

Environmental Stewardship Division
Environmental Approvals Branch
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CLIENT FILE NO.: 1921.10

May 11, 2016

Tom Raine, CAO
R.M. of Macdonald
Box 100
Sanford MB R0G 2J0

Dear Mr. Raine:

Enclosed is **revised Environment Act Licence No. 857 RR** dated May 11, 2016 issued to the **R.M. of Macdonald** for the construction, operation and maintenance of the Development being a wastewater collection system, a forcemain connection, and an expanded wastewater treatment lagoon system located in the Rural Municipality of Macdonald, in accordance with the Proposal filed under *The Environment Act*.

In addition to the enclosed Licence requirements, please be informed that all other applicable federal, provincial and municipal regulations and by-laws must be complied with. A Notice of Alteration must be filed with the Director for approval prior to any alteration to the Development as licensed.

For further information on the administration and application of the Licence, please feel free to contact Asit Dey, Environmental Engineer at 204-945-2614.

Pursuant to Section 27 of *The Environment Act*, this licensing decision may be appealed by any person who is affected by the issuance of this Licence to the Minister of Sustainable Development within 30 days of the date of the Licence.

Yours truly,

“original signed by”

Tracey Braun, M.Sc.
Director
Environment Act

c: Don Labossiere, Donna Smiley, Yvonne Hawryluk - Environmental Compliance and Enforcement
Dana Bredin, WSP
Public Registries

NOTE: Confirmation of Receipt of this Licence No. 857 RR (*by the Licencee only*) is required by the Director of Environmental Approvals. Please acknowledge receipt by signing in the space below and provide a copy (letter only) to the Department by May 25, 2016

On behalf of the RM of Macdonald

Date

LICENCE

Licence No. / Licence n° 857 RR

Issue Date / Date de délivrance October 12, 1979

Revised : August 27, 1998

Revised : May 11, 2016

In accordance with *The Environment Act* (C.C.S.M. c. E125)
Conformément à la *Loi sur l'environnement* (C.P.L.M. c. E125)

Pursuant to Sections 11(1) and 14(3) / Conformément au Paragraphe 11(1) et 14(3)

THIS LICENCE IS ISSUED TO: / CETTE LICENCE EST DONNÉE À:

RURAL MUNICIPALITY OF MACDONALD;
"the Licencee"

for the construction, operation and maintenance of the Development being a wastewater collection system, a forcemain connection, and an expanded wastewater treatment lagoon system with a (227-day) hydraulic storage capacity of 71,290 cubic metres (314 cubic metres per day average) that is located on NW-17-8-1 EPM in the Rural Municipality of Macdonald and with discharge of treated effluent to the La Salle River via Kosci Coulee, which eventually empties into the Red River, in accordance with the Proposal filed under *The Environment Act* on March 26, 1979, and the Notice of Alteration dated December 9, 1993, and the Environment Act Proposal filed on June 12, 2015, and subsequent additional information dated January 22, 2016, March 14, 2016, and March 18, 2016, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"accredited laboratory" means an analytical facility accredited by the Standards Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation and Water Stewardship to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

"affected area" means a geographical area, excluding the property of the Development;

"approved" means approved by the Director or an assigned Environment Officer in writing;

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

"base" means the exposed and finished elevation of the bottom of any cell of the wastewater treatment lagoon;

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

"bioassay" means a method of determining toxic effects of industrial wastes and other wastewaters by using viable organisms;

"day" means any 24-hour period;

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

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

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

"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 (BOD₅)" means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within 5 days at a temperature of 20°C;

"five-day carbonaceous biochemical oxygen demand (CBOD₅)" means that part of the oxygen demand usually associated with biochemical oxidation of carbonaceous organic matter within five days at a temperature of 20°C, excluding the oxygen demand usually associated with the biochemical oxidation of nitrogenous organic matter;

"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 or the line of the exterior of the perimeter dykes which is reached during local flooding;

"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;

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

"in-situ" means on the site;

"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;

"odour nuisance" means a continuous or repeated odour, smell or aroma, in an affected area, which is offensive, obnoxious, troublesome, annoying, unpleasant or disagreeable to a person:

- a) residing in an affected area;
- b) working in an affected area; or
- c) present at a location in an affected area which is normally open to members of the public;

if the odour, smell or aroma

- d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director and within a 90-day period, from 5 different persons falling within clauses a), b) or c), who do not live in the same household; or
- e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b) or c) and the Director is of the opinion that if the odour, smell or aroma had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90-day period, from 5 different persons who do not live in the same household;

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

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

"rip rap" 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;

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

"sludge solids" means solids in sludge;

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

"Standard Methods for the Examination of Water and Wastewater" means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Federation;

"storage cell" means a cell of the wastewater treatment lagoon system which is a cell that receives partially treated wastewater from the primary cell and retains the wastewater for a period of time;

"total residual chlorine" means the sum of free chlorine and combined chlorine, including inorganic chloramines;

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

"wastewater collection system" means the sewer and pumping system used for the collection and conveyance of domestic, commercial and industrial wastewater; and

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

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

Wastewater Source

1. The Licencee shall direct all wastewater generated within the Community of Sanford toward the wastewater treatment lagoons or other approved wastewater treatment facilities.

Future Sampling

2. In addition to any of the limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
 - a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such pollutants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;
 - b) determine the environmental impact associated with the release of any pollutant(s) from the Development;
 - c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
 - d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

Reporting Format

3. The Licencee shall submit all information required to be provided to the Director or Environment Officer under this Licence, in written and electronic format, in such form (including number of copies), and of such content as may be required by the Director or Environment Officer, and each submission shall be clearly labelled with the Licence Number and Client File Number associated with this Licence.

Respecting Air Emissions

4. The Licencee shall not cause or permit an odour nuisance to be created as a result of the construction, operation or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate an odour nuisance.

Equipment Breakdown or Process Upset

5. The Licencee shall, in the case of physical or mechanical equipment breakdown or process upset where such breakdown or process upset results or may result in the release of a pollutant in an amount or concentration, or at a level or rate of release, that causes or may cause a significant adverse effect, immediately report the event by calling the 24-hour environmental accident reporting line at 204-944-4888 (toll-free 1-855-944-4888). The report shall indicate the nature of the event, the time and estimated duration of the event and the reason for the event.
6. The Licencee shall, following the reporting of an event pursuant to Clause 5:
 - a) identify the repairs required to the mechanical equipment;
 - b) undertake all repairs to minimize unauthorized discharges of a pollutant;
 - c) complete the repairs in accordance with any written instructions of the Director; and
 - d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.
7. The Licencee shall, during construction and operation of the Development, report spills of fuels or other contaminants to an Environment Officer in accordance with the requirements of *Manitoba Regulation 439/87* respecting *Environmental Accident Reporting* or any future amendment thereof.

Future Studies

8. The Licencee shall actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for the La Salle River, Red River and Lake Winnipeg and/or associated waterways and watersheds.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Respecting Construction – General

9. The Licencee shall notify the assigned Environment Officer not less than two weeks prior to beginning construction of the Development. The notification shall include the intended starting date(s) of construction and the name(s) of the contractor(s) responsible for the construction.
10. The Licencee shall:
 - a) conduct all ditch related work activities during no flow or dry conditions and not during the April 1 to June 15 fish spawning and incubation period;

- b) not construct the wastewater treatment lagoon or wastewater collection system during periods of heavy rain;
 - c) place and/or isolate all dredged and construction material where it will not erode into any watercourse;
 - d) implement effective long-term sediment and erosion control measures to prevent soil-laden runoff, and/or silt from entering any watercourse during construction and until vegetation is established;
 - e) routinely inspect all erosion and sediment control structures and immediately complete any necessary maintenance or repair;
 - f) revegetate soil exposed during the construction of the Development with native or introduced grasses or legumes. Native species shall be used to revegetate areas where native species existed prior to construction; and
 - g) use rock that is free of silt and clay for riprap.
11. The Licencee shall, during construction of the Development, operate, maintain and store all materials and equipment in a manner that prevents any deleterious substances (fuel, oil, grease, hydraulic fluids, coolant, paint, uncured concrete and concrete wash water, etc.) from entering the wastewater treatment lagoon, the discharge route and associated watercourses, and have an emergency spill kit for in-water use available on site during construction.
12. The Licencee shall dispose of non-reusable construction debris from the Development at a waste disposal ground operating under the authority of a permit issued pursuant to *Manitoba Regulation 150/91* respecting *Waste Disposal Grounds* or *Manitoba Regulation 37/2016* respecting *Waste Management Facilities*, or any future amendment thereof, or a Licence issued pursuant to *The Environment Act*.
13. The Licencee shall locate all fuel storage and equipment servicing areas established for the construction and operation of the Development a minimum distance of 100 metres from any waterbody, and shall comply with the requirements of *Manitoba Regulation 188/2001* respecting *Storage and Handling of Petroleum Products and Allied Products Regulation* or any future amendment thereof.
14. The Licencee shall, during construction and maintenance of the Development, prevent the introduction and spread of foreign aquatic and terrestrial biota by cleaning equipment prior to its delivery to the site of the Development.
15. The Licencee shall install and maintain a fence around the wastewater treatment lagoon to limit access. The fence shall be a minimum of 1.2 meters high and have a locking gate, which shall be locked at all times except to allow access to the wastewater treatment lagoon.

16. The Licencee shall treat the petroleum-impacted soils on the lands where the expanded lagoon cell will be constructed, sample and test the treated soils, and report the test results along with a site decommissioning report to the Director, in writing and in a format acceptable to the Director, for approval prior to the construction of Secondary Cell No. 2 as identified in Schedule "A".
17. The Licencee shall remove the existing truck dump ramp in the Converted Secondary Cell No. 1 and shall repair to the Director's satisfaction any damaged clay liner under the existing truck dump ramp located in the Converted Secondary Cell No. 1, as identified in Schedule "A", in accordance with the proposal submitted on January 22, 2016. The Record drawings shall be updated accordingly.

Respecting Construction – Continuous Clay Soil Liners

18. The Licencee shall, prior to the construction of the dykes for the Proposed Secondary Cell No. 2 of 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 liner will be constructed.
19. The Licencee shall construct and maintain the Converted Primary Cell, the Converted Secondary Cell No. 1 and the Proposed Secondary Cell No. 2 of the wastewater treatment lagoon as indicated on Schedule "A" to this Licence with a continuous liner under all interior surfaces of the cell in accordance with the following specifications:
 - a) the liner shall be made of clay;
 - b) the liner shall be at least one metre in thickness;
 - c) the liner shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less at all locations;
 - d) the liner shall be constructed to an elevation of 2.5 metres above the floor elevation of the Converted Primary Cell, Converted Secondary Cell No. 1, and New Secondary Cell No. 2.

Respecting Sludge Management

20. The Licencee shall, prior to putting Converted Secondary Cell No. 1 and the Converted Primary Cell of the wastewater treatment lagoon into operation, submit a report to the Director for approval respecting the impact of sludge buildup on the total operating depth of the wastewater treatment lagoon along with a complete assessment of options for the beneficial reuse of sludge including details of the

sampling and analysis results, and proposed actions relative to the ultimate disposal of the sewage sludge.

Respecting Operation

21. The Licencee shall obtain and maintain classification of the Development pursuant to *Manitoba Regulation 77/2003* respecting *Water and Wastewater Facility Operators* or any future amendment thereof and maintain compliance with all requirements of the regulation including, but not limited to, the preparation and maintenance of a Table of Organization, Emergency Response Plan and Standard Operating Procedures.
22. The Licencee shall carry out the operation of the Development with individuals properly certified to do so pursuant to *Manitoba Regulation 77/2003* respecting *Water and Wastewater Facility Operators* or any future amendment thereof.
23. The Licencee shall operate and maintain the wastewater treatment lagoon in such a manner that:
 - a) 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;
 - b) the depth of liquid in the primary cell and the secondary cells does not exceed 1.5 metres; and
 - c) a 1.0 metre freeboard is maintained in the primary cell and the secondary cells at all times.
24. The Licencee shall not discharge septage into the wastewater treatment lagoon between the 15th day of October of any year and the 1st day of June of the following year. The Licencee shall not discharge septage generated outside the Community of Sanford into the wastewater treatment lagoon.
25. The Licencee shall construct and maintain an all-weather access road and a wastewater dumping station for truck-hauled wastewater. The dumping facility shall have a surface splash ramp with a smooth hard surface that can be easily washed free of solids.

Respecting Operation – Wastewater Treatment Lagoon

26. The Licencee shall not discharge effluent from the wastewater treatment lagoon :
 - a) where the organic content of the effluent, as indicated by the five day carbonaceous biochemical oxygen demand, is in excess of 25 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;

- c) where the total suspended solids content of the effluent is in excess of 25 milligrams per litre;
- d) where the total phosphorus content of the effluent is in excess of 1.0 milligrams per litre;
- e) where the unionized ammonia content of the effluent is in excess of 1.25 milligrams per litre expressed as nitrogen (N), at $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- f) between the 1st day of November of any year and the 15th day of June of the following year;
- g) when flooding from any cause is occurring along the effluent drainage route; or
- h) when such a discharge would cause or contribute to flooding in or along the effluent drainage route.

Respecting Disinfection – General

27. The Licencee shall, when chlorine is used as a disinfecting agent:
- a) notify the Director in advance;
 - b) dechlorinate effluent prior to discharge;
 - c) obtain grab samples prior to and daily during the discharge period and have them analyzed for total residual chlorine; and
 - d) not discharge effluent where the concentration of the total residual chlorine is in excess of 0.02 milligrams per litre.

Respecting Maintenance

28. The Licencee shall, if in the opinion of the Director, significant erosion of the interior surfaces of the dykes occurs, repair the dyke and install rip rap as necessary. The rip rap shall be placed on the interior dyke surfaces from 0.6 metres above the high water mark to the bottom of the dykes to protect the dykes from wave action.
29. The Licencee shall provide and maintain a grass cover on the dykes of the wastewater treatment lagoon and shall regulate the growth of the vegetation so that the height of the vegetation does not exceed 0.3 metres on all dykes.
30. The Licencee shall annually remove by mechanical methods all reeds, rushes and trees located above the low water mark in every cell of the wastewater treatment lagoon.
31. The Licencee shall implement an ongoing program to remove burrowing animals from the site of the wastewater treatment lagoon.

MONITORING AND REPORTING

General

32. The Licencee shall, unless otherwise specified in this Licence:
- a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in "Standard Methods for the Examination of Water and Wastewater" or in accordance with an equivalent analytical methodology approved by the Director;
 - b) carry out all sampling of, and preservation and analyses on, soil or other samples in accordance with methodologies approved by the Director;
 - c) have all analytical determinations undertaken by an accredited laboratory; and
 - d) report the results to the Director, in writing or in a format acceptable to the Director, within 60 days of the samples being taken.

Respecting Monitoring

33. The Licencee shall, prior to each effluent discharge campaign, obtain grab samples of the treated wastewater and have them analyzed for:
- a) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand (CBOD₅) and expressed as milligrams per litre;
 - b) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - c) the total phosphorus content expressed as milligrams per litre;
 - d) the total suspended solids content expressed as milligrams per litre; and
 - e) the unionized ammonia nitrogen expressed as milligrams per litre.

Respecting Records Maintenance and Reporting

34. The Licencee shall during each year maintain the following records and retain them for a minimum period of five calendar years:
- a) reports of visual inspections conducted at a minimum of once per month;
 - b) wastewater sample dates;
 - c) original copies of laboratory analytical results of the sampled wastewater and water;
 - d) a summary of laboratory analytical results;
 - e) effluent discharge dates;
 - f) estimated effluent discharge volumes;
 - g) maintenance and repairs; and
 - h) a summary of any sanitary sewer overflows.

35. The Licencee shall submit an annual report to the Environment Officer by February 28 of the following year including all records required by Clause 34 of this Licence.

Respecting Operating Depth and Freeboard Non-Compliance Events

36. The Licencee shall immediately notify the Director each time the operating depth of any cell of the wastewater treatment lagoon does not comply with the maximum operating depth and minimum freeboard requirements for that cell as specified in Clause 23 of this Licence.
37. The Licencee shall, if reporting is required pursuant to Clause 36 of this Licence in two consecutive years:
- a) engage the services of a qualified consultant, acceptable to the Director, to undertake an investigation of the wastewater treatment lagoon and related infrastructure, to determine the ability or inability of the existing system to meet the hydraulic loading capacity of the community. The investigation shall include but not be necessarily limited to:
 - i) diagnosis of the cause(s) of the recent exceedances of maximum operating depth;
 - ii) sources of infiltration into the wastewater system including the municipal infrastructure;
 - iii) current hydraulic loading of the system;
 - iv) lack of storage capacity due to sludge build-up within existing cells;
 - v) the organic loading on the primary cell in terms of the five day biochemical oxygen demand; and
 - vi) operating procedures;
 - b) provide to the Director, within four months of the notification given pursuant to Clause 36 of this Licence, an engineering report describing in detail the results and observations concluded by virtue of the investigation; and
 - c) provide to the Director, within four months of the report provided pursuant to sub-Clause b) of this section, a remedial action plan in the form of a detailed engineering report describing recommended modifications, repairs or upgrading works to overcome excessive hydraulic loading of the system.

Respecting Hauling Records

38. The Licencee shall maintain a record of all septage and wastewater hauled to the wastewater treatment lagoon, including the following:
- a) number of loads on a daily and weekly basis,
 - b) the volume of each load,

- c) the name of the hauler,
- d) the source of the contents of each load according to the type of waste and the name and location of each property serviced; and
- e) if the septage discharged in any one day exceeds 24,750 litres (approximately 11 septic tanks loads), an assessment of compliance with Clause 23 a).

The Licencee shall retain this record and provide it to an Environment Officer upon request.

Respecting Soil Liner Sampling, Testing and Reporting

- 39. 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, unless otherwise approved by the Environment Officer.
- 40. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "B" to this Licence, from the soil liners of the wastewater treatment lagoon; the number and location of samples and test methods to be specified by the designated Environment Officer up to a maximum of 20 samples.
- 41. The Licencee shall, not less than 2 weeks before any new or upgraded clay-lined cell of the wastewater treatment lagoon as indicated on Schedule "A" to this Licence is placed in operation, submit for the approval of the Environment Officer the results of the tests carried out pursuant to Clause 40 of this Licence.

Respecting Initial Characterization

- 42. The Licencee shall, during the first year of operation of the Development following the issuance of this licence that a discharge must occur, obtain and analyze grab samples of the effluent during each effluent discharge campaign and report the results of the analysis in accordance with Schedule "C" attached to this Licence.

Respecting Record Drawings

- 43. The Licencee shall:
 - a) prepare updated "record drawings" for the Development and shall label the drawings "record drawings"; and
 - b) provide to the Director, within four months of the Environment Officer's approval of the reports required by Clause 41 of this Licence, two electronic copies of the "record drawings" of the Development.

REVIEW AND REVOCATION

- A. Licence No. 857 R is rescinded upon approved commencement of use of the expanded wastewater treatment lagoon in accordance with this Licence.
- B. 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 in this Licence, the Director may, temporarily or permanently, revoke this Licence.
- C. If the Licencee has not commenced construction of the Development within three years of the date of this Licence, the Licence is revoked.
- D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of *The Environment Act*.

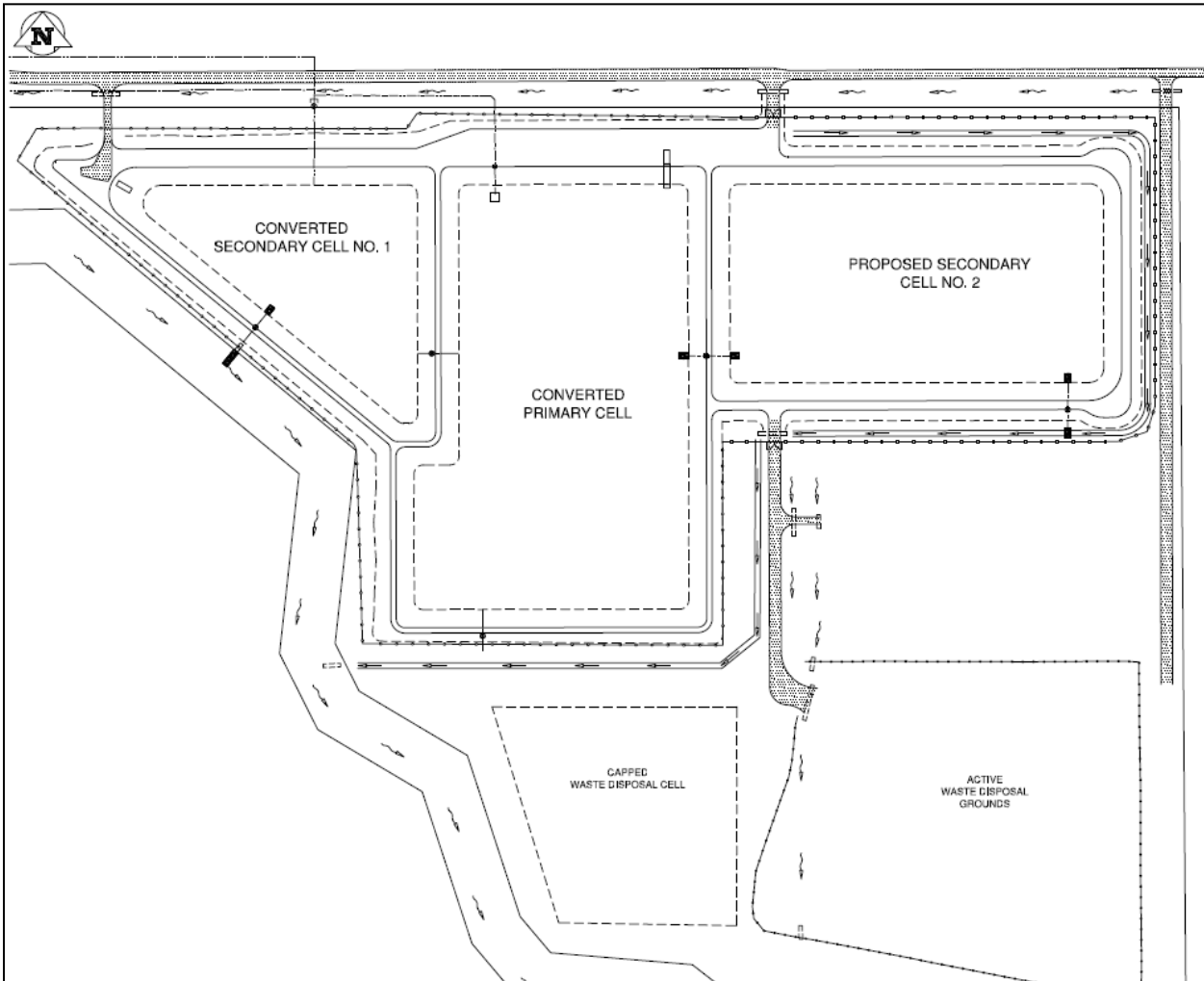
“original signed by”

Tracey Braun, M.Sc.
Director
Environment Act

FILE: 1921.10

Schedule "A" to Environment Act Licence No. 857 RR

Facility layout pursuant to Clauses 16, 17, 19, and 41



Not to Scale

Schedule "B" to Environment Act Licence No. 857 RR

Soil Sampling and Testing Pursuant to Clause 40

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.

Schedule "C" to Environment Act Licence No. 857 RR

Initial Characterization of Wastewater Pursuant to Clause 42

Facility Size: Very Small (<500 m³/day)

Facility Type: Facultative wastewater treatment lagoon – intermittent discharge

Effluent Sampling:

During the first year of operation:

1. Obtain a representative grab sample of the discharging effluent near the beginning of the discharge period and near the end of the discharge period (i.e., two samples for each discharge event); and
2. Determine the temperature of each sample at the time of sampling.

Effluent Analysis:

1. For each grab sample, have the grab sample analyzed for:
 - a) the organic content as indicated by the five-day biochemical oxygen demand and expressed as milligrams per litre;
 - b) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand and expressed as milligrams per litre;
 - c) the total suspended solids content expressed as milligrams per litre;
 - d) the *Escherichia coli* (*E. Coli*) content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - e) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - f) the total coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
 - g) if chlorine was used as a disinfecting agent, total residual chlorine expressed as milligrams per litre;
 - h) total ammonia nitrogen expressed as milligrams per litre;
 - i) nitrate-nitrite nitrogen expressed as milligrams per litre;
 - j) total Kjeldahl nitrogen (TKN) expressed as milligrams per litre;
 - k) dissolved phosphorus expressed as milligrams per litre;
 - l) total phosphorus expressed as milligrams per litre; and
 - m) pH.

Effluent Reporting:

1. For each grab sample, report the results to the Director, in writing or in an electronic format acceptable to the Director within 60 days of the sampling date. The report shall include the sampling date, sample temperature, the dates of the effluent discharge, and copies of the laboratory analytical results of the sampled effluent.