Environment Act Proposal Form

Manitoba
Sustainable Development

Name of the development: Wastewater Treatment Lagoon	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Class 2 development	
Legal name of the applicant: Sprucewood Colony	
Mailing address of the applicant: General Delivery Brookdale Contact Person: Joey Waldner City: Brookdale Province: MB Postal Code: R0K 0G0 Phone Number: (204) 354-2318 Fax: email: irvinspwd@gmail.com	
Location of the development: Rural Municipality of North Cypress-Langford Contact Person: Joey Waldner Street Address: Legal Description: NE 17-12-15W City/Town: Brookdale Province: MB Postal Code: R0K 0G0 Phone Number: (204) 354-2318 Fax: email: irvinspwd@gmail.com	
Name of proponent contact person for purposes of the environmental assessment: Peter Grieger, P.Eng	
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Date: Sept 5/23	Signature of proponent, or corporate principal of corporate proponent: [redacted] Printed name:

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Proposal for an Environment Act Licensed to Construct New Domestic Wastewater Lagoon and Livestock Slaughter Facility for Sprucewood Colony at NE 17-12-15W in the Rural Municipality of North Cypress-Langford

Submitted to:
Director
Environment Approvals Branch
Department of Environment and Climate
Box 35, 14 Fultz Blvd
Winnipeg, MB R3Y 0L6

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
South-Man Design Group Ltd.
No. 7810

Proponent:
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[redacted]

September 5, 2023

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1 Executive Summary

Sprucewood Colony, located in the RM of North Cypress-Langford on NE 18-12-15W and NW 17-12-15W, was founded in 1975 as a daughter Colony of the Spring Hill Colony. As typical for Colonies, Sprucewood Colony is set to slowly expand in population from the existing 100 to approximately 200 people, at which point the Colony will undertake plans to establish a new colony. The Colony is proposing to construct a new wastewater treatment lagoon east of the colony's residence to serve a total of 200 people. Sprucewood Colony is also operating a seasonal livestock meat slaughter and truck wash facility, which contributes to the wastewater treatment volume and organic loading.

Sprucewood Colony owns vast stretches of agricultural land adjacent to the existing facility, where construction of a new wastewater treatment lagoon is logical. Geotechnical investigations revealed that the soil at the proposed location to the east of the Colony's premises is not suited for the construction of a wastewater treatment lagoon comprising a compacted clay liner. As a result, the new wastewater treatment lagoon is proposed to be constructed using a geosynthetic (HDPE) liner.

Owing to its location, the proposed site is ideal to mitigate any nuisance concerns to neighbors. No impacts to wildlife or fish are anticipated as a result of the proposed development. The new wastewater treatment lagoon will significantly improve Sprucewood Colony's environmental performance.

Following issuance of an Environment Act Licence for construction and operation of the proposed wastewater treatment facility, Sprucewood Colony will take steps to ensure that a certified operator will be available to operate the new wastewater treatment facility.

2 Introduction

South-Man Design Group Ltd has been retained by Sprucewood Colony to provide the design services related to the construction of the new wastewater treatment lagoon. The wastewater treatment lagoon design and construction are prompted by the Colony's intention to accommodate the proposed increase in population size from the current 100 to 200 people. The existing wastewater facility at Sprucewood Colony dates back to 1975. The facility was erected as a two-cell wastewater treatment lagoon and later its secondary cell was converted to an earthen manure storage for livestock waste storage. No engineering information is available for this facility. In order to meet both hydraulic and organic loading requirements, the colony is intending to construct a new wastewater treatment lagoon east of the colony's residence and decommission the existing wastewater treatment lagoon.

This report has been compiled to provide the necessary information requested in The Environment Act Proposal Form to support the construction of a new domestic wastewater treatment lagoon and livestock slaughter facility.

3 Land Ownership and Municipal Land-Use Designation

The proposed site of the new domestic wastewater treatment lagoon is located on NE 17-12-15W in the rural municipality of North Cypress-Langford. This land is owned by Sprucewood Colony and it is situated east of the Colony's premises. A copy of the Certificate of Title for the land is included in Appendix A.

To date, Sprucewood Colony has used this land mainly for agricultural purposes, primarily for the cultivation of cereal grains and oilseeds, and for managing livestock operations comprising 1250 animal units. Under the provisions of Zoning Bylaw No 1896 of the Rural Municipality of North Cypress, the development site and adjoining land is designated "Agriculture General Zone – AG" (Figure 1). The Bylaw also indicates that wastewater treatment lagoons are allowed as a conditional use development in this Zone. The zoning bylaw further states that rural residential zones shall not be located within 305 m (1000 ft) of sewage lagoons.

As the surrounding property is primarily agricultural land mostly under the ownership of Sprucewood's Colony, there is little expectation that any residential development will

occur in the immediate area. Public consultations will be carried out as part of the application review process required by the Rural Municipality of North Cypress-Langford.

4 Site Conditions

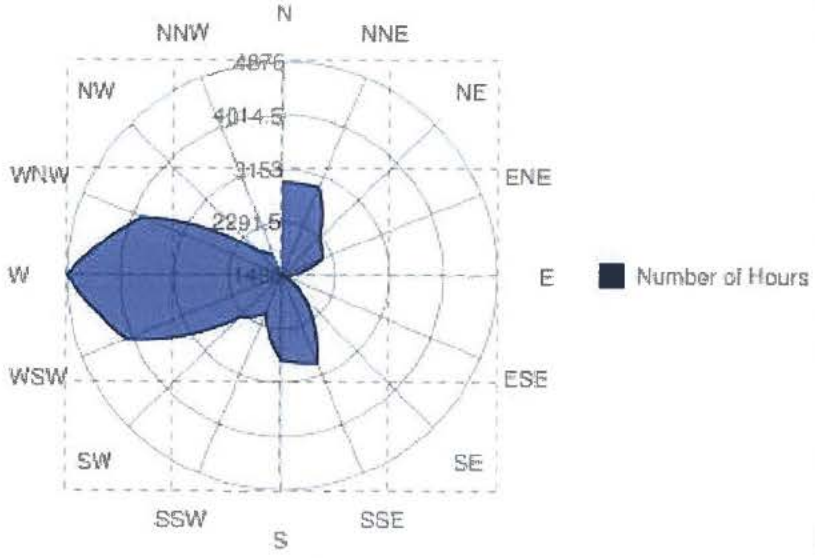
4.1 Location

The proposed wastewater treatment lagoon is located approximately 690 m from the nearest neighboring rural residence. There is no wastewater treatment facility within 3 km of the proposed site. The nearest urban residential development is Brookdale located approximately 5.8 km northwest of the lagoon. Information obtained from Google Earth indicates that there are approximately 5 rural residences within a 3 km radius of the site.

Figure 1. Location of the proposed wastewater lagoon.

Access to the proposed development is attainable via Trans-Canada Highway 1 and Provincial Trunk Highway 5 which intersects Municipal Road 67N approximately 9 km southeast of the site.

The location where the lagoon is to be situated is such that prevailing winds from the west, north-northeast, and south-southeast directions will not affect a significant number of people in the area (Figure 2). The nearest residence to the east is approximately 690 m away meeting the minimum setback requirements set by Manitoba Sustainable Development and the RM of North Cypress-Langford Zoning Bylaw. It is anticipated that this separation distance will significantly mitigate any odor concerns as a result of the prevailing westerly wind in the area. This wind blows over farm fields, wetlands, and forests, which will help absorb odor and airborne microbes. Consequently, the proposed site affords adequate separation for mitigating most if not all nuisance odor concerns for neighbors not associated with Sprucewood Colony. The release of odorous hydrogen sulphide gas (H_2S) from the wastewater treatment system usually occurs during the spring season for a short period of time while the ice thaws and the system returns to a non-odorous condition once the melting of ice cover is complete.



Direction	Number of Hours
N	2.931
NNE	2.961
NE	2.271
ENE	2.125
E	1.582
ESE	1.430
SE	1.980
SSE	2.941
S	2.780
SSW	2.098
SW	2.391
WSW	4.103
W	4.876
WNW	3.848
NW	1.958
NNW	1.778

Figure 2. Historical wind direction at Carberry meteorological station https://carberry.weatherstats.ca/metrics/wind_direction.html

4.2 Groundwater and Surface Water Resources

Based on well logs recorded by Manitoba Water Stewardship (GW Drill Logs), it was found that there is one well record on NW 17-12-15W. Review of this well log revealed that the

water table in the area is generally 4.6 m below the surface. The soil formation in the area is generally characterized by the presence of brown clay in the top 1.8 m underlain by medium brown sand and coarse sand with layer of coal.

In consultation with the water use licensing section of the Department of Environment and Climate, it has been confirmed that there is one licensed surface water user from Boggy Creek (for irrigation purpose) about 3 km downstream of the proposed site. It is anticipated that the quality of effluent discharged from the proposed wastewater treatment lagoon will not significantly impact the quality of surface water in the Boggy Creek for agricultural use. Typically water is extracted from the Boggy Creek in early spring to fill water storage reservoirs for irrigation later in the growing season. As discharge of the lagoon is not expected until the middle of June, the potential impacted are further mitigated.

A review of topography in the area indicates that natural drainage patterns are to the north and northeast from the proposed site. In consultation with Manitoba Infrastructure, it has been determined that there is no flood risk information for Boggy Creek south of the proposed development site (Appendix D). However, to prevent isolated surface accumulations from causing property damage it is recommended that any structure built be slightly elevated and graded to enhance drainage. Structures such as the wastewater treatment lagoon will be constructed with inherent flood protection by way of berms which will extend approximately 1.22 meters above surrounding grade. Any natural drainage impeded by the proposed facility will be re-established by the construction of drainage swales with a minimum 0.1% slope to ensure ponding does not occur adjacent to the structure.

4.3 Soil Conditions

A geo-technical investigation was conducted by South-Man Design Group Ltd on January 25, 2018, in order to assess the soil characteristics to facilitate construction of the proposed wastewater lagoon. Four test holes were drilled in the quarter section NW 17-12-15W, where the wastewater treatment lagoon was originally proposed to be constructed, and representative samples were collected for laboratory analysis. Details of test hole logs are included in Appendix C.

Based on the test hole logs information, the soil on the site generally varies from silty sand to coarse sand. It is unlikely that soils exhibiting these characteristics will yield a hydraulic conductivity of 1.0×10^{-7} cm/s or less when remolded and compacted to 95% of

maximum proctor dry density at plus or minus two percent of optimum moisture content. Consequently, the waste water treatment lagoon design will be based on the use of a high-density polyethylene (HDPE) plastic liner.

5 Design Criteria for the Proposed Wastewater Lagoon

5.1 Hydraulic Loading

5.1.1 Domestic

Hydraulic loading refers to the volume of raw sewage that will flow to the treatment lagoon per day. This volume is impacted by the number of residents the system is servicing, the amount of water used by each resident and the amount of water infiltration into the infrastructure. In discussion with Sprucewood Colony it is their intent to increase the population to a maximum of 200 persons at the proposed development site.

Based on historical data and industry adopted production rates for this type of application, the estimated water usage per person is 250 liters per day. Based on a population of 200 people the total flow will be 50,000 liters per day (**50 m^3/day**). The contribution from water infiltration into sewer systems was considered insignificant as the colony currently utilizes a low pressure sewer system which first collects the waste from each source in a septic tank which them transfers into the main collection system directed to the lift station. Water from weeping tiles is directed to surface discharge and does not contribute to the hydraulic loading.

$$Domestic\ WW = \frac{250\ L/person.day \times 200\ person}{1000\ L/m^3} = \mathbf{50\ m^3/day}$$

5.1.2 Slaughter House

In addition to domestic wastewater production, there will also be contribution from the existing slaughterhouse used strictly for butchering and packaging meat products for their own consumption. Based on FAO publication (FAO, 2009), average meat consumption in Canada in 2005 is 96.3 kg/person.year. For beef meat, Iowa State University Extension and Outreach determined the percentage yields from live weight killed to dressed weight (dressing percentage) and from dressed weight to packaged meat weight (carcass cutting

percentage) as 61% and 67%, respectively (Thiboumery and Jepsen, 2009). Therefore, average live weight animal killed for consumption per person per year in Canada is calculated as 236 kg LWK/person.year. For Sprucewood Colony, the total live weight of livestock that would be processed annually for consumption by 200 people would be 47,200 kg. Based on discussions with members of the Colony all blood-letting will take place outside of the facility and the paunches will be disposed of by means of composting.

Based on the low range of wastewater production from simple commercial slaughterhouses and low-processing packing houses it is estimated that 760 liters of wash water will be produced per 455 kg of live weight killed. On an annual basis this represents a total hydraulic load of 78,840 liters (78.84 m^3). Although it is likely that slaughtering will not occur on a daily basis, for the purpose of determining the daily hydraulic loading the annual production has been divided evenly into each day. The resulting daily hydraulic loading from the slaughterhouse is 215 liters/day (**0.22 m^3/day**).

$$Slaughterhouse\ WW = \left(\frac{760\ L}{455\ kg\ LWK \times 1000\ L/m^3}\right) \times \left(\frac{47{,}200\ kg\ LWK/yr}{365\ d/yr}\right) = \mathbf{0.22\ m^3/day}$$

5.1.3 Truck Wash Bay

The truck wash bay is operated on average 2 hours per day, considering heavier uses in the summer, and less use in the winter months. The main purpose is for washing domestic vehicles and livestock trucks. The Colony intends to ship livestock twice a week, therefore there are only two trucks being thoroughly washed and disinfected each week. These trucks are washed and have the manure removed prior to returning home from their destination thereby eliminating any introduction of livestock manure. The other uses for the wash bay will include washing of other farm equipment and domestic vehicles. Nichols (2012) reports amounts as much as 2.4 m^3/truck of wash water production for livestock haul trucks, using pressure spray washers. Sprucewood Colony will use a high-pressure washer as the main cleaning tool; the rated flow for the high-pressure washer is 13 L/min (Rich Silverman, n.d.). The use of this high-pressure washer over a continuous operation for 2 hours would result in **1.56 m^3/day** of wastewater on average throughout the year.

$$Truck\ wash\ bay\ WW = \left(\frac{13\ L/min}{1000\ L/m^3}\right) \times (2\ h/d \times 60\ min/h) = \mathbf{1.56\ m^3/day}$$

5.1.4 Total Hydraulic Loading

Therefore, the total hydraulic loading from domestic wastewater, slaughter house waste and truck wash bay waste is 51,780 litres per day (**51.78 m³/day**).

$$Total\ daily\ hydraulic\ load = 50 + 0.22 + 1.56 = \mathbf{51.78\ m^3/day}$$

5.2 Organic Loading

5.2.1 Domestic

Based on accepted practice the domestic daily BOD_5 (5 day Biochemical Oxygen Demand) production has been estimated to be 0.077 kg per person. The total daily BOD_5 contribution to the stabilization pond will be **15.40 kg** based on a population of 200 people.

$$Domestic\ BOD_5 = 0.077\ kg\ \ BOD_5/person.day \times 200\ person = \mathbf{15.40\ kg\ BOD_5\ /day}$$

5.2.2 Slaughter House

The average daily BOD_5 contribution from the slaughter house is estimated to be **1.68 kg** based on 13 kg BOD_5 per tonne of live weight.

$$\frac{13\ kg/tonne \times 47.20\ tonne/yr}{365\ days/yr} = \mathbf{1.68\ kg/day}$$

Traditionally the BOD_5 of wastewater from a red meat slaughter house is estimated at 26 kg/tonne of live weight, with blood being the single largest contributor. As the blood will not be disposed of through the sewer and the paunch will be disposed of through composting, these contributors have been subtracted resulting in an estimated 13 kg/tonne of live weight.

5.2.3 Truck Wash Bay

The BOD_5 from the truck wash water comes primarily from washing domestic vehicles, highway trucks and farm equipment. Nichols (2012) reports values of 1.05 kg BOD_5/truck washed. As far as the wash water for the other equipment, the material washed out is primarily soil and mud. The wash bay sewer system will incorporate a large settling tank which allows separation of sand and silts, and other dense solids. It is anticipated that the main contribution to the BOD_5 for the wash bay would come from the livestock truck wash water. Reported on a daily basis, the BOD_5 for two truck washes per week is as follows:

$$Truch\ wash\ bay\ BOD_5 = \frac{1.05\ kg\ BOD_5/truck \times 2\ trucks/week}{7\ days/week} = \mathbf{0.30\ kg\ BOD_5/day}$$

5.2.4 Total Organic Loading

Based on the above discussions, the total daily BOD_5 contribution to the stabilization pond has been estimated to be **17.38 kg** based on a population of 200 people and the slaughterhouse activities indicated.

$$Combined\ BOD_5\ loading = 15.40 + 1.68 + 0.30 = \mathbf{17.38\ kg\ BOD_5/day}$$

5.3 General Design Parameters

The maximum design liquid depth in the storage is 1.11 meters. A one-meter freeboard is provided to protect against catastrophic levels of precipitation and to shelter the liquid surface to minimize the effects of wave action. Moreover, a 0.39 m depth is set aside as reserve storage to hold the wastewater flow in the primary cell without surpassing the freeboard level when the transfer pipe connecting the primary cell to secondary cell is closed to facilitate effluent discharge. The interior slopes of the embankments will be constructed at 4:1 and the exterior slopes will be constructed at 5:1 in order to facilitate proper maintenance and grooming. The embankment top width will be 3.05 meters to permit access of maintenance equipment.

Due to the fact that the soil type of the area is not suited for clay liner material, it is recommended that the lagoon be constructed utilizing a synthetic HDPE liner. The synthetic liner material is proposed as a means of ensuring that any potential preferential flow paths are eliminated, thereby minimizing seepage losses. With the exception of

topsoil which is to be utilized for landscaping only, any deleterious soil containing high percentages of silt or sand shall only be used in constructing the outer embankments.

The first phase of construction will consist of removing all topsoil and organic matter from the entire foot print of the proposed cell, including beneath the embankments. This material is to be stockpiled for future use in landscaping and final dressing of the embankments in order to promote the growth of grass. In addition to the removal of the topsoil, a 0.3 m deep key is to be constructed beneath the embankments to provide additional lateral support. Prior to starting placement of fill material to construct the embankments the material in the key is to be recompacted to 95% of maximum dry density (MDD).

During construction of the embankments, the material is to be placed in maximum 150 mm thick lifts and compacted using a smooth drum or padfoot packer to achieve a minimum of 95% of MDD. The amount of compaction effort required to achieve the minimum 95% will be dependent on the moisture content of the material. To achieve the desired compaction rate, the moisture content of the fill material should be within plus or minus two percent of the optimum moisture content as determined from the Standard Proctor moisture versus density relationship curve. In general, a minimum of 5 to 10 passes over each lift will be required. Wetting of the granular fill material may be necessary to maittain the optimum moisture content.

Construction of the finished surface of the storage will consist of removing all sharp objects from the finished surface or earthwork to prevent puncturing the HDPE liner. The interior surface will be proof rolled to conceal small stones and gravel. However, all rocks greater than 50 mm are to be removed from the surface of storage prior to proof rolling the interior surface. Surfaces containing sharp stones may require a 3" sand bedding layer or 12oz geotextile placed between the sub-base and HDPE liner, if physical removal is not possible. Moreover, a 406 g/m^2 (12 oz/yard^2) nonwoven geotextile fabric will be installed under the concrete access ramps and any other appurtenances installed on top of the liner, to prevent punctures during construction and abrasion after. The HDPE liner will be anchored at the top of the berms via a 0.45×0.45m anchor trench. A 0.3 m thick ballast layer consisting of granular material will be installed onto the floor of each cell of the facility; this granular material shall be void of sharp stones or shale and any stones greater than 50 mm in diameter.

A gas venting system and de-watering sump will be installed to prevent the formation of biogas under the liner material and as a means for leachate detection, respectively.

For safety reasons it is recommended that fencing and warning signs be installed around the facility to discourage the entry of livestock, wildlife and trespassers. Gates sufficient to permit the entry of mowing and maintenance equipment shall be provided and be locked when access is not required.

6 Design Capacity

6.1 Primary Cell

The size of the primary cell has been determined based on the liquid surface area at 0.56 m above the cell floor. The surface area at 0.56 m height is 4,456 m^2 (0.4456 ha). Based on the BOD_5 contribution of 17.38 kg per day anticipated at the maximum design capacity, the primary cell BOD_5 loading will be 39.01 kg/ha/day. A conservative BOD_5 loading has been used to minimize the potential for odor production during spring thaw and to limit the potential for offensive odor production throughout the year. Given the geometry of the proposed cells the larger size minimizes the potential for short circuiting of effluent between the cells. Construction drawings for the lagoon are included in Appendix E.

6.2 Secondary Cell

Given the design criteria to be implemented, it is reasonable to assume that seepage losses from the storage will be negligible. Based on resources from the University of Manitoba (Figure 3) and historical data collected between 2000 and 2013 for the area (The Weather Network, 2015), annual precipitation for this area is approximately 550 mm while annual evaporation values from open water bodies are as high as 750 mm. Therefore, it is assumed that evaporation will at a minimum meet or exceed precipitation levels, thereby eliminating the need to provide additional storage capacity to facilitate excess precipitation.

Operation of the lagoon is based on twice per year discharge, thereby requiring that the total storage capacity of the wastewater lagoon be equivalent to the estimated hydraulic flow, multiplied by the retention time. To eliminate the need for discharging treated effluent more than twice per year or discharging in the period between November 1st and June 15th of the following year, the secondary cell is sized to accommodate a minimum of 182 days of retention time, not taking into consideration any contribution in allowable

storage capacity of the primary cell. Therefore, the storage capacity of the secondary cell is 9,423 m^3, excluding 0.3 m of dead storage below the discharge pipe. The footprint of the storage is such that the design storage capacity is achieved at a maximum liquid depth of 1.11 m. In addition to the 1.0 m freeboard required to accommodate a significant rainfall event and to shelter the liquid surface from wind another 0.39 m depth is also available to accommodate flow in the primary cell during the period when effluent is discharged. The retention capacity of the secondary cell alone is 182 days, and when combined with 50% of the capacity of the primary cell will achieve a total retention time of 230 days at the design population.

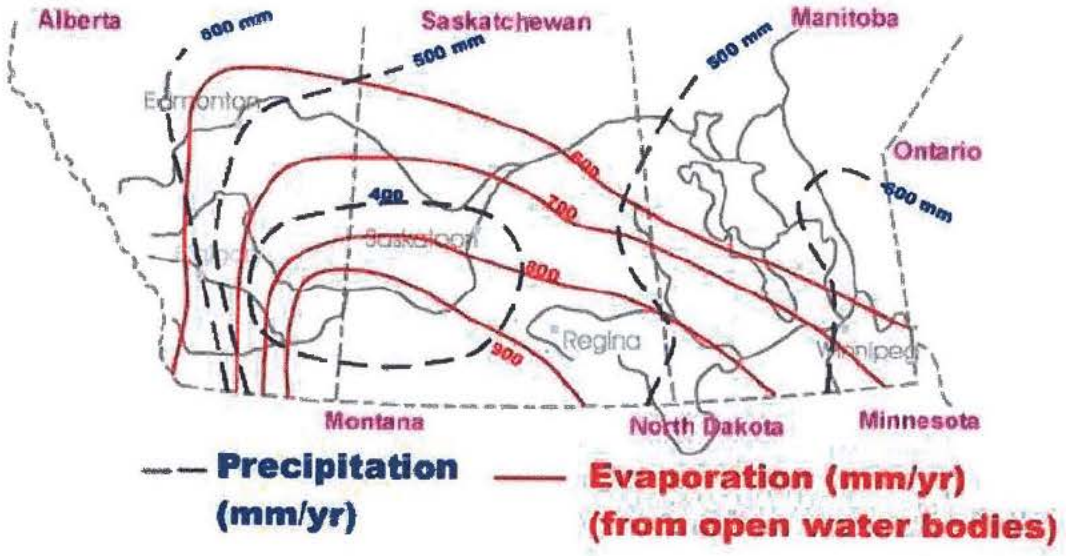


Figure 3. Annual precipitation and evaporation in Manitoba.
(Source: http://home.cc.umanitoba.ca/~mlast/lakelevel/page3/page3.html)

7 Effluent Discharge

7.1 Method of Discharge

It is proposed that treated effluent from the wastewater lagoon will be discharged into Boggy Creek which runs along the south side of the development site and eventually flows to Lake Irwin. As the lagoon will be constructed partially above grade, it is proposed to accomplish the cleanout by means of gravity. The Boggy Creek will convey the effluent to the northeast where it ultimately discharges to Lake Irwin approximately 35 km from

the development site. Installation of rip rap at the discharge of the effluent pipe at the point of entry into the creek will be required to prevent erosion of the embankments and disturbance of particulate matter in the water stream.

Trickle discharge will be implemented in order to limit the release of liquids into the stream as a means of trying to minimize the amount of liquids and particulates that actually enter into the Boggy Creek. Over its entire length between the proposed construction site and the Boggy Creek, the treated effluent will flow through a vegetated swale which is permanently grassed. This provides the unique opportunity to recapture any nutrients within the treated effluent as well as any sediment within the water stream. Trickle discharge will allow the opportunity for maximum infiltration to occur and under low flow conditions will provide additional opportunity for further treatment to occur. Under normal conditions where soil conditions are not saturated or following an intense rainfall event, it is not anticipated that any effluent discharge will reach the Boggy Creek. Therefore, it is anticipated that the effluent reaching the Boggy Creek will be equivalent to the water quality of the creek under normal non-discharge conditions.

For the purpose of trickle discharge it is proposed to restrict the release of liquids to 0.006 m^3/sec. This can be accomplished by restricting the valve opening to approximately 10% of its maximum opening area. Discharge duration is computed iteratively as the total wastewater generated during the maximum residence period (230 days) (November 1 to June 15 of the next year) less the amount generated when the valve in the connecting pipe between the primary and secondary cells is closed (21 days plus discharge duration) divided by the trickle discharge (0.006 m^3/sec). At this rate, it would be anticipated to take approximately 19 days to complete an entire discharge.

Discharges should not be undertaken or contribute to localize flooding as the result of excessive or intense rainfalls. In the event that significant rainfall is experienced during the discharge period, discharge shall be halted until such time that runoff accumulation in the drainage system has subsided.

7.2 Discharge Procedure

In order to facilitate emptying the secondary cell, it must first be proven that the treated effluent meets the minimum effluent standards. Consideration must be given to the time required for the final treatment in the cell and the time required to perform the necessary testing in order to meet a specific discharge period as may be specified in the Licence. Realistically, the final treatment and testing phase may take in excess of four weeks.

Following is the general discharge procedure to be implemented:

1) Close the valve in the connecting piping between the primary and secondary cells a minimum of two weeks before collecting the effluent samples for laboratory analysis. This valve is to remain closed until discharge of the secondary cell is complete.

2) Collect samples from the secondary cell and submit for analysis. Laboratory results can usually be expected in approximately two weeks.

3) If the results of the laboratory analysis meet the minimum effluent quality requirements, discharge of the secondary cell can proceed. If the results are not favorable, additional treatment will be required. In the event that the BOD_5 level exceeds the limit, additional time will be required to allow the contents of the secondary cell to further stabilize. Alternately, mechanical aeration can be provided to speed up the treatment process. If the coliform MPN exceeds the limit, dry chlorine may be spread over the surface of the secondary cell at a rate of 100 kg/ha. Re-testing to verify that the minimum standards are met will be required. Discharge the secondary cell when all requirements are met.

4) With discharge of the secondary cell complete, the discharge valve is closed and the valve between the primary and secondary cells is opened to allow the liquid levels of all cells to equalize. This valve will remain open until the next discharge procedure is initiated. Sizing of the secondary cell is such that two discharges will be required per year at the maximum design population of 200 persons.

5) If additional discharges are required due to unforeseen scheduling issues, repeat the entire procedure.

8 Environmental Impact

8.1 Odor Production

Sizing of the primary cell has been based on an organic loading rate 39.01 kg BOD_5/ha/day. This level, which is significantly less than the maximum allowable 56 kg BOD_5/ha/day as prescribed in the Province of Manitoba's document "Design Objectives for Standard Sewage Lagoons" will ensure that the facility operates odor-free for the majority of the year.

Potential does exist for odor to be present during the spring thaw when gases such as hydrogen sulfide, which have been trapped under the ice, are released. Production of these gases are the result of anaerobic decomposition of organic compounds which occurs when the ice cover prevents the introduction of oxygen into the wastewater. The duration of these odors is not anticipated to last any longer than two to three weeks depending on the time it takes for the ice cover to completely melt. With the removal of the ice cover the lagoon will quickly return to an aerobic state and odor production will return to a minimal level.

The large separation distance between the lagoon and the nearest residence not associated with the lagoon (690 m) will serve to further reduce any potential impacts of odor production. Wind data available for the area indicates that the prevailing wind directions are from west, north-northeast, and south-southeast. The large separation distance to the neighbouring residence in the prevailing wind direction (from west) is such that little to no effect is anticipated based on the minimum setback requirements.

In summary, odor reduction has been taken into consideration in the design of the treatment lagoon and separation distances from neighbouring residences are significantly greater than the required minimums. For these reasons, it is not anticipated that odor will have any significant environmental impacts.

8.2 Impact of Discharge to Waterways

The treated effluent from the secondary cell of the lagoon will be discharged twice per year during the period prescribed in the Environment Licence. In order to discharge treated domestic effluent into a waterway, specific treatment levels must be achieved before any release is permitted. Laboratory analysis of samples taken from the treated effluent will be used to verify that the minimum requirements as specified in the Environment Licence are met. Discharge will not be permitted unless the minimum requirements are met. Table 1, summarizes published information for the minimum accepted standards of specific constituents.

Table 1: Minimum Standards for Effluent Quality

CONSTITUENT	TREATED WASTERWATER
$CBOD_5$ (mg/L)	Less than 25
Total Suspended Sediments (mg/L) (excluding growing algae)	Less than 25

Fecal Coliform (MPN/100mL)	Less than 200
Un-ionized ammonia (mg/L) expressed as nitrogen, at 15°C±1°C	Less than 1.25
Total Phosphorus (mg/L)	Less than 1

Stream flow statistics are available for Boggy Creek from monitoring station located above Lake Irwin. Historical recorded data is available for the station from 1961 to 1991. Over this period, minimum daily flow rates of 0.000 m^3/s were recorded at this station on a number of days during the period of record. For a more realistic representation of the minimum flow rates to be anticipated the monthly discharges are considered. The lowest monthly discharge rate during this period is 0.018 m^3/s. Figure 4 presents monthly discharges of the station during the period of record. Under trickle discharge conditions which are anticipated to be approximately 6 L/s, the dilution rate would be close to 3:1, even if all of the treated effluent discharged from the facility were to reach this monitoring station. When minimum flow rates are experienced in the Boggy Creek, no flow would be anticipated to reach the river as most of the treated effluent would be absorbed into the soil or utilized by the vegetation within the creek.

Moderate levels of SAR in treated wastewater are not anticipated to affect the quality of water significantly in waterways. The proportion of treated wastewater to the volume of water flowing through the body of water is relatively small, resulting in a highly diluted solution. The cumulative effect of numerous sources within the watershed region should be considered in coordinating the discharge periods in order to lessen the impact on water quality. In the event that discharge is necessary during a period of low flow in the waterway, it is anticipated that any precipitated salts will be re-suspended and diluted by the next significant rainfall and corresponding flow event.

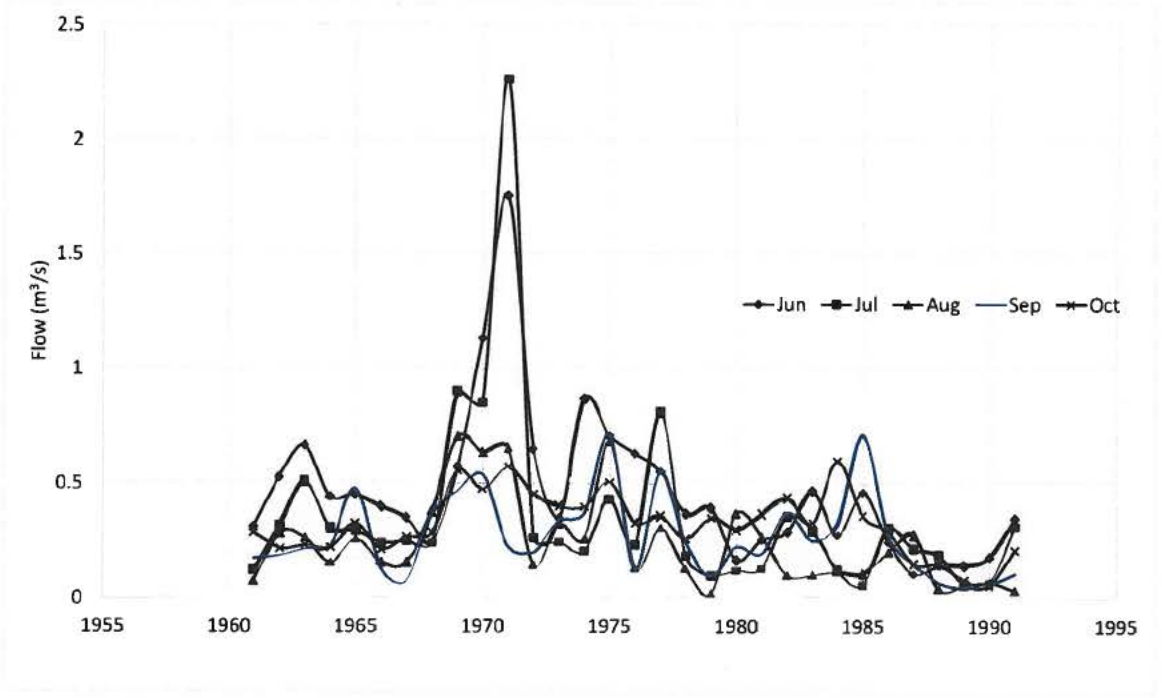


Figure 4. Average monthly flow data of Boggy Creek above Lake Irwin

The implementation of trickle discharge, except under extremely wet surface soil conditions, will in most situations prevent or minimize the amount of treated effluent from reaching the Boggy Creek, thereby further minimizing the threat to the downstream environment. During periods of increased flows, dilution of any residual constituents from the treated effluent will be afforded.

The minimum standards for effluent quality, requires that the maximum phosphorus level in the treated effluent be less than 1.0 mg/L. The colony has been made aware of this requirement and have committed to reducing the use of phosphate-based soaps in order to achieve this goal. Testing of the treated effluent for phosphorus levels prior to discharge is suggested as a means of monitoring levels. In the event that levels exceed the allowable minimum, alum may be applied to the lagoon as a means of reducing the phosphorus level in the discharge effluent stream.

Periodic removal of vegetative growth within the grassed waterway is also recommended as a means of removing the nutrient stores within the plant material in order to minimize the long-term potential for nutrient movement into the creek. Removal of this material, however, should be done in a manner that does not disturb the soil surface in order to avoid the potential for introducing sediments into the water stream. Removed material can be utilized as animal feed if of a desirable plant species or alternately recycled as organic material and applied to surrounding cropland as a source of fertilizer.

Agricultural waterways are generally classified into five fish habitat types (A, B, C, D or E) based on gross measurements of fish habitat complexity and the fish species presence (Melani, 2013). Type E habitat typically has insufficient flow duration for fish to complete one or more of their life processes (spawning, rearing, feeding, over wintering or migration) and provides indirect fish habitat whereas type A habitat includes those fish with sport or commercial fishery value, and includes species at risk.

It has been determined that type A fish habitat exists in the Boggy Creek (Figure 5). As this habitat represents potential spawning grounds, discharge of treated wastewater during the spawning period is not recommended. It is generally accepted that discharge after June 15th will mitigate any negative effects on fish spawning.

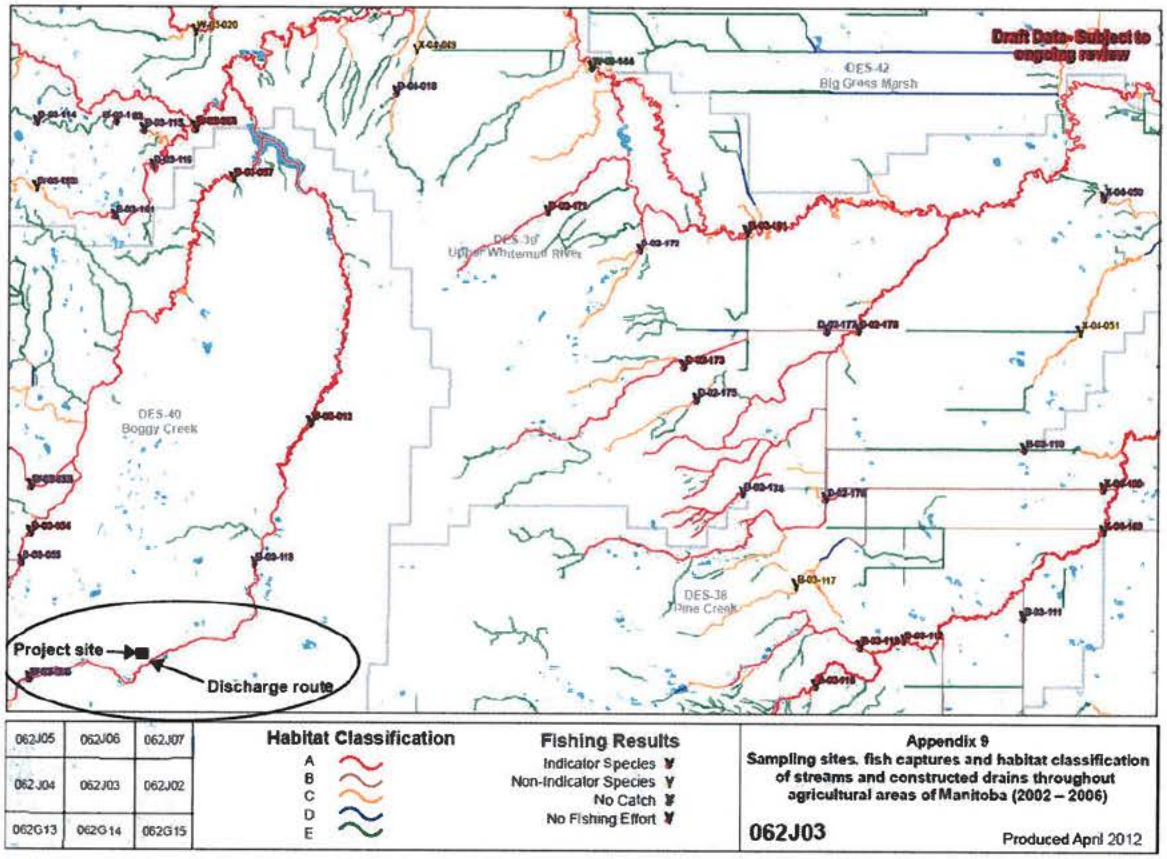


Figure 5. Fish habitat classification of Boggy Creek downstream of the proposed site

8.3 Impact on Groundwater

Construction methods to be utilized in constructing the lagoon will limit potential seepage losses to a minimum. The HDPE plastic liner within the proposed lagoon will adequately

protect the sub-surface groundwater resources beneath the facility. For this reason, the impact on groundwater is considered negligible.

8.4 Impacts on Wildlife, Forestry and Heritage Resources

Presently the land at the proposed construction site is used for agricultural production of annual crops. Consequently, the construction of this wastewater treatment facility does not represent a significant threat to wildlife habitat or forest. The construction will not disturb either the landscape or fisheries habitat in any way. Our inquiry with Manitoba Conservation Data Centre (Appendix D) revealed that there are no listed or tracked rare species occurrences found within the quarter section of the proposed site at this time.

Contact was made with Manitoba Historic Resources Branch to determine if heritage resources exist within the project area. The Branch has indicated that the proposed development site is situated along a major riverine travel corridor along which archaeological and sites of a sensitive nature have been previously reported. These factors, although not exclusive to the analysis, indicate a reason to believe that any future planned ground disturbance, activity, and/or development within the area has the potential to impact heritage resources, therefore, the Historic Resources Branch has concerns. As a result, the Branch required the proponent to apply for a heritage permit and conduct a heritage resource impact assessment (HRIA) and mitigation, prior to the project's start. Correspondence with the Heritage Resources Branch is included in Appendix D.

Therefore, the proponent has retained the services of a consulting agent (Western Heritage) to conduct a Heritage Resources Impact Assessment of the proposed lagoon and provide a report on any findings. Results of this HRIA will be shared with the Manitoba Environment and Climate once they are available.

8.5 Gasoline and Associated Product Storage

No storage of gasoline or associated petroleum products are expected on site due to the proposed development. Refueling and storage of petroleum products will be done within the developed yard site far from the proposed lagoon, and is to maintain a minimum 100 m setback from any waterway.

8.6 Socio-economic Implication

As no significant environmental impacts are anticipated, no socio-economic implications are likely. Construction of the proposed facility will in fact generate economic opportunities for local contracts, having a beneficial impact.

9 Maintenance and Inspection

9.1 General Maintenance

Synthetic liners require routine inspections to identify and repair punctured areas to protect leakage of wastewater. Damaged areas identified during routine inspections are exposed carefully by removing the soil cover and patched according to the manufacturer's specifications. The repaired area of the liner needs to be covered with soil and the project engineer should inspect all repairs and either approve the repairs or require additional protection such as erosion protection at inlet pipes, transfer lines, or agitator pads and protection from wheel damage. Moreover, lagoon embankments should be inspected for signs of animal burrowing activity.

9.2 Monitoring Requirements

Operation of the lagoon is relatively self-sufficient, however regular inspections are required to ensure operation and water flows are occurring as designed.

During moderate temperature when the lagoon surface is free of ice, it should be noted whether the wastewater introduced into the primary cell is dispersed evenly or whether it is short-circuiting to the cross-over into the secondary cell. Odor levels are to be assessed and if excessive, the cause of the odors determined and rectified. General condition of the embankments and any rip-rap should also be assessed for damage from wind and wave action and repaired as necessary.

Winter monitoring is limited to checking for frozen piping and verifying that the cross-over piping between the cells is not frozen. This can be accomplished by comparing that the water levels in the cells are the same.

10 Construction Schedule

It is proposed that construction would begin as soon as the Environment Licence has been granted and weather conditions are favorable. For practical purposes, construction would occur between May 1st and October 31st to avoid contending with frozen soil and freezing conditions.

11 Funding

Construction of the domestic lagoon will be funded primarily by Sprucewood Colony. However, a grant may be requested from the Canada/Manitoba Infrastructure Program to potentially recover some of these costs.

12 Decommissioning Plan

The Colony proposes to implement the decommissioning plan outlined below immediately upon commissioning of the proposed wastewater treatment lagoon. The proposed decommissioning plan for the existing wastewater treatment lagoon comprises of the following steps:

1. transferring wastewater and sludge from the existing lagoon to the primary cell of the new lagoon;
2. leveling the site of the existing lagoon to its original grade.

First, wastewater remaining in the existing lagoon will be pumped out by a registered sewage hauler and transferred to the primary cell of the new lagoon. Once the liquid wastewater is removed from the lagoon, the sludge from the existing lagoon will be removed and transported to the primary cell of the new lagoon. Lastly, the existing lagoon site will be levelled to its original grade by a suitable contractor.

13 References

Agriculture and Agri-Food Canada (2000). Soils and Terrain, An introduction to the land resource Rural Municipality of Lansdown – Information Bulletin 99-37 http://sis.agr.gc.ca/cansis/publications/surveys/mb/mbrm525/index.html.

FAO (2009). The state of food and agriculture. *Rome*, Italy.

Hydrogeology Section (1985). Hydrogeology of the Manitoba Escarpment Region. Manitoba Water Stewardship. 64pp. Available at: http://www.gov.mb.ca/conservation/waterstewardship/reports/groundwater/resources2/hydro_mb_escarpment.pdf

Milani, D.W. 2013. Fish community and fish habitat inventory of streams and constructed drains throughout agricultural areas of Manitoba (2002-2006). Can. Data Rep. Fish. Aquat. Sci. 1247: xvi + 6,153 p.

Nichols, D. (2012). Fact Sheet for State Waste Discharge Permit ST0008072 – Tidy Truck Wash, Inc. Wallula Facility. Feburary 3, 2012. 27pp.
ttps://fortress.wa.gov/ecy/wqreports/public/f?p=110:1000:2300249960119429::NO:RP:P1000_FACI LITY_ID,P1000_FACILITY_NAME:21056,TIDY%20TRUCK%20WASH,%20INC.

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The Weather Network (2015). Farmzone - Historical Search for the Portage - Carman - Holland, Manitoba. http://www.farmzone.com/

Thiboumery, Arion and Jepsen, Kristine (2009). Beef and Pork Whole Animal Meat Buying Guide. Iowa State University, Extension and Outreach.

14 Appendix A – Certificate of Title

STATUS OF TITLE

Manitoba Land Titles Registry

Title Number 1572344/2
Title Status Accepted
Client File

1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

BROOKDALE HOLDING CO. LTD.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON IN THE FOLLOWING DESCRIBED LAND,

NE 1/4 17-12-15 WPM.

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act*.

2. ACTIVE INSTRUMENTS

Instrument Type:	Caveat
Registration Number:	1198808/2
Instrument Status:	Accepted
Registration Date:	2007-03-27
From/By:	MTS ALLSTREAM INC.
To:	BRENDA MATTE, AS AGENT
Amount:	
Notes:	ELY 12M
Description:	RIGHT-OF-WAY AGREEMENT DATED FEB 20, 2007

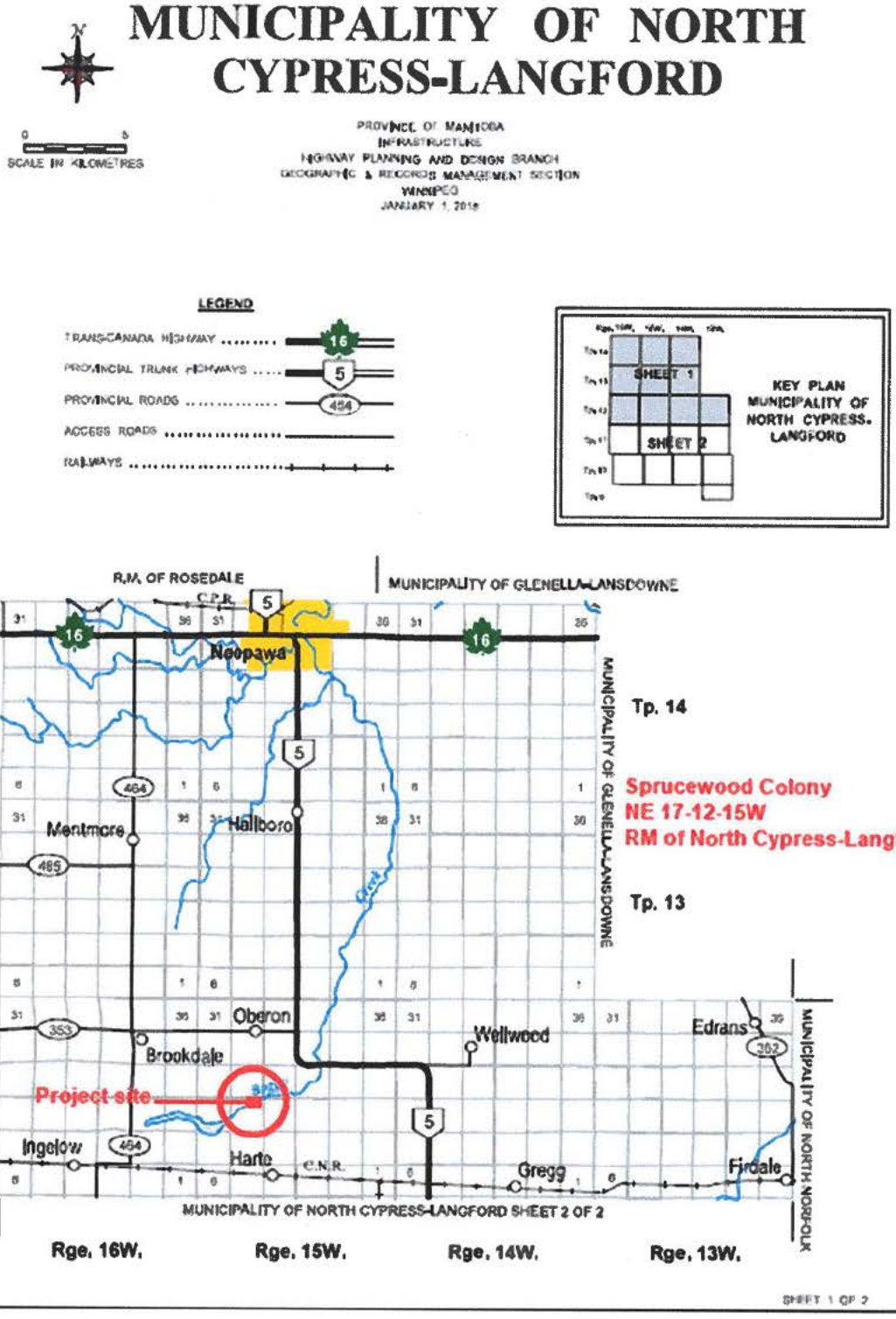
Instrument Type:	Mortgage
Registration Number:	1340133/2
Instrument Status:	Accepted
Registration Date:	2013-06-24
From/By:	BROOKDALE HOLDING CO. LTD.
To:	CANADIAN IMPERIAL BANK OF COMMERCE
Amount:	$14,000,000.00
Notes:	No notes
Description:	No description

3.	**ADDRESSES FOR SERVICE** BROOKDALE HOLDING CO. LTD. C/O BAKER, ZIVOT & CO 306 - 211 PORTAGE AVE WINNIPEG MB R3B 2A2
4.	**TITLE NOTES** No title notes
5.	**LAND TITLES DISTRICT** Brandon
6.	**DUPLICATE TITLE INFORMATION** Duplicate not produced
7.	**FROM TITLE NUMBERS** 121944/2 All
8.	**REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS** No real property application or grant information
9.	**ORIGINATING INSTRUMENTS** Instrument Type: Request To Issue Title - Internal Registration Number: 1043445/2 Registration Date: 1998-05-08 From/By: BRANDON L.T.O. - INTERNAL To: Amount:
10.	**LAND INDEX** NE 17-12-15W

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE SYSTEM OF TITLE NUMBER 1572344/2

15 Appendix B – Location of the proposed development

MUNICIPALITY OF NORTH CYPRESS-LANGFORD



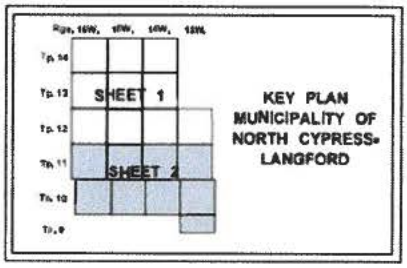
MUNICIPALITY OF NORTH CYPRESS-LANGFORD

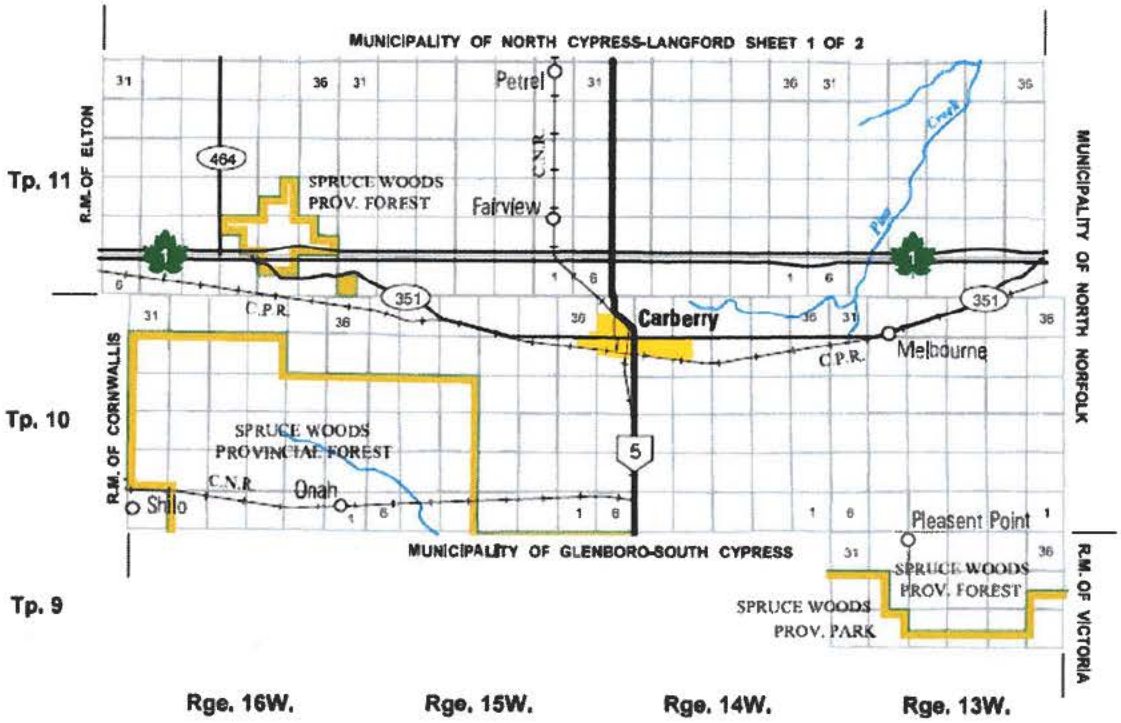
0 5
SCALE IN KILOMETRES

PROVINCE OF MANITOBA
INFRASTRUCTURE
HIGHWAY PLANNING AND DESIGN BRANCH
GEOGRAPHIC & RECORDS MANAGEMENT SECTION
WINNIPEG
JANUARY 1, 2015

LEGEND

TRANS-CANADA HIGHWAY 1
PROVINCIAL TRUNK HIGHWAYS 5
PROVINCIAL ROADS 351
ACCESS ROADS .....
RAILWAYS .....





SHEET 2 OF 2

16 Appendix C – Bore hole log information

South-Man Engineering

15-1599 Dugald Road
Winnipeg, MB R2J 0H3

Phone: 204.668.9652
Fax: 204.668.9204
E-mail: sme@southmaneng.com

TEST HOLE LOGS

For: Sprucewood Colony
Operation: Manure Storage Lagoon
Location: N1/2 17-12-15W
RM: North Cypress-Langford
City/Town, Prov.: Brookdale, Mb

Test Hole Logs by: Peter Grieger, P. Eng.
Drilling Performed by: Paddock Drilling Ltd
Date: January 25, 2018

Test hole # 1	**125 m east side existing lagoon**
0-6"	Top soil, sandy silty
6"-2'	Sand, silty frozen to 2'
2'-5'	Sandy clay, med/low plastic, silty
5'-10'	Med/fine sand, dry
10'-17'	Med/fine sand, slight silt, wet @ 12.5', no oxidation above
17'-20'	Med/coarse sand, wet, oxidized, sloughed @ 13', no water after 1 hour

Test hole # 2	**125 m east of #1**
0-5'	Silty sand, dry
5'-10'	Sand, slight silt, med/fine sand
10'-15'	Med/coarse sand, dry, oxidation below 12'
15'-20'	Med sand, wet below 15.5'
	hole sloughed @ 15.5', no water above

Test hole # 3	**125 m east of #2**
0-6"	Top soil
6"-5'	Silty sand
5'-10'	Sand med/fine, dry
10'-15'	Sand med/fine, wet below 13', no oxidation
15'-20'	Sand med/fine, wet
	Sloughed to 14', no water above

Test hole # 4	**200 m east of #3**
0-6"	Top soil
6"-2.5'	Silty sand, dry, fine
2.5'-5'	Silty clay, stiff, low plastic
5'-10'	Med/fine sand, dry
10'-15'	Med/fine sand, wet below 14', no oxidation above
15'-20'	Med sand, wet, black inclusions appears organic
	Sloughed to 16', no water

17 Appendix D – Correspondences

Information about historical record of licensed surface water users

Licensed surface water users-Sprucewood Colony

2 messages

Desalegn Edossa <desalegn.southmaneng@gmail.com> Wed, May 13, 2020 at 12:56 PM
To: "Butterfield, Tamara (SD)" <Tamara.Butterfield@gov.mb.ca>

Hi Tamara,

I am contacting you for information regarding licensed surface water users downstream of a proposed domestic wastewater treatment lagoon. We are in the process of preparing a proposal for Environment Act Licence for the construction and operation of a Wastewater Treatment Lagoon for Sprucewood Colony located on NW 17-12-15W in the Rural Municipality of North Cypress-Langford. The Colony is planning to discharge the treated effluent to Boggy Creek via a swale to be constructed in the adjacent agricultural land. Could you please provide us with information if there are licensed surface water users up to 3 km downstream of the development site. Location map of the proposed lagoon is attached.

Regards,

--

Desalegn Edossa (D.Eng., EIT)
South-Man Engineering,
8-851 Lagimodiere Blvd,
Winnipeg, MB R2J 3K4

Project location.pdf
178K

Butterfield, Tamara (CC) <Tamara.Butterfield@gov.mb.ca> Thu, May 14, 2020 at 8:20 AM
To: Desalegn Edossa <desalegn.southmaneng@gmail.com>

Hi Dasalegn

As per your request and map, there is one registered/licensed surface water project in our database on the route indicated. This is an irrigation project. The project would be on the edge of the 3 km route.

Please note, that we do not licence a project if the water use associated with the project falls below the domestic exemption category (< 25 000 Litres/day). Therefore, we would not have any records of domestic users in the area of interest.

Let me know if you need anything else.

Tamara

Cell 204-918-6273

Information about historical record of flooding in the area

Flooding History-SpruceWood Colony DL

4 messages

Desalegn Edossa <desalegn.southmaneng@gmail.com> Tue, May 12, 2020 at 9:07 AM
To: "Belton, Robert (MI)" <Robert.Belton@gov.mb.ca>

Hi Robert,

Could you please provide us with information if there is any flooding history at a proposed wastewater treatment lagoon site (see attached location map).

Regards

--

Desalegn Edossa (D.Eng., EIT)
South-Man Engineering,
8-851 Lagimodiere Blvd,
Winnipeg, MB R2J 3K4

Project location.pdf
178K

Belton, Robert (MI) <Robert.Belton@gov.mb.ca> Tue, May 12, 2020 at 9:09 AM
To: Desalegn Edossa <desalegn.southmaneng@gmail.com>
Cc: "+WPG1166 - MIT Water Review (MI)" <MITWaterReview@gov.mb.ca>

Good morning Desalegn,

I am no longer with Water Management, Planning and Standards. Please contact my former colleagues at MITwaterreview.ca who can help you out with the FPL.

Regards,

Robert Belton

A/Supervisor of Recovery & Assessments

Manitoba Emergency Measures Organization

1525-405 Broadway | Winnipeg, MB | R3C 3L6

204-794-6020

Project location.pdf
178K

+WPG1166 - MIT Water Review (MI) <MITWaterReview@gov.mb.ca> Sun, May 17, 2020 at 3:42 PM
To: Desalegn Edossa <desalegn.southmaneng@gmail.com>

Hi Desalegn,

Unfortunately I have no flood risk information for Boggy Creek. I apologise.

Thank you,

Evan Graham

A\Senior Flood Protection Planning Officer

Water Management, Planning and Standards

Manitoba Infrastructure

Second Floor - 280 Broadway – Winnipeg, Manitoba R3C 0R8

204-794-3557 – evan.graham2@gov.mb.ca

Information about rare species in the area

Desalegn Edossa

From: Murray, Colin <Colin.Murray@gov.mb.ca>
Sent: July 4, 2023 1:37 PM
To: Desalegn Edossa
Subject: DR D Edossa SouthMan 20230613 Sprucewood colony NE-17-012-15W1
Attachments: DR D Edossa SouthMan 20230613 Sprucewood colony NE-17-012-15W1.xlsx; c_NE-17-012-15W1_qsect_buf.zip

Hi Desalegn
Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's (CDC) rare species database for your area of interest. This includes the primary location: NE-17-012-15W1; and a 2km radius buffer from the footprint boundary.

I am attaching a Microsoft Excel spreadsheet summarizing these occurrences. The spreadsheet includes scientific and common names, the provincial (SRank) rank for each species as well as the Manitoba Endangered Species and Ecosystem Act, and the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and Species at Risk Act (SARA) designations. I'm also including the GIS files used to fulfill this request.

Further information on this ranking system can be found on our website at: https://www.natureserve.org/conservation-status-assessment.
These designations can be found at:
http://web2.gov.mb.ca/laws/statutes/ccsm/e111e.php,
https://www.cosewic.ca/index.php/en-ca/ and
https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html.

Manitoba's recommended setback distances can be found at:
https://www.gov.mb.ca/nrnd/fish-wildlife/cdc/pubs/mbcdc-bird-setbacks-nov2021.pdf

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre of the Wildlife Branch at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. An absence of data does not confirm the absence of any rare or endangered species. Many areas of the province have never been thoroughly surveyed, therefore, the absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present. The information should not be regarded as a final statement on the occurrence of any species of concern, nor should it substitute for on-site surveys for species or environmental assessments. Also, because our Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request.

Please contact the Manitoba CDC for an update on this natural heritage information if more than six months passes before it is utilized.

Third party requests for products wholly or partially derived from our Biotics database must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using data from our database, as the Manitoba Conservation Data Centre; Wildlife Branch, Manitoba Natural Resources and Northern Development.

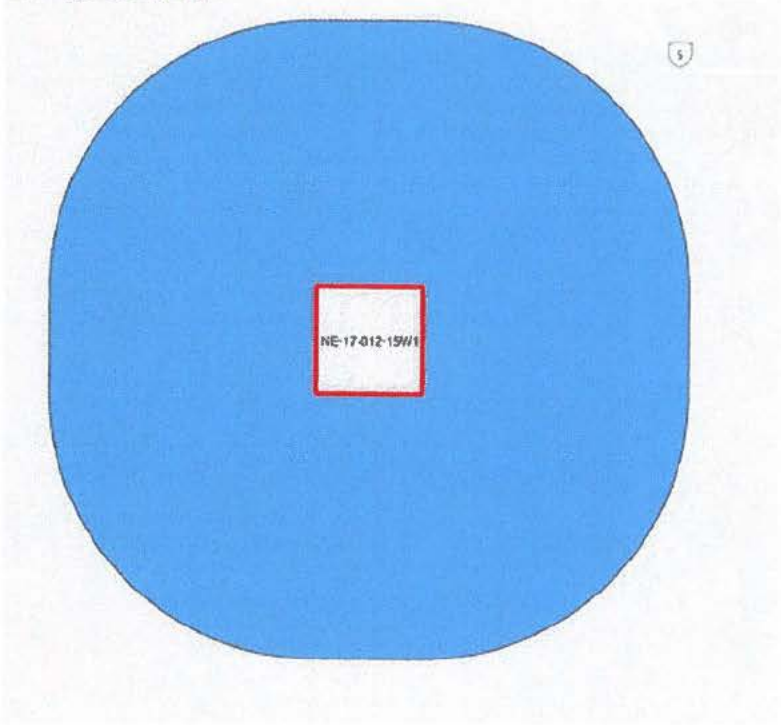
This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information contact me directly at colin.murray@gov.mb.ca or 204-914-2849.

Colin

Reference screen clip:



Colin Murray
Information Manager- Manitoba Conservation Data Centre
Wildlife Branch, Natural Resources and Northern Development
14 Fultz Boulevard, Winnipeg, MB R3Y0L6
E: colin.murray@gov.mb.ca T: 204-914-2849

-----Original Message-----
From: Form Submissions <noreply@gov.mb.ca>
Sent: June 13, 2023 10:49 AM
To: Murray, Colin <Colin.Murray@gov.mb.ca>
Subject: WWW Form Submission

Below is the result of your feedback form. It was submitted by CDC Information Request () on Tuesday, June 13, 2023 at 10:48:56

DocumentID: Manitoba_Sustainable_Development

Project Title: Sprucewood Colony Domestic Lagoon

Date Needed: 2023/06/20

Name: Desalegn Edossa

Company/Organization: South-Man Design Group Ltd

Address: 8-851 Lagimodiere BLVD

City: Winnipeg

Province/State: MB

Phone: 2049639144

Email: desalegne@southmandesign.ca

Project Description: It is proposed to construct a new wastewater treatment lagoon and we want to determine if there are rare species available on the site that can be impacted by the proposed project.

Information Requested: Information that can be utilized to determine if there are rare species available on the site that can be impacted by the proposed project.

Format Requested: Microsoft Word Document or pdf as email attachment.

Location: The proposed project is located in the RM of North Cypress-Langford on NE 17-12-15W.

action: Submit

REQUEST	SEARCH CRITERIA	SITE	SCINAME	COMNAME	S_RANK	ESEA	SARA	COSEWIC	FIRSTOBS	LASTOBS	EO_RANK	REPACC
Sprucewood colony NE-17-012-15W1	Within	NE-17-012-15W1	No listed or tracked species occurrences found at this time									
Sprucewood colony NE-17-012-15W1	Within 2km radius of site boundary of	NE-17-012-15W1	Athene cunicularia	Burrowing Owl	S1B	Endangered	Endangered	Endangered	1924-01-01	1924-01-01	H - Historical	Very Low
Sprucewood colony NE-17-012-15W1	Within 5km radius of site boundary of	NE-17-012-15W1	Athene cunicularia	Burrowing Owl	S1B	Endangered	Endangered	Endangered	1924-01-01	1924-01-01	H - Historical	Very Low
Sprucewood colony NE-17-012-15W1	Within 5km radius of site boundary of	NE-17-012-15W1	Bombus terricola	Yellow-banded Bumble Bee	S3S5		Special Conc	Special Concern	1954-07-16	1954-09-16	H - Historical	Medium
Sprucewood colony NE-17-012-15W1	Within 5km radius of site boundary of	NE-17-012-15W1	Coturnicops noveboracensis	Yellow Rail	S3B		Special Conc	Special Concern	2011-06-17	2011-06-17	E - Verified extant (via	Medium
Sprucewood colony NE-17-012-15W1	Within 5km radius of site boundary of	NE-17-012-15W1	Dolichonyx oryzivorus	Bobolink	S3S4B		Threatened	Threatened	2010-06-12	2014-06-25	E - Verified extant (via	Medium

Information about heritage sites in the area

Manitoba
Sport, Culture and Heritage

Memorandum

DATE: 2023-04-12

TO: **Desalegn Edossa**
South-Man Design Group Limited

FROM: Archaeological Assessment Services Unit
Historic Resources Branch
Main Floor – 213 Notre Dame Avenue
Winnipeg, MB R3B 1N3
T: (204) 945-2118 F: (204) 948-2384
e: HRB.archaeology@gov.mb.ca

SUBJECT: **Spruce Wood Colony Lagoon**
AAS File AAS-22-20224

Concerns

Further to your e-mail regarding the above noted application, the Manitoba Historic Resources Branch (HRB) has examined the locations in conjunction with Branch records for areas of potential concern. Notably, the development footprint is situated along a major riverine travel corridor along which archaeological and sites of a sensitive nature have been previously reported. These factors, although not exclusive to the analysis, indicate a reason to believe that any future planned ground disturbance, activity, and/or development within the area has the potential to impact heritage resources, therefore, the Historic Resources Branch has concerns.

Legislation

Under Section 12(2) of The Heritage Resources Act (the Act), if there is reason to believe that heritage resources or human remains upon or within or beneath lands are likely to be damaged or destroyed by any work, activity, development or project, then the Minister may require a proponent to apply for a heritage permit and conduct at his/her own expense, a heritage resource impact assessment (HRIA) and mitigation, prior to the project's start. As per sections 46 and 51 of the Act, there is an obligation to report any heritage resources and a prohibition on destruction, damage or alteration of said resources. A copy of this legislation can be found at this address:

- https://web2.gov.mb.ca/laws/statutes/ccsm/h039-1e.php.

A Heritage Resource Impact Assessment (HRIA) is an assessment showing the impact that proposed work is likely to have upon heritage resources or human remains. HRIAs must be conducted by a qualified archaeological consultant under a heritage permit. Please find attached a flow chart outlining the general process of an HRIA.

HRIA Expectations

The Branch will work with the proponent and its consultant to draw up terms of reference for this project. Please allow for HRIA timelines in your planning as HRIAs are conducted in snow and frost-free conditions. Any exceptions require planning and consultation with the HRB.

Please find attached an archaeological consultants' list for reference. Due diligence should be conducted in order to assess quotes, services, and timelines.

If you have any questions, please contact as above for proper assignment and queueing.

Historic Resources Branch
Archaeological Assessment Services Unit

Attachments: HRIA flowchart and list of heritage consultants

18 Appendix E – Design Drawings

Plans and Engineering by:

SOUTH-MAN
DESIGN GROUP LTD

Unit 8 - 851 Lagimodiere Blvd. Winnipeg, MB. R2J 3K4
www.southmandesign.ca
204-371-7314

Sheet List	
No.	Sheet Name
00	Cover Sheet
A1.0	General Notes
A2.0	Site Plan
A2.2	Proposed Plan
A2.2B	Proposed Cross Sections
A3.1	Inlet Piping Detail
A4.1	Trench Detail
A5.1	Ramps & Splash Pad Details
A6.1	Rebar Splice Detail
A7.1	Gas Venting Plan
A8.1	Gas Venting Details
A9.1	Gate Valve Details
A10.1	Cleanout Detail
A11.1	Lift Station Details
A12.1	Fence Details

Project Information:

NUMBER: 2303-042
LOCATION: Brookdale, MB
CLIENT: Sprucewood Colony

PROJECT NAME:
Wastewater Treatment Lagoon

DRAWN BY:	AH/RF
CHECKED BY:	DE
DATE:	09/05/23

00

Cover Sheet

GENERAL NOTES AND SPECIFICATIONS:

THIS WASTE WATER TREATMENT LAGOON AND ASSOCIATED PRODUCTS SHALL CONFORM TO ASTM AND AWWA STD. SPECIFICATIONS. ALL CONSTRUCTION SHALL CONFORM TO SPECIFICATIONS.

- STRIP ALL ORGANIC MATERIAL AND TOPSOIL FROM STORAGE SITE TO OUTSIDE TOE OF BERM. REMOVE MATERIAL TO STOCK PILE FOR USE IN LANDSCAPING IN THE FUTURE.

- PROVIDE A 0.30M DEEP X 2.44M WIDE KEYWAY BENEATH BERMS PRIOR TO STARTING CONSTRUCTION OF BERMS. REMOVE ALL TOPSOIL AND ORGANIC MATERIAL BENEATH NEW BERM CONSTRUCTION.

- INTERIOR SURFACE OF FACILITY TO CONSIST OF A 60MIL HDPE LINER (TEXTURED SHEET) WITH 0.30M THICK GRANULAR COVER MATERIAL OVERTOP OF THE SYNTHETIC LINER ON BOTTOM OF BOTH CELLS.

- CONSTRUCT BERMS IN MAXIMUM 150MM LIFTS. COMPACT EACH LIFT USING A FULLY BALLASTED SHEEPSFOOT PACKER (2400KPA OF COMPACTION PRESSURE) TO ACHIEVE 95% OF STANDARD PROCTOR DENSITY. PRIOR APPROVAL REQUIRED FOR OTHER TYPES OF PACKING EQUIPMENT.

- UNACCEPTABLE MATERIAL CONSISTING OF ORGANIC MATERIAL, FROZEN SOIL OR STONES GREATER THAN 75MM SHALL NOT BE USED IN CONSTRUCTION OF THE BERMS. CONSULT ENGINEER IF QUALITY OF MATERIAL IS QUESTIONABLE.

- THE MOISTURE CONTENT OF THE FILL MATERIAL SHALL BE SUCH THAT PROPER PACKING CAN BE ACHIEVED (0.9-1.2 OPTIMUM). MATERIAL SHOULD BE STIFF TO THE TOUCH BUT NOT CRUMBLE WHEN HANDLED. ALLOW DRYING OR PROVIDE WETTING BETWEEN CONSECUTIVE LIFTS AS REQUIRED.

- THE FINISHED INTERIOR SURFACE OF STORAGE SHALL BE LEVELED AND PROOF ROLLED WITH A SMOOTH DRUM VIBRATORY ROLLER TO CONCEAL ALL STONES, GRAVEL AND POTENTIALLY SHARP OBJECTS.

- WHERE SHARP OBJECTS OR STONY MATERIAL IS STILL PRESENT ON INTERIOR SURFACE OF STRUCTURE, EITHER A 76MM LAYER OF CLEAN SAND OR 12OZ. NON-WOVEN GEOTEXTILE SHALL BE INSTALLED OVER THE INTERIOR SURFACE LAYER TO PROTECT THE HDPE LINER FROM PUNCTURE OR ABRASION.

- ACCESS RAMPS AND SPLASH PADS TO BE CONSTRUCTED USING 0.15M REINFORCED CONCRETE, C/W 10M @ 0.40M O/C BOTH WAYS. ACCESS RAMPS TO HAVE 0.15M WIDE BY 0.30M HIGH RAISED CURB ALONG EDGES. INSTALL 12OZ. NON-WOVEN GEO-TEXTILE OVER LINER WHERE CONCRETE IS TO BE POURED FOR RAMPS AND PADS.

- MINIMUM SPLICE LENGTH FOR 10M BARS TO BE 0.45M.

- ALL CONCRETE TO BE 25MPa TYPE 10 W/5-8% AIR ENTRAINMENT.

- CONCRETE PLACED IN COLD WEATHER (BELOW 0°C AIR TEMP. AND WINDCHILL) SHALL BE PROTECTED WITH INSULATED TARPS. BELOW -3°C CONCRETE IS TO BE HEATED TO MAINTAIN 10° CELSIUS FOR A MINIMUM OF TWO DAYS AFTER PLACEMENT. REMOVE INSULATION AND HEATING GRADUALLY TO AVOID THERMAL SHOCK.

- INSTALL FENCE AROUND ENTIRE PERIMETER OF WASTE WATER LAGOON AS PER DETAIL ATTACHED.

- SIGNAGE SHALL BE PROVIDED INDICATING THAT POTENTIAL FOR DANGER EXISTS.

- SEED BERMS WITH GRASS TO PREVENT LONG TERM EROSION.

- SYNTHETIC LINER MATERIAL SPECIFICATION: 60MIL PREMIUM GRADE HDPE GEOMEMBRANE (TEXTURED SHEET) OR EQUIVALENT.

- SYNTHETIC LINER INSTALLATION TO BE IMPLEMENTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALLATION OF THE HDPE LINER SHALL BE CONTINUOUSLY SUPERVISED BY A QUALIFIED INSTALLATION SUPERVISOR. PROOF OF CERTIFICATION OR TRAINING REQUIRED UPON DEMAND.

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ISSUED FOR CONSTRUCTION

CLIENT NAME: Sprucewood Colony	PROJECT LOCATION: Brookdale, MB	PROJECT NAME: Wastewater Treatment Lagoon
SOUTH-MAN DESIGN GROUP LTD	PROJECT NUMBER: 2303-042	A1.0
	DRAWN BY: AH/RF	
	CHECKED BY: DE	General Notes
	DATE: 09/05/23	

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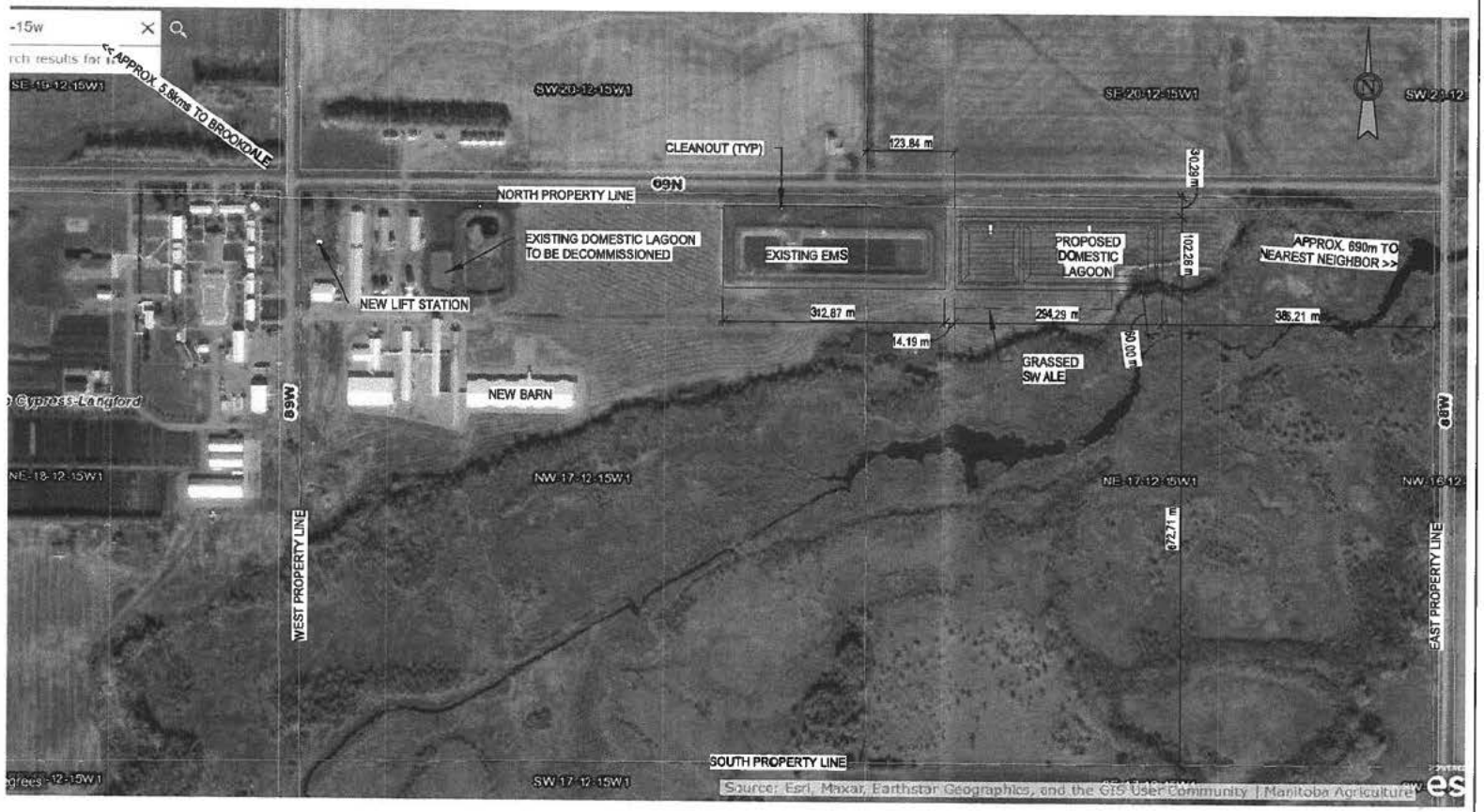

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CLIENT NAME:	**Sprucewood Colony**
PROJECT LOCATION:	**Brookdale, MB**
PROJECT NAME:	**Wastewater Treatment Lagoon**
PROJECT NUMBER:	2303-042
DRAWN BY:	AH/RF
CHECKED BY:	DE
DATE:	**09/05/23**
	A2.0
	Site Plan

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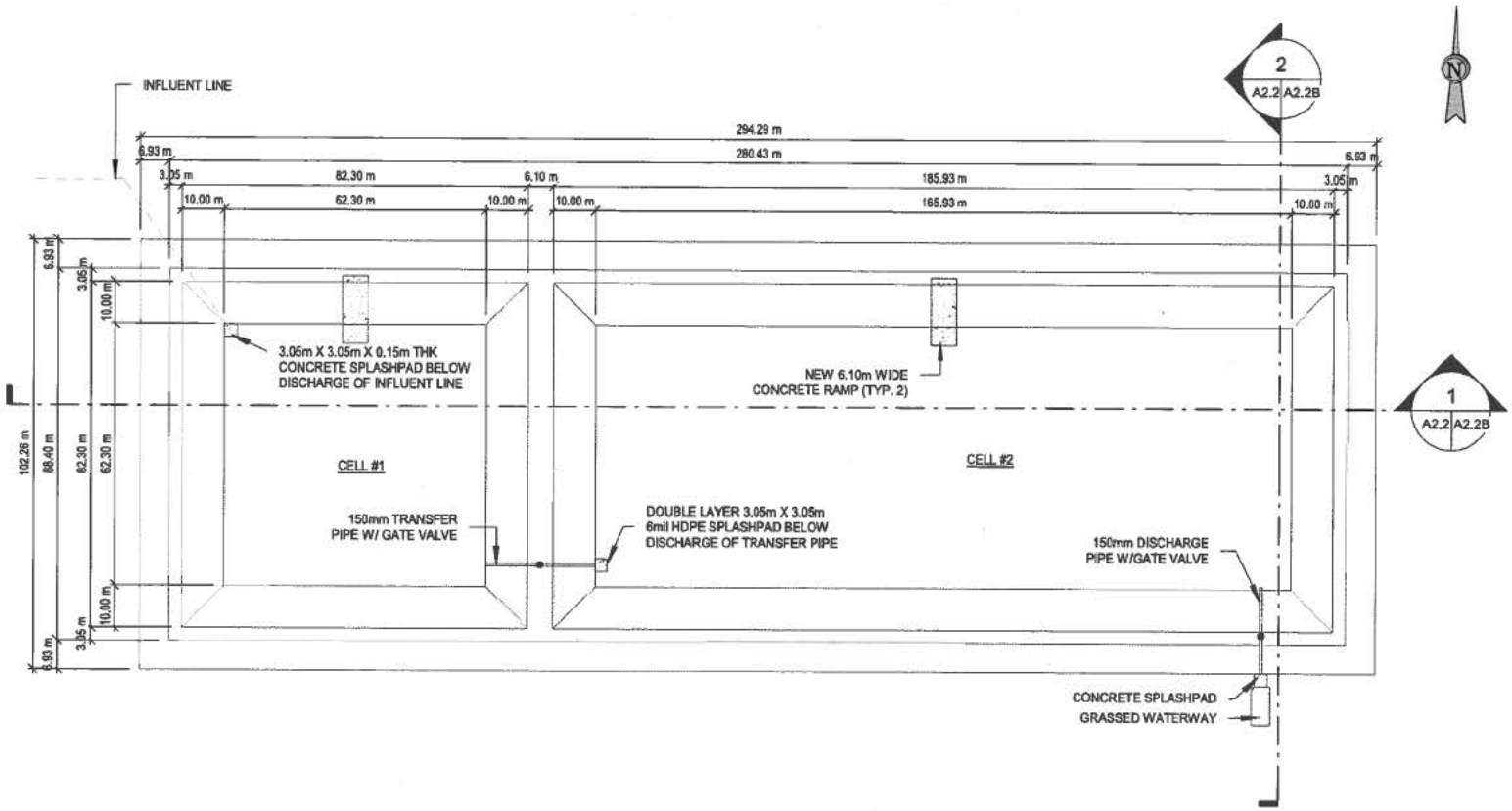

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PROJECT LOCATION:	**Brookdale, MB**
PROJECT NAME:	**Wastewater Treatment Lagoon**
PROJECT NUMBER:	2303-042
DRAWN BY:	AH/RF
CHECKED BY:	DE
DATE:	**09/05/23**
	A2.2
	Proposed Plan

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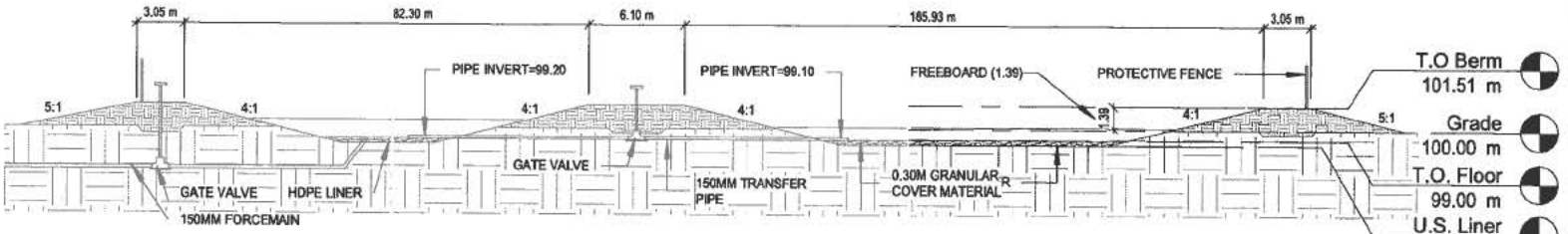
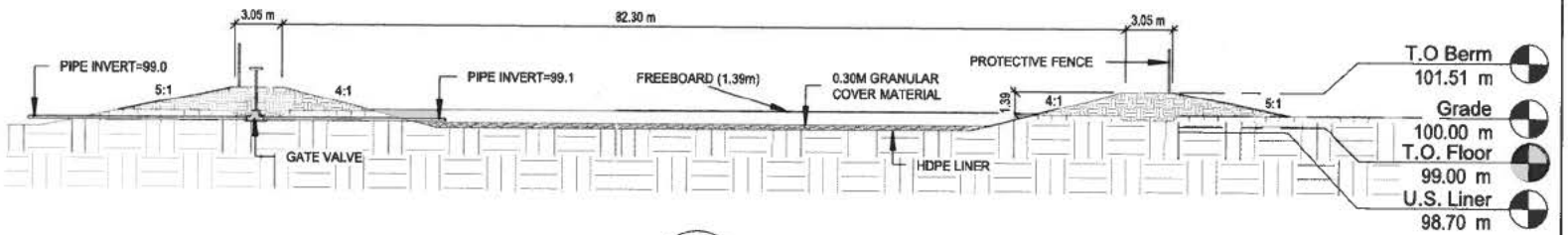


1 (A2.2 | A2.2B) Section 1
1 : 384



2 (A2.2 | A2.2B) Section 2
1 : 384

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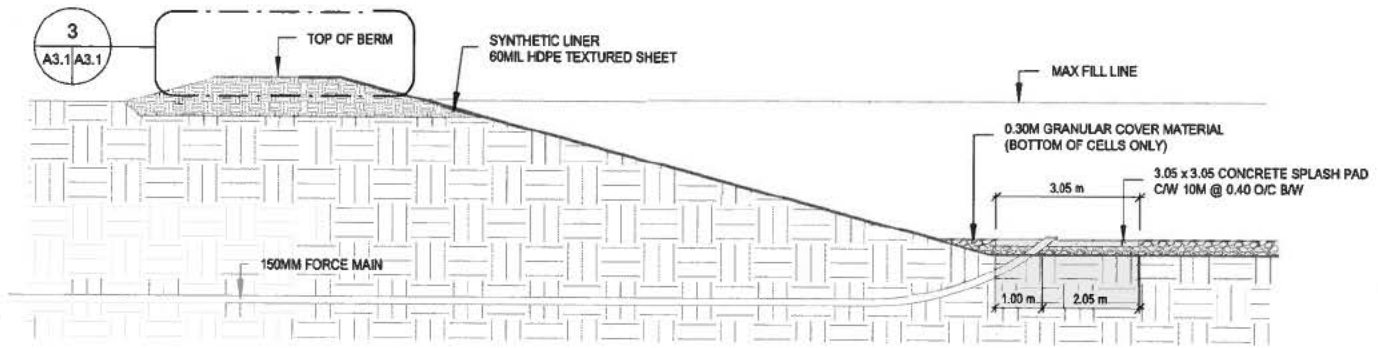
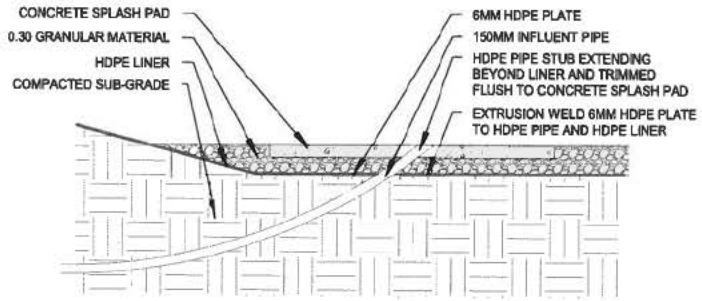
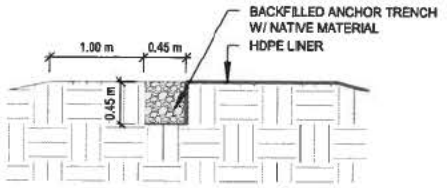
PROJECT NAME: Wastewater Treatment Lagoon	
A2.2B	
Proposed Cross Sections	



Inlet Piping Detail - Side View
1 : 128



Inlet Piping Detail
1 : 64



3 / A3.1 **Anchor Trench Detail**
1 : 64

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PIPING GENERAL NOTES:

1. ALL PIPELINE CONSTRUCTION AND PRODUCTS INCORPORATED INTO PROJECT SHALL CONFORM TO ASTM AND AWWA STANDARD SPECIFICATIONS.

2. INSTALLATION TO CONFORM WITH PIPE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

3. FROZEN MATERIAL SHOULD NOT BE USED TO SUPPORT OR BED THE PIPE.

4. AT LEAST 1.2M OF BEDDING MATERIAL SHOULD BE PLACED UNDER THE PIPE IF ROCKY CONDITIONS EXIST. PROJECTING BELLS OF THE PIPE SHOULD BE PROPERLY RELIEVED IN THE TRENCH BOTTOM SO THAT THE ENTIRE PIPE IS EVENLY SUPPORTED BY THE BEDDING.

5. DO NOT THROW THE PIPE & FITTINGS INTO THE TRENCH, OR ALLOW ANY PART OF THE PIPE TO TAKE AN UNRESTRAINED FALL ON TO THE TRENCH BOTTOM.

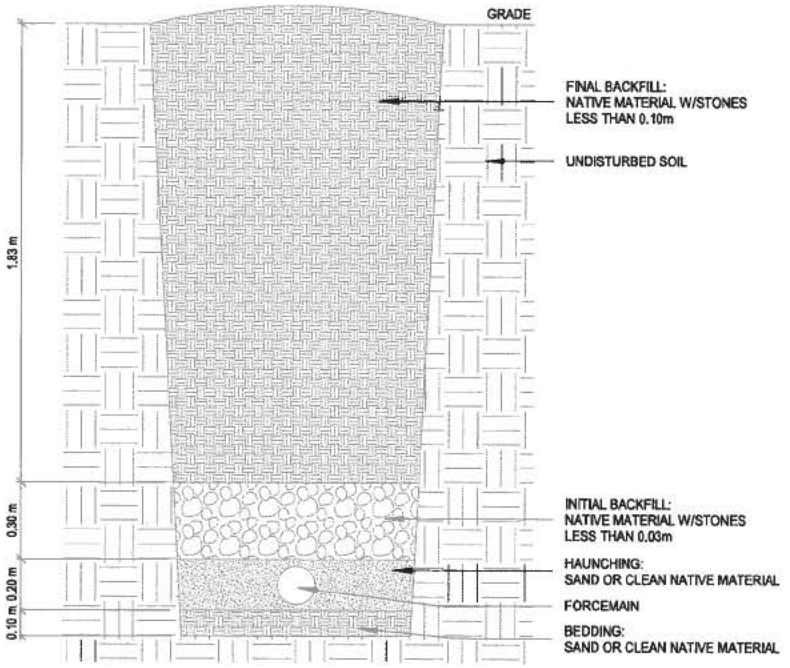
6. PIPE MACHINING & CHAMFERING:
   PIPE SHOULD BE CUT AS SQUARE AS POSSIBLE AND CHAMFERED SIMILAR TO THE PIPE SUPPLIED FROM THE FACTORY.

7. WHERE THE PIPE LINE EXPERIENCES CHANGES IN DIRECTION, THUST BLOCKS CONSISTING OF CONCRETE TO BE INSTALLED. MINIMUM THRUST BLOCK AREA IS 1.8 SQ.M.. CONCRETE USED FOR THRUST BLOCKS ARE TO HAVE A MIN. 28 DAY COMPRESSIVE STRENGTH OF 15MPA. CONCRETE SHALL BE SULPHATE RESISTANT (TYPE GU/TYPE 10 CEMENT), AND FOLLOW THE CURRENT CSA STANDARD A23.1. WATER USED FOR CONCRETE SHALL BE CLEAN AND EQUAL TO POTABLE (DRINKABLE) WATER IN PHYSICAL AND CHEMICAL PROPERTIES.

8. PRESSURE PIPE & FITTINGS TO MEET THE FOLLOWING STANDARDS
   CANADIAN STANDARDS ASSOCIATION
   B137.2 RIGID PVC PIPE FOR PRESSURE APPLICATIONS
   B137.3 LARGE DIAMETER FABRICATED FITTINGS
   AMERICAN WATER WORKS ASSOCIATION
   AWWA C900 PVC PRESSURE PIPE, 1.2M THROUGH - 3.7M FOR WATER
   AWWA C907 PVC PRESSURE FITTINGS FOR WATER - 1.2M THROUGH 3.7M
   ASTM D2241 PVC PRESSURE RATED PIPE (SDR SERIES) OR DR17 HDPE PIPE
   PIPING: DR17 HDPE UNLESS NOTED OTHERWISE

9. ALL UNDERGROUND PIPING IS TO BE PRESSURE TESTED TO ENSURE THE INTEGRITY OF THE PIPE AND CONNECTIONS. THE PRESSURE TEST SHALL BE CARRIED OUT AT 700KPA PRESSURE WITH PRESSURE DROP OVER 1HR PERIOD NOT TO EXCEED 1.5%.

10. CLEANOUTS TO BE PROVIDED ON PIPELINE AT MAXIMUM 300m (1000 ft) INTERVALS.



Trench Detail
1 : 24

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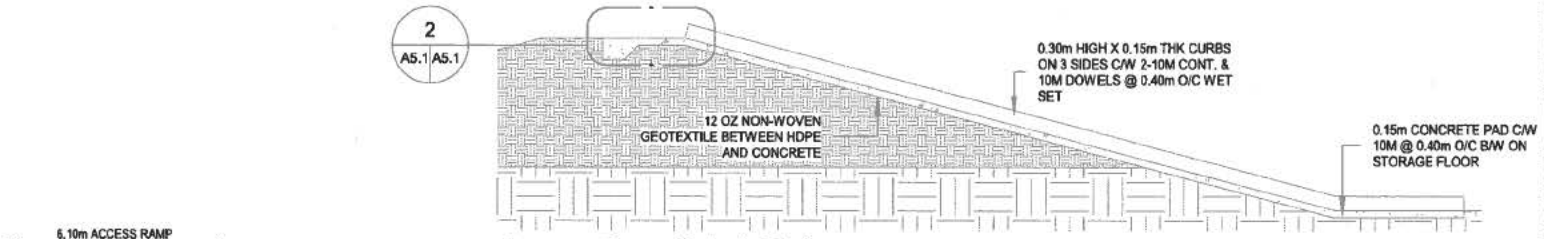
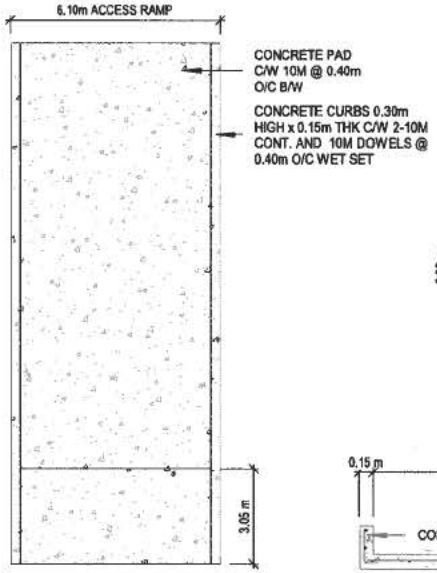
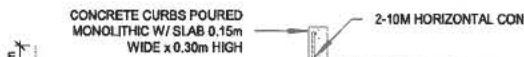


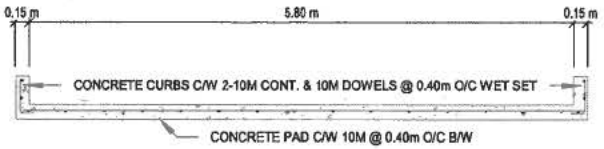
Access Ramp-Splash Pad - Side View
1 : 128



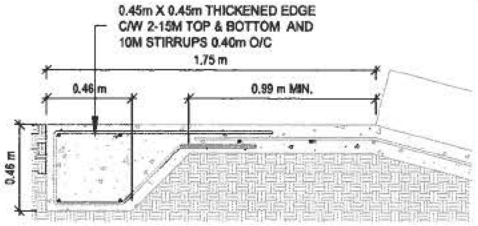
Access Ramp-Splash Pad - Top View
1 : 192



Access Ramp-Splash Pad Curbs - Cross Section Detail
1 : 48



Access Ramp-Splash Pad - Cross Section Detail
1 : 64



Access Ramp-Splash Pad - Anchorage Detail
1 : 32

NOTE: EPOXY COATED DOWELS REQUIRED ONLY IF CURBS NOT POURED MONOLITHIC W/ SLAB.

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SOUTH-MAN DESIGN GROUP LTD	PROJECT NUMBER: 2303-042	A5.1
	DRAWN BY: AH/RF	
	CHECKED BY: DE	Ramps & Splash Pad Details
	DATE: 09/05/23	

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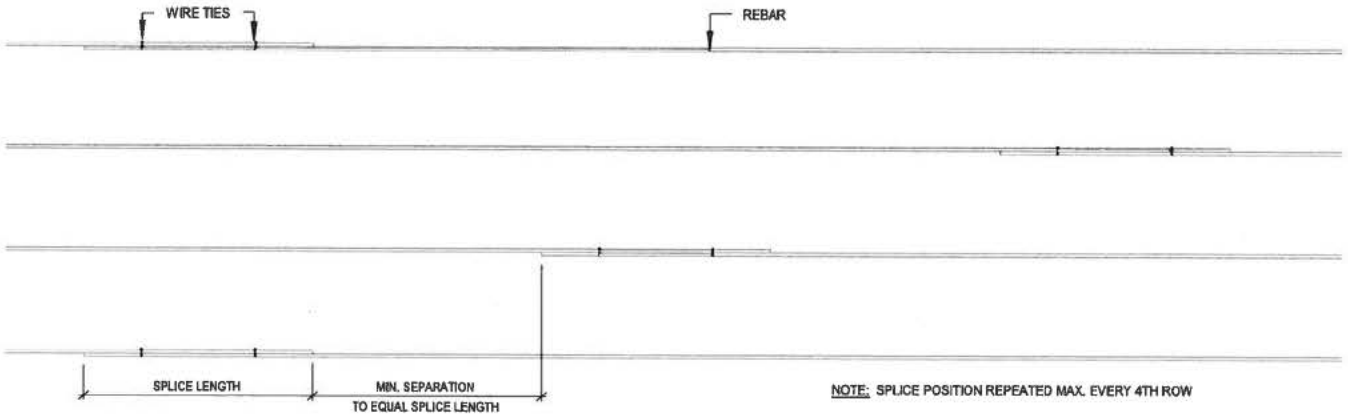

Rebar Splice Detail
1 : 24

NOTE:
-SPLICE POSITION REPEATED MAX. EVERY 4th ROW;
-ALTERNATELY IF SPLICES ALIGNED INCREASE SPLICE LENGTH BY 50% (10M-0.70, 15M-0.90);

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CLIENT NAME: Sprucewood Colony	PROJECT LOCATION: Brookdale, MB	PROJECT NAME: Wastewater Treatment Lagoon
SOUTH-MAN DESIGN GROUP LTD	PROJECT NUMBER: 2303-042	A6.1
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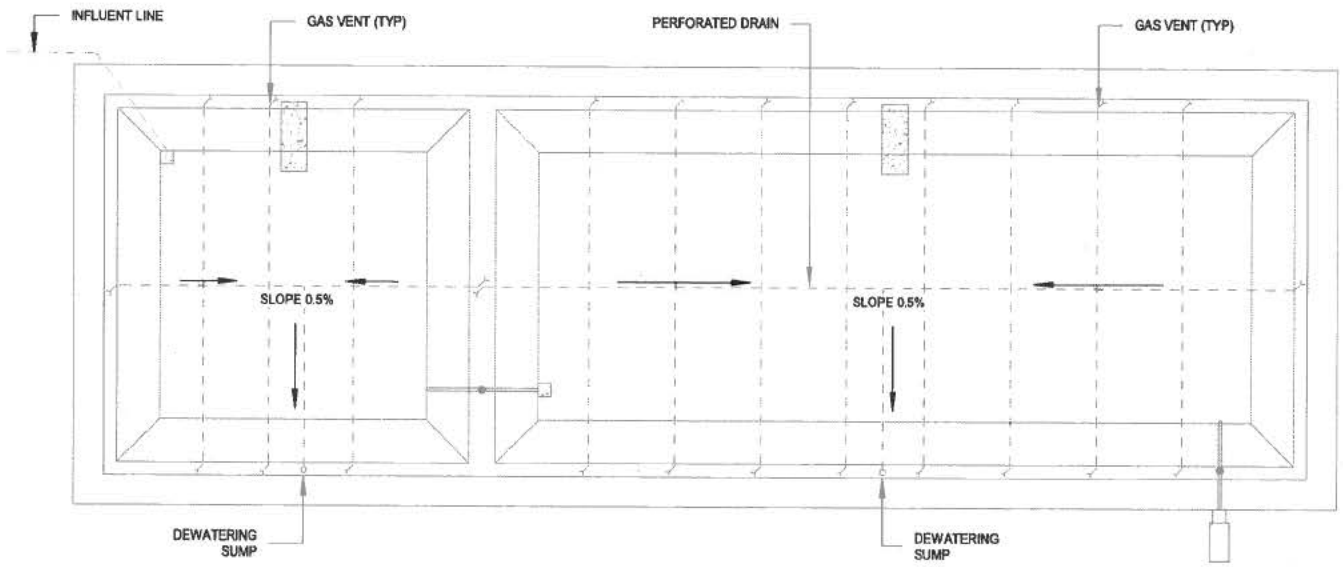
	DATE: 09/05/23	



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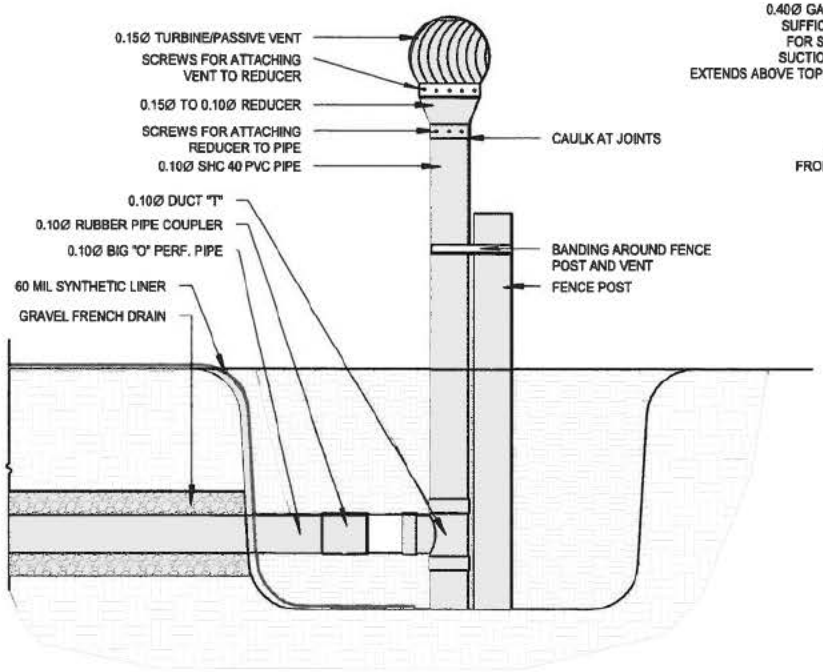
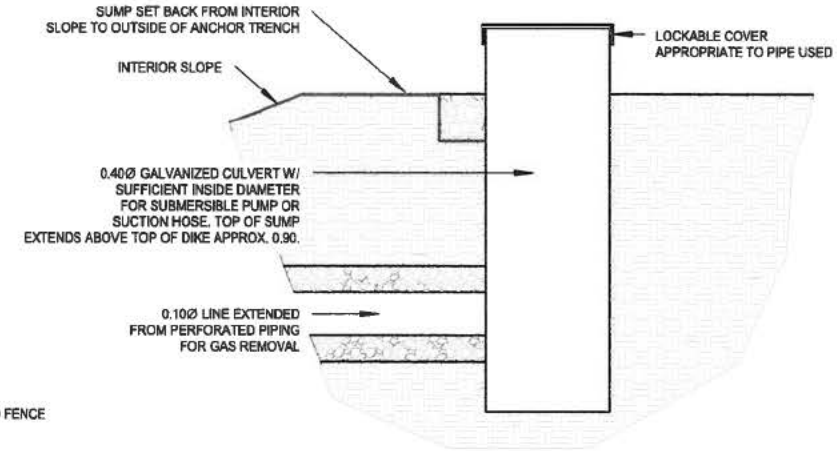
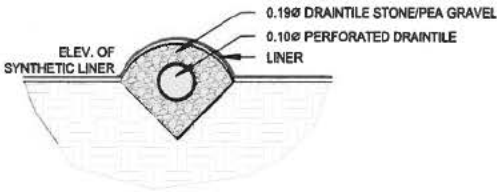


Gas Venting Detail
1 : 96



Dewatering Sump Detail
1 : 96



Gas Removal V-Trench Detail
1 : 96

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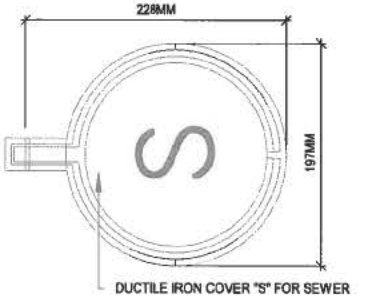

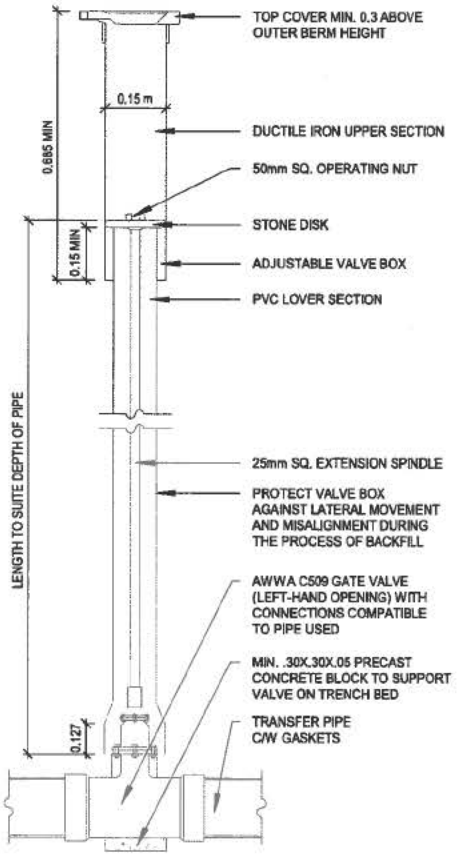

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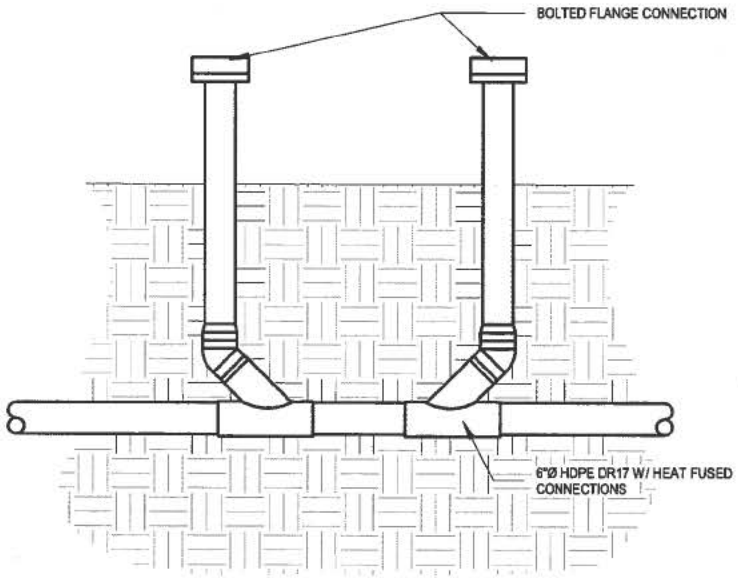

Cleanout Detail

1 : 24

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	CHECKED BY: DE	**Cleanout Detail**
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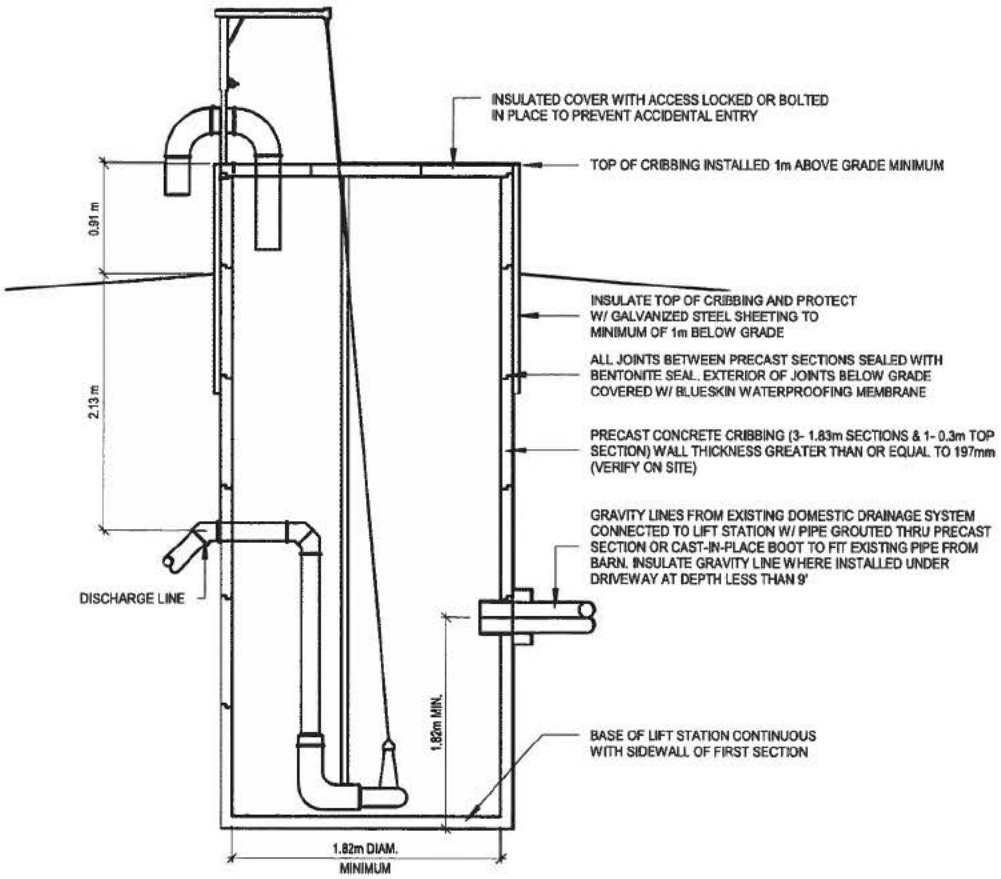

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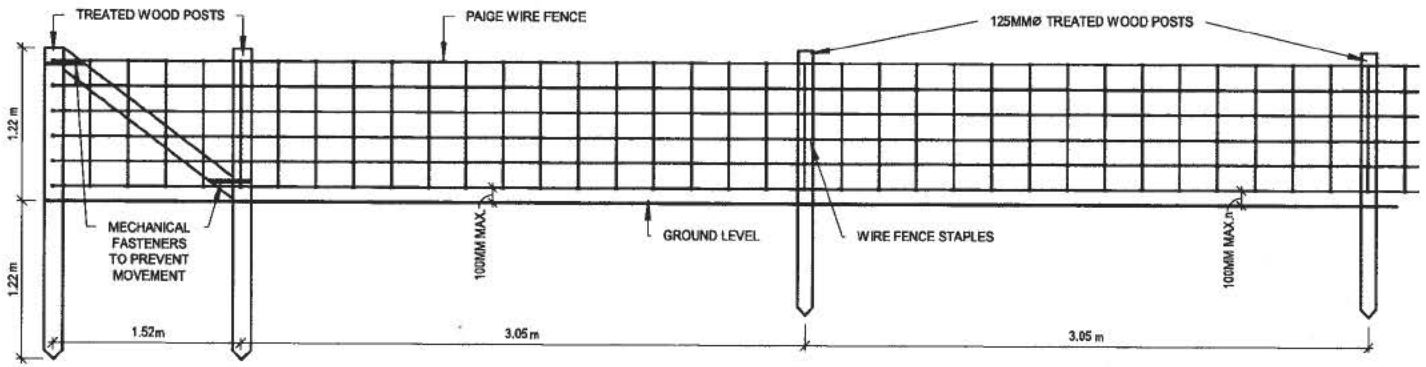

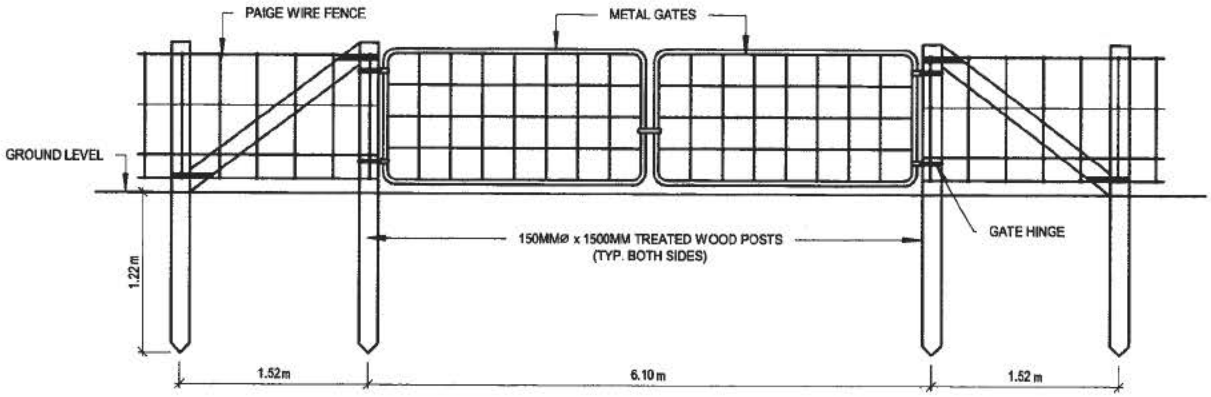

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South-Man Design Group Ltd.
No. 7810

ISSUED FOR CONSTRUCTION

CLIENT NAME: **Sprucewood Colony**	*PROJECT LOCATION:* **Brookdale, MB**	*PROJECT NAME:* **Wastewater Treatment Lagoon**
SOUTH-MAN DESIGN GROUP LTD Unit 8 - 951 Lagimodiere Blvd. Winnipeg, MB. R2J 3K4 www.southmandesign.ca Pete K: 204-371-7314 | Peter G: 204-323-6289	*PROJECT NUMBER:* 2303-042	**A12.1**
	DRAWN BY: AH/RF	
	CHECKED BY: DE	**Fence Details**
	DATE: **09/05/23**	