/outcamps	1
Recreation	Campgrounds	1
Recreation	Cottage Development	1
Recreation	Major Recreation and Tourism Development	2
Recreation	Provincial, Municipal and Federal Parks	2
Transportation and Transmission	All Season Roads	1
Transportation and Transmission	Railroads -	1
Transportation and Transmission	Seasonal Roads	1
Water Development and Control	Lake Regulation	2

\* Class number is based on the Classes of Development Regulation, under Chapter 26 (Bill 26) of the Manitoba Environment Act.

**Habitat Conditions**

Habitat Parameter	Limiting Factor	Weight	Probable Source	Weight
FISH COMMUNITY	Human intervention	1	Stress	1
WATER QUALITY	Nutrient Surplus	2	Individual sewage disposal	2
WATER QUANTITY	Flow Levels - Below Optimum	1	Water regulation	1
	Loss of Flushing Flows	1	Water regulation	1

**Weight**

1 = Minor Concern

2 = Major Concern

**Waterbody: Brereton Lake**

**Provincial Waterbody Id #**  
82.00

**Watershed**  
5PGB

**Region**  
Eastern

**District**  
Rennie

**Map Sheet**  
52E13

**Latitude:** 49 54 16

**Longitude:** 95 32 40

**Literature****Citation**

Amason, I. G. 1957. A biological survey of Brereton Lake. M.R. Dept. MR and EM(fisheries). On microfiche file. Fisheries Branch, Man. Dept. Nat. Resources, Winnipeg.

Beyette, Jim. 1990. Pers. communication. Fisheries technician for the Dept. Nat. Resources, Beausejour, Man.

Fitzjohn, D. 1985. An analysis of angler surveys on selected lakes in Whiteshell Provincial Park: Management Implications. 1982. Practicum. Nat. Res. Inst., Univ. Manitoba. 71pp.

Fitzjohn, D. 1991. Pers. communication. Fisheries Biologist for the Man. Dept. Nat. Resources, Winnipeg.

Hayward, M.K. 1992. Brereton Lake 1991 Inventory Report. Man. Dept. Nat. Res. Fish. Br. Tech. Rept. DNR Beausejour, Manitoba. Feb. 14, 1992.

Inland Waters Directorate, 1989. Water Quality Data 1988. Water Survey of Canada. Environment Canada, Ottawa.

MDNR. Microfiche file. 1944, 1967-1968. Internal document. Man. Dept. Nat. Resources, Fisheries Branch, Winnipeg.

MDNR. Sportfishing lodge and outcamp file. 1990. Internal document. Man. Dept. Nat. Resources, Fisheries Branch, Wpg.

MDNR. Stocking records E/SE region. 1930-1990. Internal document. Man. Dept. Nat. Resources, Fisheries Branch, Wpg.

Newbury, R. 1982. Manitoba Department of Natural Resources. Water Resources Branch. Surface Water Data 1980. A report prepared by Hydrology Section.

Orvis, G.E. and M.D. Miller. 1970. Memo to file re: Brereton Lake Survey - Summer 1968. Microfiche file, Fisheries Branch, Wpg.

**Key Words**

CHEMISTRY

QUALITATIVE  
BIOLOGY  
RESOURCE USE  
LAND USE  
FISHING-SPORT  
HABITAT

QUANTITATIVE  
FISHING-SPORT

HABITAT  
QUALITATIVE

BIOLOGY

WATER QUALITY  
HYDROLOGY  
QUANTITATIVE

CHEMISTRY  
BIOLOGY  
FISHING-SPORT

RESOURCE USE

BIOLOGY

CHEMISTRY  
HYDROLOGY

CHEMISTRY  
MORPHOLOGY



**Waterbody: Brereton Lake**

**Provincial Waterbody Id #**  
82.00

**Watershed**  
5PGB

**Region**  
Eastern

**District**  
Rennie

**Map Sheet**  
52E13

**Latitude:** 49 54 16

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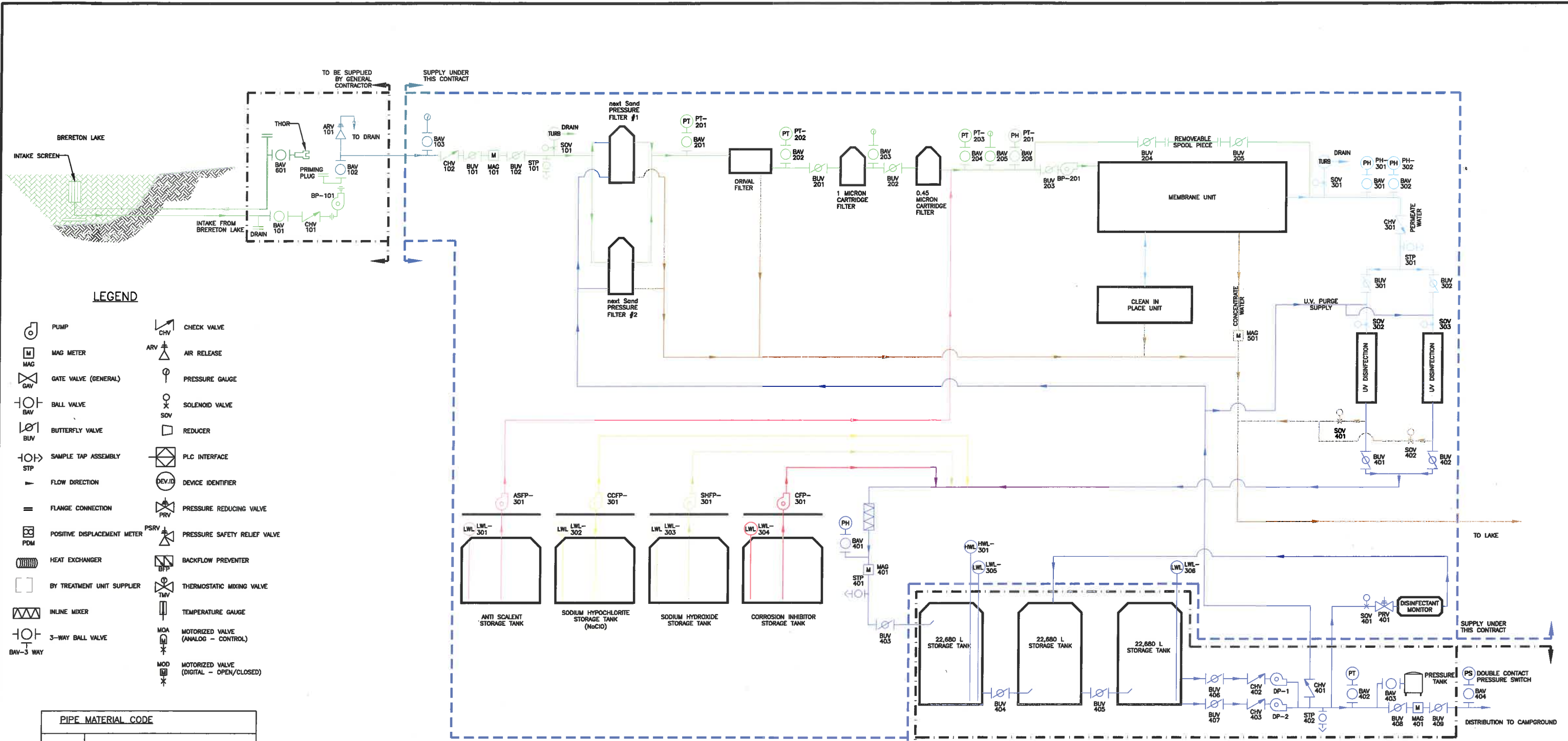
## **Appendix C**

Plan 1: Proposed Water Treatment Plant Location

Plan 2: Water Treatment Plant Process Flow Chart







**LEGEND**

- PUMP
- MAG METER
- GATE VALVE (GENERAL)
- BALL VALVE
- BUTTERFLY VALVE
- SAMPLE TAP ASSEMBLY
- FLOW DIRECTION
- FLANGE CONNECTION
- POSITIVE DISPLACEMENT METER
- HEAT EXCHANGER
- BY TREATMENT UNIT SUPPLIER
- INLINE MIXER
- 3-WAY BALL VALVE
- BAV-3 WAY
- CHECK VALVE
- AIR RELEASE
- PRESSURE GAUGE
- SOLENOID VALVE
- REDUCER
- PLC INTERFACE
- DEVICE IDENTIFIER
- PRESSURE REDUCING VALVE
- PRESSURE SAFETY RELIEF VALVE
- BACKFLOW PREVENTER
- THERMOSTATIC MIXING VALVE
- TEMPERATURE GAUGE
- MOTORIZED VALVE (ANALOG - CONTROL)
- MOTORIZED VALVE (DIGITAL - OPEN/CLOSED)

**PIPE MATERIAL CODE**

CODE	PIPE MATERIAL AND RATING
SS	STAINLESS STEEL SCHEDULE 10
ST40	STEEL PIPE, ANSI 150 # FLANGE RATING
GSP	GALVANIZED STEEL PIPE, ANSI 150 # FLANGE RATING
PVC	PVC PIPE, SCHEDULE 80
TUBE	FLEXIBLE TUBING
CI	CAST IRON- DRAIN WASTE VENT PIPE
COPM	TYPE M COPPER PIPE
COPL	TYPE L COPPER PIPE
CHEM TUBE	FLEXIBLE CHEMICAL TUBING IN CARRIER PIPE
INS	INSULATED PIPE

- TT TEMPERATURE TRANSMITTER
- US ULTRASONIC TRANSDUCER
- PT PRESSURE TRANSDUCER
- TURBIDITY METER
- HL&T HYDROSTATIC LEVEL SENSOR WITH TEMPERATURE
- PH PH METER
- HNL HIGH LEVEL FLOW SWITCH
- LWL LOW LEVEL FLOW SWITCH
- - - SUPPLY UNDER THIS CONTRACT
- - - TO BE SUPPLIED BY GENERAL CONTRACTOR

		B.M. EL.									
<p style="font-size: small;">LOCATIONS OF UNDERGROUND STRUCTURES/UTILITIES AS SHOWN ARE BASED ON AVAILABLE INFORMATION BUT NO GUARANTEE IS GIVEN OR IMPLIED THAT ALL EXISTING UNDERGROUND STRUCTURES/UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL UNDERGROUND STRUCTURES/UTILITIES MUST BE OBTAINED FROM THE APPROPRIATE AUTHORITY/OWNER, BY THE CONTRACTOR, BEFORE PROCEEDING WITH CONSTRUCTION.</p>			 Certificate of Authorization <b>J.R. Cousin Consultants Ltd.</b> No. 234 Date: 15/05/11		<p style="font-size: small;">ENGINEER'S SEAL</p> <b>G. R. COUSIN</b> REGISTERED PROFESSIONAL ENGINEER	 <b>JR Cousin Consultants Ltd.</b> 91A Scurfield Blvd. Winnipeg MB R3V 1G4 p. (204) 489-0474 f. (204) 489-0487 www.jrcc.ca	CODE: B-653.03 DESIGNED BY: JC DRAWN BY: BM REVIEWED BY: JC	PROJECT: BRERETON LAKE CAMPGROUND WTP PRE-DESIGN LETTER REPORT TITLE: WATER TREATMENT PLANT PROCESS FLOW CHART	SCALE: NTS DATE: 14/08/18 PLAN: P1 SHEET: 1 of 1		
No.	REVISIONS	DATE	INITIALS								