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Licence No./Licence n° 2170
Issue Date/Date de délivrance April 12, 1996

In accordance with the Manitoba Environment Act (C.C.S.M. c. E125)

THIS LICENCE IS ISSUED TO:

RURAL MUNICIPALITY OF ST. CLEMENTS: "the Licencee"

for the construction and operation of the Development being a wastewater treatment lagoon and a constructed wetland treatment system located on southwest quarter of Section 9, Township 18, Range 7, EPM in the Rural Municipality of St. Clements and with discharge of treated effluent into Marais Creek which drains into a natural lagoon before entering Lake Winnipeg, in accordance with the Proposal filed under The Environment Act on October 3, 1995, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"**appurtenances**" means machinery, appliances, or auxiliary structures attached to a main structure to enable it to function, but not considered an integral part of it;

"**as constructed drawings**" means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

"**ASTM**" means the American Society for Testing and Materials;

"**bentonite**" means specially formulated standard mill grade sodium bentonite conforming to American Petroleum Institute Specification 13-A;

"**commissioning date**" means the date on which wastewater was first placed in the wastewater treatment facility;

"**constructed wetland treatment system**" means a designed and man-made complex of saturated substrates, emergent and submergent vegetation, animal life, and water that simulates natural wetlands, and is used for further wastewater treatment following a sewage treatment plant or a wastewater treatment lagoon;

"**cut-off**" means a vertical-side trench filled with compacted clay or a wall constructed from compacted clay;

"**Director**" means an employee so designated pursuant to The Environment Act;

"**effluent**" means treated wastewater flowing or pumped out of the wastewater treatment lagoon or sewage treatment plant;

"fecal coliform" means aerobic and facultative, Gram-negative, nonspore-forming, rod-shaped bacteria capable of growth at 44.5 °C, and associated with fecal matter of warm-blooded animals;

"five-day biochemical oxygen demand" means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within five days at a temperature of 20°C;

"flooding" means the flowing of water onto lands, other than waterways, due to the overtopping of a waterway or waterways;

"high water mark" means the line on the interior surface of the primary and secondary cells which is normally reached when the cell is at the maximum allowable liquid level;

"hydraulic conductivity" means the quantity of water that will flow through a unit cross-sectional area of a porous material per unit of time under a hydraulic gradient of 1.0;

"in-situ" means on the site;

"influent" means water, wastewater, or other liquid flowing into a wastewater treatment facility;

"low water mark" means the line on the interior surface of the primary and secondary cells which is normally reached when the cell is discharged;

"MPN Index" means the most probable number of coliform organisms in a given volume of wastewater which, in accordance with statistical theory, would yield the observed test result with the greatest frequency;

"primary cell" means the first in a series of cells of the wastewater treatment lagoon system and which is the cell that receives the untreated wastewater;

"riprap" means small, broken stones or boulders placed compactly or irregularly on dykes or similar embankments for protection of earth surfaces against wave action or current;

"secondary cell" means a cell of the wastewater treatment lagoon system which is the cell that receives partially treated wastewater from the primary cell;

"septage" means the sludge produced in individual on-site wastewater disposal systems such as septic tanks;

"sewage" means household and commercial wastewater that contains human waste;

"shelter belt" means a barrier of trees and shrubs that forms a continuous visual barrier;

"sludge" means accumulated solid material containing large amounts of entrained water, which has separated from wastewater during processing;

"total coliform" means a group of aerobic and facultative anaerobic, Gram-negative, nonspore-forming, rod-shaped bacteria, that ferment lactose with gas and acid formation within 48 hours at 35 °C, and inhabit predominantly the intestines of man or animals, but are occasionally found elsewhere and include the sub-group of fecal coliform bacteria;

"wastewater" means the spent or used water of a community or industry which contains dissolved and suspended matter; and

"wastewater treatment lagoon" means the component of this development which consists of an impoundment into which wastewater is discharged for storage and treatment by natural oxidation.

GENERAL REQUIREMENTS

1. The Licencee shall direct all sewage generated within the Grand Marais area toward the wastewater treatment lagoon or other approved sewage treatment facilities.
2. The Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that:
 - (a) the release of offensive odours is minimized;
 - (b) the organic loading on the primary cell, as indicated by the five-day biochemical oxygen demand, is not in excess of 56 kilograms per hectare per day; and
 - (c) the depth of liquid in the primary cell or secondary cells does not exceed 1.5 metres.
3. The Licencee shall, in case of physical or mechanical breakdown of the wastewater treatment system:
 - (a) notify the Director immediately;
 - (b) identify the repairs required to the wastewater treatment system;
 - (c) undertake all repairs to minimize unauthorized discharges of wastewater; and
 - (d) complete the repairs in accordance with any written instructions of the Director.
4. The Licencee shall ensure that septage is not discharged into the wastewater treatment lagoon between the 15th day of October of any year and the 1st day of June of the following year.
5. The Licencee shall fill both the primary and secondary cells with water, to an elevation of 0.75 metres above the floor elevation of each respective cell, after all required soil sampling and within 8 months of the commissioning date for the wastewater treatment lagoon. The Licencee shall maintain the liquid depth in the primary cell at an elevation of not less than 0.75 metres above the floor elevation of the primary cell, at all times. The Licencee shall maintain the liquid depth in the secondary cell at an elevation of not less than 0.75 metres above the floor elevation of secondary cell, at all times with the exception of the period between the 1st day of September and the 1st day of November.

CONSTRUCTION SPECIFICATIONS

6. The Licencee shall, prior to the construction of the dykes for the wastewater treatment lagoon:
 - (a) remove all organic topsoil from the area where the dykes will be constructed; or
 - (b) remove all organic material for a depth of 0.3 metres and a width of 3.0 metres from the area where the cut-off will be constructed.

7. The Licencee shall construct and maintain the wastewater treatment lagoon with a continuous liner, including cutoffs, under all interior surfaces of the cells in accordance with the following specifications:
 - (i) the liner shall be made of clay;
 - (ii) the liner shall be at least one metre in thickness;
 - (iii) the liner shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less; and
 - (iv) the liner shall be constructed to an elevation of 2.5 metres above the floor elevation of both the primary and the secondary cells.

8. The Licencee shall ensure that if, in the opinion of the Director, significant erosion of the interior surfaces of the dykes occurs, rip rap shall be placed on the interior dyke surfaces from 0.6 metres above the high water mark to at least 0.6 metres below the low water mark to protect the dykes from wave action.

9. The Licencee shall construct and maintain an all-weather access road and a sewage dumping station for truck hauled sewage. The dumping facility shall be sized to handle peak truck traffic and shall have a surface splash ramp with a smooth hard surface that can be easily washed free of solids.

10. The Licencee shall install and maintain a fence around the wastewater treatment lagoon to control access.

11. The Licencee shall plant and maintain a shelter belt, acceptable to the Director, between the development and Provincial Road No. 500 to visually screen the development.

DISCHARGE LIMITS, TERMS AND CONDITIONS

12. The Licencee shall not discharge effluent from the wastewater treatment lagoon to the constructed wetland treatment system:
 - (a) where the organic content of the effluent, as indicated by the five day biochemical oxygen demand, is in excess of 30 milligrams per litre;
 - (b) where the fecal coliform content of the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample; or
 - (c) where the total coliform content of the effluent, as indicated by the MPN index, is in excess of 1500 per 100 millilitres of sample.

13. The Licencee shall not discharge effluent from the constructed wetland treatment system between the 1st day of November of any year and the 15th day of September of the following year, without first obtaining written approval from the Director.

MONITORING AND REPORTING SPECIFICATIONS

14. The Licencee shall arrange with the designated Environment Officer a mutually acceptable time and date for any required soil sampling between the 15th day of May and the 15th day of October of any year.
15. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "A" attached to this Licence, from the liner; the number and location of samples and test methods to be specified by the designated Environment Officer up to a maximum of 20 samples.
16. The Licencee shall, not less than 2 weeks before the wastewater treatment lagoon is placed in operation, submit to the Director the results of the tests carried out pursuant to Clause 15 of this Licence.
17. The Licencee shall:
 - (a) prepare "as constructed drawings" for the Development and shall label the drawings "As Constructed"; and
 - (b) provide to the Director, on or before June 1, 1997, two sets of "as constructed drawings" of the wastewater treatment lagoon.
18. The Licencee shall maintain a record of all hauled waste including the number of loads on a daily and weekly basis, the volume of each load, the name of the hauler, and the source of the contents of each load according to the type of waste and the name and location of each property serviced. The Licencee shall submit an annual report of all the waste hauling information to the Director by the 15th day of January of the following year.
19. The Licencee shall conduct a monitoring program along the effluent discharge route and the monitoring program shall include:
 - (a) a minimum five year monitoring period during which water and effluent are flowing in Marais Creek;
 - (b) a minimum of two sample collections during each effluent discharge period, with a minimum time period of 48 hours between sample collections, at a minimum of four sample collection sites located at:
 - (i) the point of discharge from the wastewater treatment lagoon to the constructed wetland treatment system;
 - (ii) the point of discharge from the constructed wetland treatment system;
 - (iii) upstream of the point at which the effluent discharges into the Marais Creek at a point near the intersection of Municipal Road No. 103 and Marais Creek; and

- (i) ~~temperature~~ of the point at which the effluent discharges into the temperature;
- (ii) pH;
- (iii) ammonia and the calculated value of un-ionized ammonia;
- (iv) BOD₅;
- (v) total chlorine, if chlorine has been used during effluent treatment;
- (vi) total and fecal coliform content; and
- (vii) suspended solids.

20. The Licencee shall, not less than 60 days after the results of the sample analysis are available, submit to the Director the results of the monitoring program for each year of the five year monitoring program, carried out pursuant to Clause 19 of this Licence.

DECOMMISSIONING

21. The Licencee shall, after placing the Development into operation, prevent any additional wastewater or septage from being discharged into the liquid waste pits, located at the waste disposal ground located on Section 10, Township 18, Range 7 EPM in the Rural Municipality of St. Clements.

REVIEW AND REVOCATION

22. If in the opinion of the Director the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out herein, the Director may revoke, temporarily or permanently, this Licence.



Larry Strachan, P. Eng.
Director
Environment Act

Schedule "A" to Environment Act Licence No. 2170

Soil Sampling:

1. The Licencee shall provide a drilling rig, acceptable to the designated Environment Officer, to extract soil samples from the liner which is not placed or found at the surface of the lagoon structure. This includes all wastewater treatment lagoons constructed with clay cutoffs at the interior base of the dyke or with a clay cutoff in the centre of the dyke. The drill rig shall have the capacity to drill to the maximum depth of the clay cutoff plus an additional 2 metres. The drill rig shall be equipped with both standard and hollow stem augers. The minimum hole diameter shall be 5 inches.
2. For lagoon liners placed or found at the surface of the lagoon structure, the Licencee shall provide a machine, acceptable to the designated Environment Officer, capable of pressing a sampling tube into the liner in a straight line motion along the centre axis line of the sample tube and without sideways movement.
3. Soil samples shall be collected and shipped in accordance with ASTM Standard D 1587 (Standard Practice for Thin-Walled Tube Sampling of Soils), D 4220 (Standard Practice for Preserving and Transporting Soil Samples) and D 3550 (Standard Practice for Ring-Lines Barrel Sampling of Soils). Thin-walled tubes shall meet the stated requirements including length, inside clearance ratio and corrosion protection. An adequate venting area shall be provided through the sampling head.
4. At the time of sample collection, the designated Environment Officer shall advise the Licencee as to the soil testing method that must be used on each sample. The oedometer method may be used for a sample were the Environment Officer determines that the soil sample is taken from an undisturbed clay soil which has not been remoulded and which is homogeneous and unweathered. The triaxial test shall be used for all samples taken from disturbed and remoulded soils or from non homogenous and weathered soils.
5. The Licencee shall provide a report on the collection of soil samples to the designated Environment Officer and to the laboratory technician which includes but is not limited to: a plot plan indicating sample location, depth or elevation of sample, length of advance of the sample tube length of soil sample contained in the tube after its advancement, the soil test method specified by the Environment Officer for each soil sample and all necessary instructions from the site engineer to the laboratory technician.
6. All drill and sample holes shall be sealed with bentonite pellets after the field drilling and sampling has been completed.

Soil Testing Methods:

1. Triaxial Test Method

- (a) The soil samples shall be tested for hydraulic conductivity using ASTM D 5084 (Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter).
- (b) Soil specimens shall have a minimum diameter of 70 mm (2.75 inches) and a minimum height of 70 mm (2.75 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The hydraulic gradient shall not exceed 30 during sample preparation and testing. Swelling of the soil specimen should be controlled to adjust for: the amount of compaction measured during sample collection and extraction from the tube and the depth or elevation of the sample. The effective stress used during saturation or consolidation of the sample shall not exceed 40 kPa (5.7 psi) or the specific stress level, that is expected in the field location were the sample was taken, which ever is greater.
- (c) The complete laboratory report, as outlined in ASTM D 5084, shall be supplied for each soil sample collected in the field.

2. Oedometer Test Method

- (a) The soil samples shall be tested for hydraulic conductivity using ASTM D 2435 (Standard Test Method for One-Dimensional Consolidation Properties of Soils).
- (b) Soil specimens shall have a minimum diameter of 50 mm (2 inches) and a minimum height of 20 mm (0.8 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The soil specimen shall be taken from an undisturbed soil sample. The soil specimen shall be completely saturated.
- (c) The complete laboratory report, as outlined in ASTM D 2435, shall be supplied for each soil sample collected in the field.