The Twisted Root RV Park
Wastewater Holding Tank System

Environmental Assessment Report

Neegan Burnside Ltd.
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August 2020
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Wastewater Holding Tank System
Environmental Assessment Report
August 2020

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Neegan Burnside Ltd.

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Executive Summary

The Twisted Root RV Park retained Neegan Burnside Ltd. (Neegan Burnside) to complete an Environment Assessment Report to support an Environment Act Proposal (EAP), and obtain an Environment Act License for the public wastewater collection system at the seasonal Recreation Vehicle (RV) campground.

The campground located in the Rural Municipality of La Broquerie. There are total of 61 existing fully serviced campsites at The Twisted Root RV Park. Each campsite is provided with a 1,135 L (300 US gallon) polyethylene wastewater holding tank that is shallow buried on the side of each campsite, at least 3.0 m away from the water supply.

The wastewater from the public washroom and shower is currently treated by an on-site septic tank and field. Few details are known about the septic tank and field. The Owner plans to install a 6,819 L (1,500 Imp. gal) polyethylene underground wastewater holding tank to collect the wastewater from a new public washroom and shower building. After this upgrade is complete, the existing septic tank and field will no longer receive any wastewater from publicly accessible campground facilities.

The stored wastewater is pumped out by a private septic hauling service company, (Don's Septic Service), as requested and hauled to the La Broquerie Wastewater Treatment Lagoon for disposal.

An average daily wastewater production of 7.25 m3 was determined based on available historical water consumption records of 2019 and 2020. With available information on the campground occupancy, an average daily wastewater production of 150.7 L was calculated for each campsite, which forms the basis for projecting the future maximum daily wastewater production.

The proposed campground expansion provides a total of 37 new campsites, which will be gradually constructed within the existing campground, starting in 2021. There is no specific construction schedule at the time of this report. The Owner intends to construct the new public washroom, shower, and laundry facility and associated holding tank within two years (prior to close of the 2022 season).

With an assumption that the campground has had full occupancy in each weekend and holiday, and the full occupancy of the campground generates the maximum day wastewater production. The projection of existing and future wastewater production was estimated as shown in the table below.

Table E1.0: Summary of The Twisted Root RV Park Wastewater Production

Projection Scenario	Number of Campsites	Average Daily Consumption	Average Daily Consumption Per Site	Maximum Daily Consumption	Maximum Daily Consumption Per Site
Existing Wastewater Production	61	7.25 m^3	150.7 L	14.5 m^3	301.4 L
Future Wastewater Production	98	14.8 m^3	150.7 L	29.5 m^3	301.4 L

Since both existing and future maximum day wastewater production exceed 10,000 L, it was determined that an Environment Act License is needed to proceed with the campground upgrade.

It is understood that the existing campground located in a rural municipality, where the land is designated to be settlement centre, and it is surrounded by rural/agricultural land that has not yet been developed. According to Nutrient Management Regulation, this area is understood to be Zone N5, where construction and installation of wastewater holding tanks is not prohibited. Since the proposed campground expansion is within the existing campground property, Neegan Burnside conclude that no impact to the surrounding environment is anticipated by the expansion if recommended mitigation measures are properly implemented.

Mitigation measures are recommended to reduce the risk of contamination of the environment from the wastewater. Measures include continued use of individual wastewater holding tanks on each campsite and transferring the wastewater by licensed haulers to an off-site wastewater treatment facility for disposal. All proposed wastewater holding tanks shall be installed with a minimum of 3.0 m separation between watermains and wastewater infrastructure.

In order to prevent spillage around the wastewater connection, Neegan Burnside recommended to install a concrete pad at the ground level around each wastewater service connection. Ongoing inspection and maintenance of the system including the wastewater holding tank and service lines are also proposed as part of mitigation measures, as is the development of an emergency response plan.

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1.0 Introduction and Background

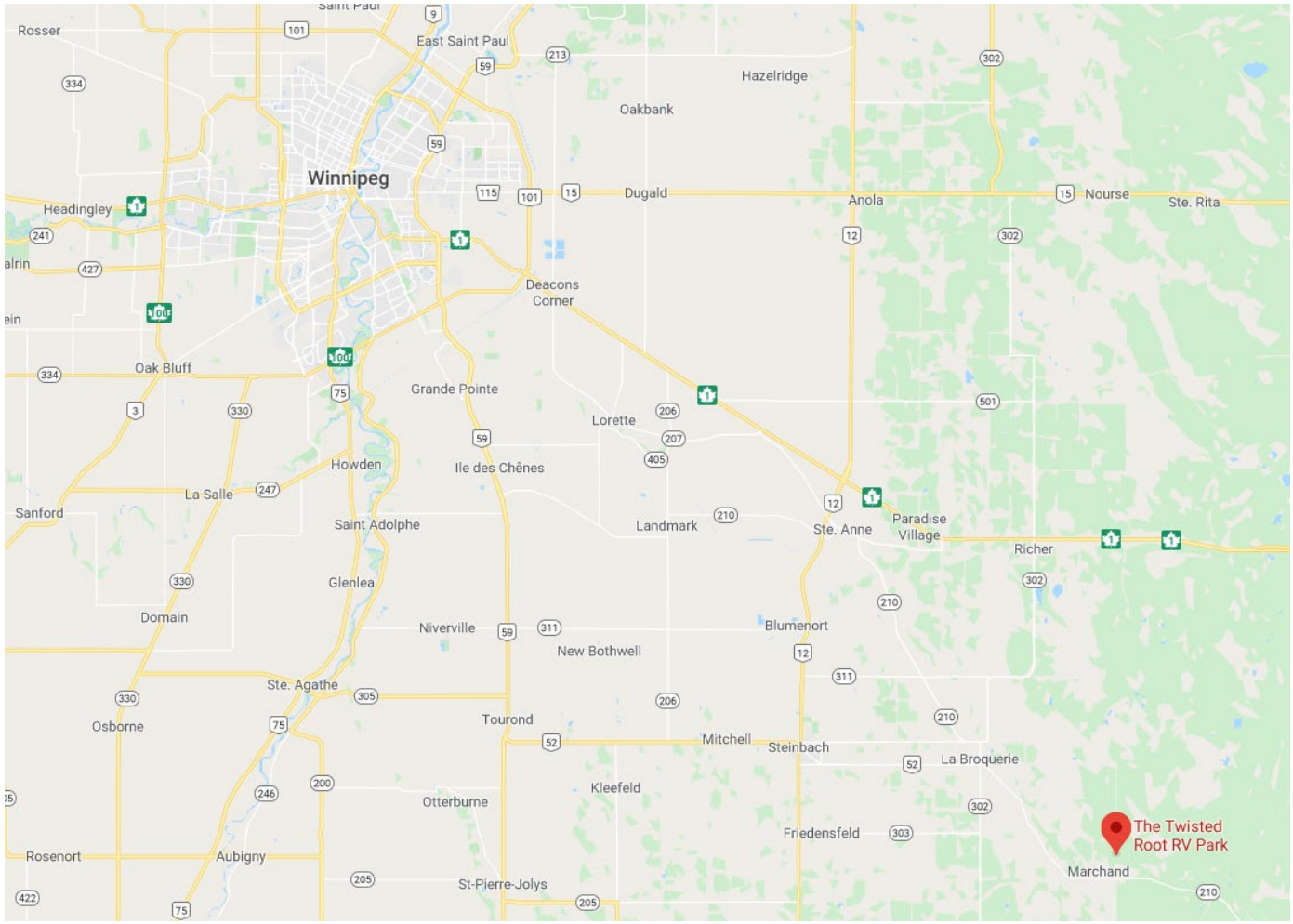
The Twisted Root RV Park retained Neegan Burnside Ltd. (Neegan Burnside) to complete an Environment Assessment Report to support an Environment Act Proposal (EAP) and obtain an Environment Act License (EAL) for an expansion of the seasonal Recreation Vehicle (RV) campground.

The campground located in the Rural Municipality of La Broquerie in Manitoba. It is adjacent to the village of Marchand, approximately 70 km southeast of Winnipeg on Road 43E off Highway 210. The location of the site within Manitoba is shown on Figure 1.0. The existing campground consists of 61 serviced RV campsites, a clubhouse, a site office, and a house with two public washrooms and showers. The existing layout of the campground and proposed expansion is shown on Figure 1.0.

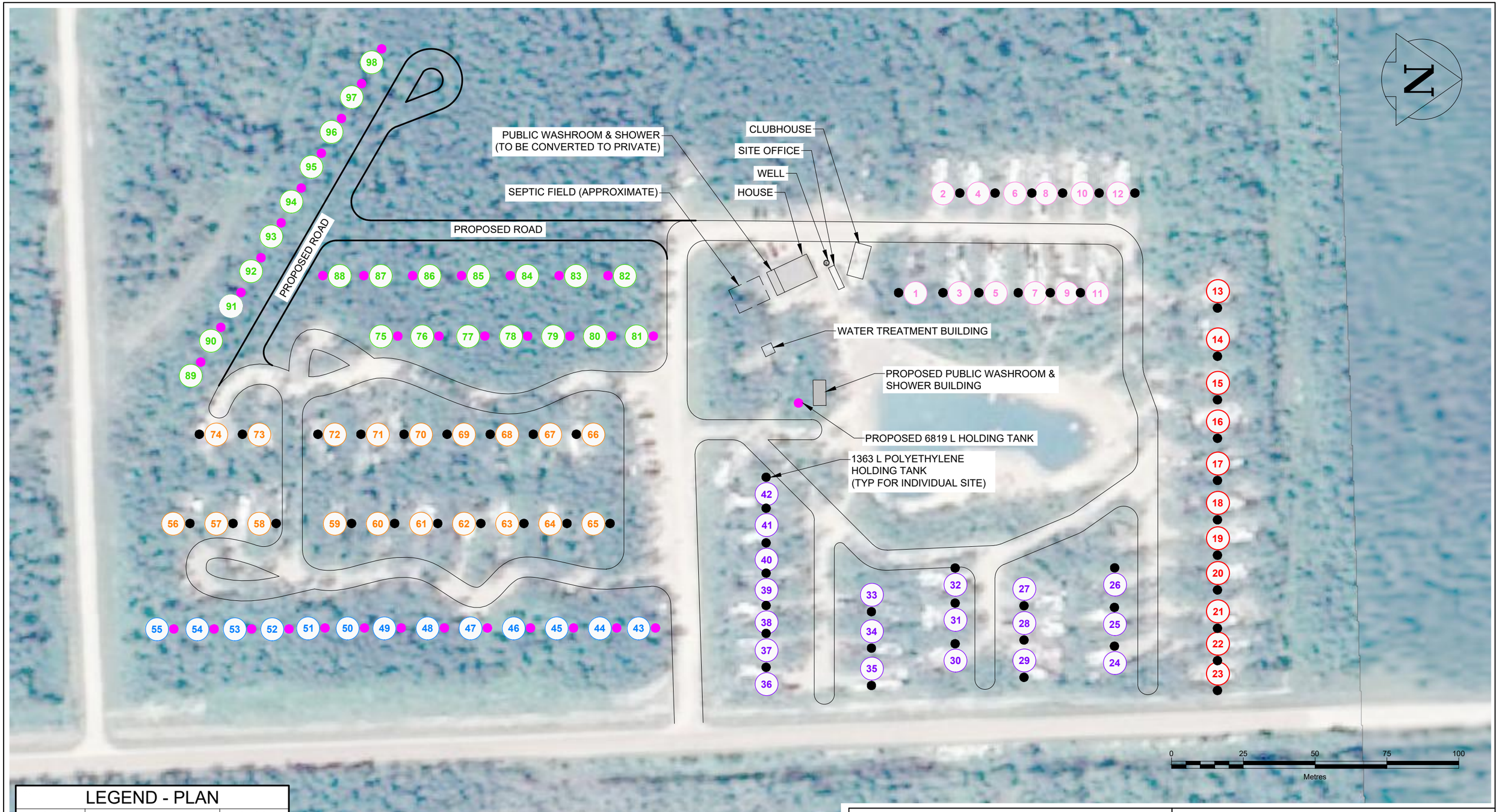
The Owner intends to expand the existing campground. A gradual expansion of 37 new serviced sites is proposed, bringing the total number of serviced campsites to 98.

This Assessment Report provides a description of the existing wastewater servicing, the proposed expansion, and the project schedule. The maximum day volume of wastewater production of the campground was estimated based on historical water consumption records.

Figure 1.0: Location of The Twisted Root RV Park within Manitoba



Source: Google Maps



LEGEND - PLAN

EXISTING		PROPOSED
●	SEWAGE HOLDING TANK	●
	ACCESS ROAD	
○	CAMPSITE (BLOCK A)	
○	CAMPSITE (BLOCK B)	
○	CAMPSITE (BLOCK C)	
	CAMPSITE (BLOCK D)	○
○	CAMPSITE (BLOCK E)	
	CAMPSITE (BLOCK F)	○

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Drawing Title

TWISTED ROOT RV PARK

WASTEWATER COLLECTION SYSTEM PLAN

Client

TWISTED ROOT RV PARK

Drawn	Checked	Date	Figure No.
JJ	YL	2020/08/04	**2.0**
Scale		Project No.	
APPROX. 1:1250		300051653	

File Name: X:\Land Desktop\300051653 Twisted Root Wastewater Engineering Assessment\dwg\contr\051653 Figure 1.0.dwg Date Plotted: August 25, 2020 - 9:49 AM

2.0 Existing Wastewater Collection System

The existing wastewater collection system at the campground consists of 61 underground wastewater holding tanks. Each campsite is provided with a 1,363 L (300 Imp. gallon) polyethylene tank (Refer to Photo 1.1 in Appendix B). Each holding tank was buried underground at the right-hand side of the site (when facing the campsite at its entrance). The top of the lid is located approximately 150 mm above the ground level and at least 3.0 m away from the water supply hose bibb. The wastewater pipe from the RV is connected directly to the 100 mm (4”) diameter opening at the center of the lid (Refer to Photo 1.3 in Appendix B). Figure 2.0 shows the existing layout of the wastewater collection system within the campground, while Figure 3.0 shows the typical tank installation and site layout.

The condition of wastewater holding tanks could not be determined at the time of the site visit, but the owner reported that they have had no known concerns of leakage from holding tanks.

The holding tanks are pumped out as required, with the wastewater hauled by Don’s Septic Service to a licensed wastewater treatment lagoon (La Broquerie Lagoon) for disposal. This wastewater collection system is seasonal, operating in summer months only. Therefore, the shallow burial of the holding tanks does not impact operations.

There is a private house adjacent to the campground which has one washroom and one washing machine. It is occupied throughout the year but is not open to the public. However, two public washrooms with showers are connected to the house and have separate entrances (Refer to Photos 1.5 to 1.7 in Appendix B). All wastewater generated by this house, including the two public washrooms, flows into an underground fiberglass holding tank with an approximate capacity of 3,182 L (700 Imp. gal.) beside the house (Refer to Photo 1.8 in Appendix B). A septic pump in the holding tank pumps the wastewater into the adjacent septic field for disposal. It is reported that few additional details regarding the septic system are known, including the year in which it was installed and the specifications of the system such as the length, design, or burial depth of the infiltration trenches. No operational issues with the septic system were reported.

The septic field is located at the south side of the house (Refer to Photo 1.9 in Appendix B). It is approximately 25 m away from the well and over 50 m away from the man-made lake and swimming area. Please refer to Figure 2.0 for the location of the house and septic field.

3.0 Proposed Wastewater Collection System

As described in Section 1.0, the owner intends to expand the existing campground with an additional 37 campsites, 24 of which are planned to be constructed west to the existing Block E, and 13 are planned to be constructed east to the existing Block E. Each new campsite is provided with a 1,363 L (300 Imp. gal.) polyethylene wastewater holding tank with a threaded lid, which has a 100 mm (4") center port that can be directly connected to the RV wastewater pipe. The Owner plans to start building the proposed campsites in 2021 but there is no specific construction schedule at the time of this report.

The Owner plans to disconnect all publicly accessible facilities from the septic tank and field system. A new public washroom and shower facility will be constructed at a new location, indicated on Figure 2. A new underground polyethylene wastewater holding tank with a capacity of 6,819 L (1,500 Imp. gal) is proposed to be installed at the location of the new public washrooms and showers facility.

The Owner has indicated that Don's Septic Service truck haul service will continue to be used for the future expansion areas for the short term. It is understood that the Owner has purchased a 2004 GMC Topkick septic truck with 6,819 L (1,500 Imp. gal.) hauling capacity. This septic truck is currently being repaired, and the Owner is planning to put it into service in 2021. It is understood that this will require the Owner to register as a sewage hauler.

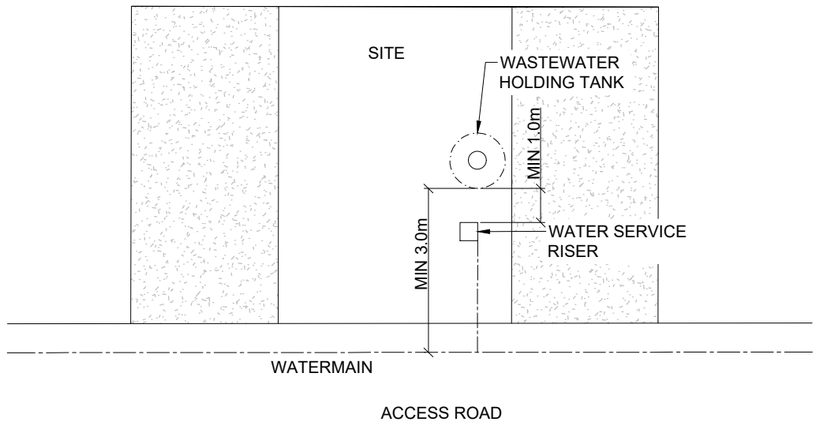
It is recommended that tanks meeting the requirement of CSA B66 are installed, according to the manufacturer's recommendations.

The system should be installed such that there is 3.0 m separation between water mains and any wastewater infrastructure, and a minimum of 1.0 m separation (3.0 m where possible) between water service lines and any wastewater infrastructure.

Please refer to Figure 3.0 for the standard detail of a typical campsite arrangement.

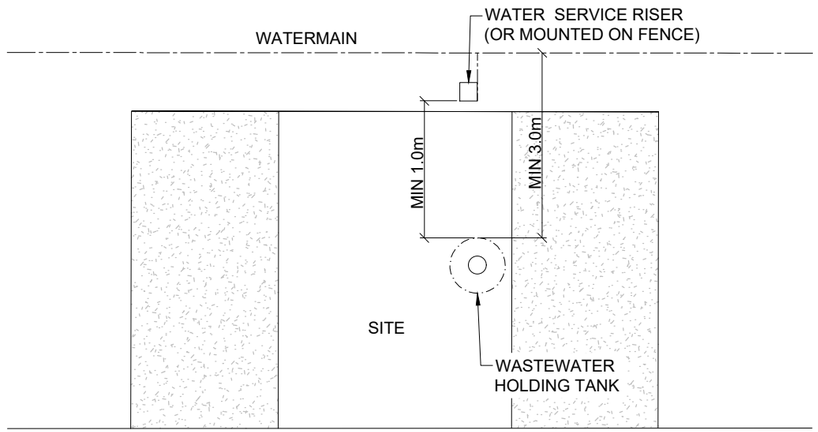
3.1 Construction Schedule

Thirty-seven proposed campsites will be constructed in stages over the next five years, while the existing public washroom and shower connection to the septic field will be disconnected within two years. A new public washroom and shower facility and a dedicated wastewater holding tank will be installed within two years (end of the 2022 camping season).



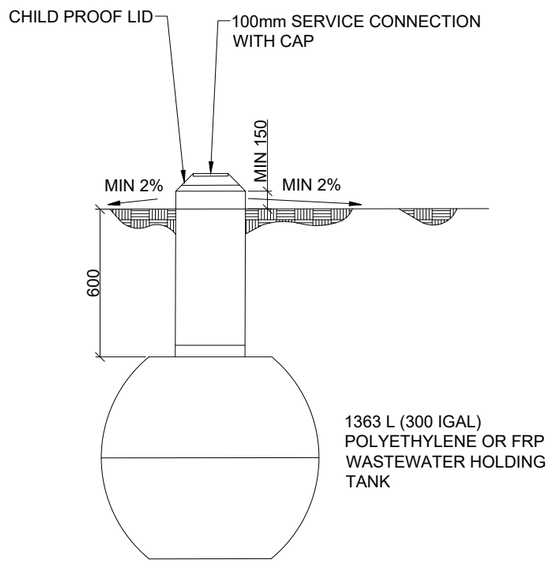
TYPICAL SITE SERVICING PLAN - FRONT WATER SERVICE

SCALE: N.T.S.



TYPICAL SITE SERVICING PLAN - REAR WATER SERVICE

SCALE: N.T.S.



TYPICAL WASTEWATER HOLDING TANK

SCALE: N.T.S.

NOTES

1. WATERMAINS TO HAVE A MINIMUM 3.0m HORIZONTAL SEPERATION FROM SEWAGE HOLDING TANKS OR SEWAGE SERVICE LINES.
2. WATER SERVICE LINES TO BE A MINIMUM 1.0m FROM SEWAGE SERVICE LINES.
3. WHERE WATER AND SEWER SERVICING MUST CROSS, WATER SERVICE SHALL BE A MINIMUM 450mm BELOW THE SEWER SERVICE.
4. ALL SEWAGE SERVICE ELBOWS TO BE 45° OR 22.5°.
5. ALL MATERIALS INCLUDING PIPE FITTINGS AND VALVES SHALL CONFORM TO THE LATEST STANDARDS ISSUED BY ASTM, AWWA AND ASNI/NSF WHERE SUCH STANDARDS EXIST.
6. WASTEWATER HOLDING TANK TO BE CSA B66 COMPLIANT AND INSTALLED TO MANUFACTURER'S SPECIFICATIONS.

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Drawing Title
TWISTED ROOT RV PARK
SEWER DETAILS AND SPECIFICATIONS

Client
TWISTED ROOT RV PARK

Drawn	Checked	Date	Figure No.
MG	YL	2020/8/19	**3.0**
Scale		Project No.	
N.T.S.		300051653	

4.0 Wastewater Production

The wastewater production of the existing campground was estimated based on the historical water consumption records. While some records for septic service pump-outs exist, the available information cannot be used to estimate wastewater generation per site, since detailed historical occupancy data is not available. Therefore, wastewater production based on pump-out information will not be considered in this report. This report will review the historical water consumption records to estimate the daily wastewater production per campsite, which forms the basis for projecting the existing and future maximum day wastewater production.

4.1 Historical Water Consumption Records

Since wastewater is normally generated during and after consuming water for daily activities, water consumption can be used to estimate the wastewater production by assuming wastewater production is less than or equal to the water consumption. Manitoba Sustainable Development recommends a daily water consumption of 180 L per campsite to be used when historical records are not available—however, historical records are available for The Twisted Root RV Park.

The source of water at the campground is a well, which is located near the site office as shown on Figure 2. Handwritten water meter reading records were made available to Neegan Burnside. Available records include daily water meter readings for the years of 2019 and 2020. Historical water use records for the data period are included in Appendix A.

The available water usage data for 2019 shows a total water consumption of 894 m^3 over four months of continuous operation from June 1 to September 29, and these volumes include water usage for campground maintenance and public washroom and shower. This gives an average daily water consumption of 7.5 m^3. The records of 2020 provide water usage data from May 13 to July 16. The average daily water consumption of the entire campground was calculated to be 7.0 m^3.

Based on all the available water usage data from 2019 to 2020, an average daily water consumption of the entire campground was estimated as 7.25 m^3. However, the water consumption of the campground is heavily dependant on the occupancy. In order to estimate the maximum day water consumption of the campground, water consumption of each campsite must be determined.

The Owner reported that 100% occupancy usually occurs during the weekends and holidays, with an assumption that all existing 61 campsites are occupied for every weekend and holiday, the average daily water consumption per site was calculated as 131.5 L for 2020. With the same occupancy assumption made for 2019, an average

daily consumption of 169.8 L per site was therefore estimated, which resulted an average daily consumption of 150.7 L per site over the recent two years.

Without considering abnormal data due to leak events or campground maintenance, a maximum daily water usage of 301.6 L per site was recorded in on Sunday, June 14, 2020 and this was used to represent the maximum day water consumption, and by proxy the maximum day wastewater generation. A Maximum Day Factor (MDF) of 2.0 was calculated by comparing the maximum day to the average daily consumption of 150.7 L per site. Therefore, a current maximum daily consumption of 14.5 m^3 was estimated based on the MDF of 2.0, and the maximum daily consumption of 301.4 L per site was calculated and will be used to project the future maximum daily wastewater production.

In conclusion, with an assumption described at the beginning of this section, of water consumption being approximately equal to wastewater production, 150.7 L/site and 301.4 L/site will be used as an average and maximum daily wastewater production respectively based on an analysis of historical water records.

4.2 Future Wastewater Production

The proposed expansion would gradually put an additional 37 RV campsites in service starting in 2021. The entire expansion area would operate seasonally. Assuming a similar wastewater production in the new campsites, the theoretical average and maximum day wastewater production of the campground were estimated as follows.

With full occupancy, for a total of 98 campsites, the average and maximum day wastewater production are projected to be 14.8 m^3 (14,768.6 L) and 29.5 m^3 (29,537.2 L), respectively.

Table 1.0 summarizes the existing and future wastewater production of the campground.

Table 1.0 - Summary of The Twisted Root RV Park Wastewater Production

Projection Scenario	Number of Campsites	Average Daily Consumption	Average Daily Consumption Per Site	Maximum Daily Consumption	Maximum Daily Consumption Per Site
Existing Wastewater Production	61	7.25 m^3	150.7 L	14.5 m^3	301.4 L
Future Wastewater Production	98	14.8 m^3	150.7 L	29.5 m^3	301.4 L

5.0 Existing Environment in the Project Area

The existing campground lies within the Steinbach Eco-district, which has short, warm summers and cold winters. Oakbank is the nearby weather station (ID 3641). According to Terrestrial Ecozones, Ecoregions, and Eco-districts of Manitoba (Agriculture and Agri-Food Canada, 2001), the mean annual temperature is 2.4^{O}C and the mean annual precipitation is approximately 510 mm. The wooded areas in this Eco-district provide habitat for white-tailed deer, moose, black bear and ruffed grouse and a variety of other birds. Endangered species found in this Eco-district based on Species at Risk (Environment Canada, 2014) are Common Nighthawk, Eastern Whip-poor-will, Least Bittern, and Red-headed Woodpecker. The habitat of these species covers large range of area within prairie provinces; therefore, the proposed campground expansion has a limited impact on their habitat.

The existing campground is located at NE-1-6-8E1 in the Rural Municipality of La Broquerie. The landcover of this region consists of Deciduous Forest that mostly covers the northeast corner of the region, Conifer Forest and Mixedwood Forest that lay in the center of this region, and Forage Crops that mostly occupies the west and southwest corner of this region. The existing campground sits within the area covered with Deciduous Forest. Two surface streams flow parallelly to each other through this region, southwest to the existing campground. Since the expansion area is approximately 130 m away from the stream, no impact on water bodies will be resulted by the expansion.

The existing well that has been used as the only water source at the campground was constructed in 2014. According to the Distribution System Upgrade Design Brief produced by Neegan Burnside in 2018, the well overburden consists of primarily of till layers, which a small clay layer and some sand layers. The bottom of the well sits in the sand layer, approximately 71.6 m (235 ft) below the surface, at the level of groundwater aquifer that the water system draws from. The groundwater quality including bacteriological sampling from the previous Design Brief (Neegan Burnside, 2018) indicated the underground aquifer was not under the impact of nearby septic field or wastewater holding tanks.

The campground expansion area is located adjacent to the existing campground, which is used for recreational proposes only and is currently covered by native vegetation; therefore, no public safety or human health risks have been identified within the campground expansion area. Marchand Provincial Park is the closest provincial park, where is located approximately 8 km southeast of existing campground. There are no known archaeological or historic sites close to the proposed campground expansion area.

The existing campground is in the Rural Municipality of La Broquerie, where does not belong to any Planning Districts. North and east sides of the existing campground are

adjacent to rural/agricultural land that is designated by Zoning Bylaws; however, these lands have not yet been developed. Since the expansion areas are within the existing campground, there will be no changes to such land use as the result of the campground expansion.

Since the existing campground is situated within a settlement area, and adjacent to the village of Marchand, it is understood that the Nutrient Management Zone would belong to zone N5 according to Clause 3(1)(e) under Nutrient Management Regulation. Installing or modifying wastewater holding tanks in nutrient management zone N5 is not prohibited according to Clause 14(1)(f). The area within 15 m of the groundwater well would be considered a Nutrient Buffer Zone; no existing or proposed future wastewater holding tanks are within this buffer zone.

6.0 Environmental Effects and Mitigation Measures

Many of the risks associated with a sewage treatment system are avoided for The Twisted Root RV Park as the facility uses wastewater holding tanks and the hauling and treatment of the wastewater is completed off-site by registered haulers and licensed facilities.

The main potential adverse environmental impact of this system would be related to the case of wastewater leaking into the surrounding soil from the holding tanks. This would pose a direct human health risk, especially in the case of a larger uncontrolled spill. Contamination of the water system from a leak in the wastewater system is another potential risk. Therefore, the most important mitigation measures will be those that reduce the risk of such a spill or leak.

Additionally, a wastewater spill would increase nitrogen (N) and phosphorus (P) to nearby water systems, which promotes the growth of algae and aquatic plants. This would cause a change to aquatic life habitat and drinking water quality if the raw water intake of a water treatment facility is located within this affected water body. This potential impact would be managed in the same way, by reducing the risk of a spill or leak.

6.1 Mitigation Measures

The proposed campground expansion will be serviced by individual wastewater holding tanks on each campsite. This system was selected for its simplicity and to avoid the need for sewer mains and larger tanks, which would carry additional risk of undiscovered leaks and require more frequent pump-outs.

All wastewater treatment will be handled off site at the discharge site utilized by the hauling service, which is reported to be the La Broquerie Lagoon. In the event that the La Broquerie Lagoon did not have the capacity to accept the sewage from the hauling company, it would be taken to another Provincially licensed lagoon.

Pump-outs of the wastewater tanks will only be performed by registered haulers who are familiar with the required protocol to safely pump out a sewage tank and avoid contamination of the nearby soil. Since the Owner has purchased a septic truck and is planning to start operating the truck in 2021, any persons who operate the sewage truck shall complete the Sewage Hauler Registration according to Onsite Wastewater Management System Regulation (2003) prior to operation of the sewage truck.

To reduce the risk of contamination from a damaged holding tank, the proposed wastewater holding tanks are proposed to be installed with a minimum of 3.0 m separation between watermains and wastewater infrastructure. The wastewater service

connection will have a minimum of 1.0 m separation from water service lines, with a greater separation of 3.0 m provided where site topography allows.

To prevent spillage around the wastewater connection, it is recommended the Owner consider a concrete slab (minimum dimensions of 450 mm by 450 mm by 150 mm thick) at the ground level around each wastewater connection.

Ongoing inspection and maintenance of the system is another important mitigation measure. Tanks should be inspected regularly to confirm their integrity and be replaced at any sign of leakage or infiltration. This would include a direct observation of a crack, foul odour around the tank when closed, or observation that the water or wastewater level in the tank has dropped without any pump-out having occurred.

A thorough inspection of each holding tank is recommended as part of the spring start-up and fall shut-down procedures for the campground, and ongoing weekly inspections are recommended during the operating season.

An emergency response plan should be in place in the event that a major spill of wastewater was to occur. This would include notification of the Manitoba Environmental Emergency Reporting line at (204) 944-4888.

6.2 Residual Environmental Effects

There would be minimal residual environmental effects from a properly maintained wastewater holding tank system such as that proposed for The Twisted Roost RV Park.

Minor drips of wastewater are unavoidable due to the nature of the application, but the mitigation measures described above will reduce the risk of a more serious event.

6.3 Follow-Up Plans, Monitoring and Reporting

No formal requirement for reporting to Manitoba Sustainable Development is anticipated for this system due to its simplicity and low environmental risk.

The Owner will be responsible to follow the monitoring and reporting requirements stated in the License once granted from Manitoba Sustainable Development.

As noted above, in the event of an environmental emergency the Owner will notify Manitoba Environmental Emergency Reporting line at (204) 944-4888.

7.0 Summary & Conclusion

The Twisted Roost RV Park has proposed to construct 37 new fully serviced campsites in addition to the existing 61 campsites, bringing the total number of campsites at the campground to 98. An underground polyethylene wastewater holding tank with capacity of 1,363 L (300 Imp gal.) will be provided at each new campsite, and a 6,819 L (1,500 Imp gal) polyethylene underground wastewater holding tank will be provided for a proposed new public washrooms and shower facility. The wastewater from each tank will be pumped out by private wastewater hauling company as required in 2020. Wastewater pump-out responsibility may be transferred to the Owner starting with the 2021 season and will still be disposed at the La Broquerie wastewater treatment lagoon.

Since the land use of existing campground was identified as settlement centre, and installing or modifying wastewater holding tanks is not prohibited according to the Nutrient Management Regulation, the proposed campground expansion is not anticipated to cause any significant environmental impact if wastewater holding tank installation and recommended mitigation measures are properly implemented.

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Appendix A

Historical Water Consumption Records

Manitoba

Monthly Chlorination Report

Water System Name: Twisted ? Water System Code: 236 ?

Month: June? Year: [illegible] Type of Measurement Device:

Operator-in-charge (Print): Brad Holmes? Other Operators (Print):

Daily Consumption Units:

Flow Meter for Daily Consumption (circle choice): Raw Treated No Metering

Date	Time	Initials	Residuals (mg/L) Free	Total	Daily Consumption
1	4:00?	BH	2.15?	2.24?	1901
2	[illegible]	BH	1.5?	1.5?	1904
3	[illegible]	BH	1.65?	1.9?	1935
4	8 pm?	BH	1.51?	1.7?	1828
5	[illegible]	BH	1.46?	1.75?	1922
6	[illegible]	BH	1.36?	1.69?	1953?
7	8 pm?	BH	1.22	1.49	1940?
8	[illegible]	BH	[illegible]	1.22?	1557?
9	[illegible]	BH	.93?	1.25?	1953?
10	[illegible]	BH	.90?	1.3?	1566?
11	[illegible]	BH	[illegible]	.95?	1765?
12	7:20?	BH	[illegible]	.97?	1768?
13	8 pm?	BH	[illegible]	1.11?	1772?
14	[illegible]	BH	1.04?	1.07?	1723?
15	7 pm?	BH	2.25?	2.48?	1792?
16	[illegible]	BH	1.65?	1.87?	2052?

Date	Time	Initials	Residuals (mg/L) Free	Total	Daily Consumption
17	12 pm	BH	.94	1.18	2004
18	2 pm	BH	.67	.87	2018
19	6 pm	BH	1.95	2.18	2013
20	4 pm	BH	1.99	2.04?	2015
21	8 pm	BH	2.0	2.16	1917?
22	7 pm	BH	1.25	1.84?	2021
23	9:00 pm	BH	1.35	1.47	2014?
24	7 pm	BH	1.21	1.44	2027
25	8 pm	BH	1.05	1.25	2011?
26	10 pm		1.25	2.35	2041?
27	11 pm	BH	1.35	2.03	2022
28	8 pm	BH	1.46	2.6	2066
29	7 pm	BH	1.24	2.46	2061
30	5:00 pm	BH	2.0	2.5	2076
31	[illegible]	BH	2.	2.5	[illegible]
				Total Monthly Consumption	[illegible]

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)
04	8:45	BH	.02	18	[illegible]	BH	.0?	30	5:00	BH	.00
06?	[illegible]	BH	.01	18?	[illegible]	BH	.0?				

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Total
4	8:50	BH	# 23	1.43	1.75
6?	[illegible]	BH	# 36?	[illegible]	[illegible]
11?	[illegible]	BH	# 72?	[illegible]	1.30?
18?	8:00?	BH	[illegible]	1.63?	[illegible]
[illegible]	7:1?	BH	# 13	1.96?	2.36?
31	1:00?	BH	Office?	2.35	2.50

Submitted by (Print): Brad Holmes Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS

Manitoba

Monthly Chlorination Report

Water System Name: [illegible] Water System Code: [illegible]

Month: [illegible] Year: [illegible] Type of Measurement Device: [illegible]

Operator-in-charge (Print): [illegible] Other Operators (Print): [illegible]

Daily Consumption Units: [illegible]

Flow Meter for Daily Consumption: (circle choice) Was Tracked Be Missing

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Monthly Consumption: [illegible]

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)
[illegible]	[illegible]	[illegible]	[illegible]

Date	Time	Initials	Ammonia (mg/L)

Date	Time	Initials	Ammonia (mg/L)

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Residuals (mg/L) Total
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Submitted by (Print): [illegible] Signature: [illegible]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: _____ Water System Code: _____

Month: _____ Year: _____ Type of Measurement Device: _____

Operator-in-charge (Print): _____ Other Operators (Print): _____

Daily Consumption Units: _____

Flow Meter for Daily Consumption (check one): Raw Treated No Meter(s)

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Total Monthly Consumption: _____

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)

Date	Time	Initials	Ammonia (mg/L)

Schedule of Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Residuals (mg/L) Total

Signed by (Print): _____ Signature: _____

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
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Manitoba

Monthly Chlorination Report

Water System Name: Twisted Root Water System Code: 736.6

Month: Sept Year: 2011 Type of Measurement Device: ______

Operator-in-charge (Print): Brad Holmes Other Operators (Print): ______

Daily Consumption Units: Gallons

Flow Meter for Daily Consumption: (circle choice) Raw Treated No Metering

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
1	9 Am		2.01	2.13	2646
2	7pm	BH	1.45	1.58	2652
3	7pm	BH	.45	1.60	2659
4	7pm	BH	.45	.53	2668
5	7pm	BH	.55	.85	2671
6	6pm	BH	.47	.96	2677
7	7pm	BH	.44	.77	2678
8	10am	BH	.46	.89	2682
9	5pm	BH	.64	.80	2684
10	7pm	BH	.45	.63	2684
11	7pm	BH	.51	.94	2685
12	7pm	BH	.55	.85	2685
13	7am	BH	.41	.94	2686
14	9am	BH	.57	.86	2691
15	9am	BH	.41	.91	2699
16	5pm	BH	.50	.61	2711
17	5pm	BH	.49	.62	2716
18	5pm	BH	.46	.59	2722
19	4	BH	1.03	1.66	2733
20	7pm		.90	1.13	2737
21	7pm		.86	1.08	2739
22	[illegible]		.71	.79	2741
23	[illegible]		.61	.83	2743
24	7:30pm		.54	.63	2751
25	5pm		.57	.67	2763
26	5:30pm		.61	.73	2769
27	4pm		.79	.90	2777
28			1.03	1.20	2780
29			1.13	1.31	2785
30					
31					

Total Monthly Consumption: ______

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)
14	4		.04

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Residuals (mg/L) Total
2	9am	BH	# 76	1.41	1.52
14	4	BH	# 13	.60	1.55

Submitted by (Print): Brad Holmes Signature: [signature]

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Monthly Chlorination Report

Manitoba

Water System Name: TWISTED ROOT Water System Code: 236.60

Month: MAY Year: 2020 Type of Measurement Device:

Operator-in-charge (Print): BRAD Other Operators (Print):

Daily Consumption Units: GALLONS

Flow Meter for Daily Consumption: (circle choice) Raw Treated No Metering

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13	9:00	BH	1,15	1,40	2798
14	8:00	-	1,69	1,83	2807
15	9:pm				2887
16			1,79	2,05	2837

Date	Time	Initials	Residuals (mg/L)		Daily Consumption
			Free	Total	
17	830pm	BH	211	218	2855
18	9 pm	BH	1.08	1.45	2862
19	9 pm	BH	1,50	1,90	2863
20	9 pm	BH	1,55	1,99	2866
21	9 pm	BH	1,67	1,99	2872
22	3 pm	BH	1,75	2,05	2876
23	430 pm	BH	1,93	2,13	2893
24	1 00 pm	BH	2,10	2,25	
25	1,00 pm	BH	2,15	2,27	2963
26	10 am	BH	2,20	2,42	2967
27	10 am	BH	2,36	2,5	2969
28	10 am	BH	2,01	2,20	2976
29	5 pm	BH	1,89	2,07	2974
30	5	BH	2,45	2,5	2986
31	5		2,5	2,50	2995
				Total Monthly Consumption	

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)

Date	Time	Initials	Ammonia (mg/L)

Date	Time	Initials	Ammonia (mg/L)

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L)	
				Free	Total

Submitted by (Print): Signature:

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Monthly Chlorination Report

Manitoba

Water System Name: [illegible] Water System Code: [illegible]

Month: June Year: 2010 Type of Measurement Device:

Operator In-charge (Print): Brian [illegible] Other Operators (Print):

Daily Consumption Units: Gallons

Flow Meter for Daily Consumption: (circle choice) Raw Treated No Reading

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
1	3:00pm	BH	1.42	1.47	3001
2	4pm	BH	.51	1.56	3004
3	5pm	BH	1.47	1.75	3005
4	7:00pm	BH	.57	.53	3008
5	9:00pm	BH	1.45	1.51	3011
6	9am	BH	2.05	2.15	3039
7	10:30	BH	2.40	2.52	3040
8	9am	BH	2.34	2.45	3041
9	9am	BH	2.01	2.10	3047
10	9am	BH	.75	.80	3049
11	9am	BH	.48	.53	3053
12	9am	BH	.53	.70	3056
13	9am	BH	1.55	1.67	3062
14	9am	BH	1.52	1.66	3071
15	9am	BH	1.10	1.20	3079
16	9am	BH	1.15	1.19	3085
17	9am	BH	1.36	1.35	3091
18	9am	BH	1.20	1.35	3097
19	9am	BH	1.36	1.75	[illegible]
20	10:00am	BH	1.52	1.57	[illegible]
21	10:00am	BH			3115
22	9am	BH	.53	1.05	[illegible]
23	9am	BH	1.20	.78	[illegible]
24	9am	BH	.72	.87	[illegible]
25	9am	BH	.55	.75	[illegible]
26	9am	BH	.52	.83	[illegible]
27	9am	BH	.67	1.05	[illegible]
28	9am	BH	.51	.63	[illegible]
29	9am	BH	.45	.70	[illegible]
30	9am	BH	.51	.65	[illegible]
31	10:30am	BH	.4	.91	[illegible]

Total Monthly Consumption:

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Residuals (mg/L) Total
05	7am	BH	[illegible]	.73	.80
23	9am	BH	[illegible]	.51	.64

Replaced doc & BH [illegible]

Submitted by (Print): ______ Signature: ______

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

Manitoba

Monthly Chlorination Report

Water System Name: Turtle Port Water System Code: ______

Month: JUNE Year: 2020 Type of Measurement Device: ______

Operator-in-charge (Print): ______ Other Operators (Print): ______

Daily Consumption Units: ______

Flow Meter for Daily Consumption: (circle choice) Raw Treated No Metering

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
1	9am	BM	.31	.87	31
2	9am	BM	.36	.82	3177
3	9am	BM	.36	.69	3189
4	1030am	BM	.46	.76	3215
5	9am	BM	.50	.84	3227
6	9am	BM	.36	.63	3239
7	11am	BM	.57	.81	3246
8	9am	BM	1.19	2.17	3247
9	9am	BM	2.04	1.10	3253
10	9am	BM	2.5	2.5	3267
11	9am	BM	1.28	2.09	3277
12	10am	BM	1.09	1.10	3289
13	11am	BM	1.01	1.01	3292
14	6pm	BM	.75	.76	3297
15	6pm		.65	.77	3300
16	2pm		.71	.83	3301

Date	Time	Initials	Residuals (mg/L) Free	Residuals (mg/L) Total	Daily Consumption
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Total Monthly Consumption: ______

Ammonia in Treated Water

Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)	Date	Time	Initials	Ammonia (mg/L)

Residuals at Distribution Sample Locations

Date	Time	Initials	Location	Residuals (mg/L) Free	Residuals (mg/L) Total

Replace report
July 6

Submitted by (Print): ______ Signature: ______

PLEASE REFER TO OPERATING LICENCE FOR APPLICABLE TREATMENT STANDARDS AND MONITORING REQUIREMENTS.
PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS.

NEEGAN BURNSIDE

Appendix B

Site Visit Photos

1. CAMPGROUND AND WASTEWATER SYSTEM PHOTOS

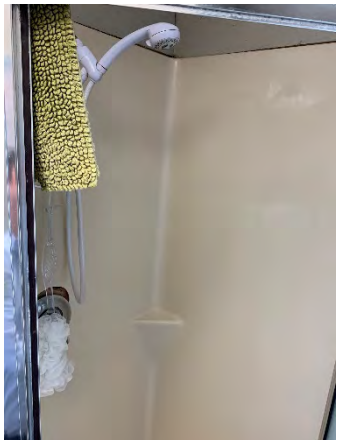
1.1 Typical Underground Wastewater Holding Tank

1.2 Typical Threaded Tank Access Hatch with 4" Centre Cap

1.3 Typical Connection Setup Between Underground Wastewater Holding Tank and RV

1.4 Typical New Campsite

1.5 Public Washroom and Shower #1



1.6 Public Washroom and Shower #1

1.7 Public Washroom and Shower #2

1.8 Fiberglass Wastewater Holding Tank Access Hatch on Septic Field

1.9 Public Washroom/Shower Building and Adjacent Septic Field

1.10 Data Plate of Fiberglass Wastewater Septic Tank