

Environmental Stewardship Division  
Environmental Approvals Branch  
123 Main Street, Suite 160, Winnipeg, Manitoba R3C 1A5  
T 204 945-8321 F 204 945-5229  
[www.gov.mb.ca/conservation/eal](http://www.gov.mb.ca/conservation/eal)

**CLIENT FILE NO.: 4138.10**

October 31, 2016

Andrew Weremy - Chief Administrative Officer  
Rural Municipality of St. Andrews  
Box 130  
Clandeboye MB R0C 0P0

Dear Mr. Weremy:

Enclosed is **revised Environment Act Licence No. 2211 R** issued to the **Rural Municipality of St. Andrews** for the construction and operation of the Development being a wastewater treatment lagoon located in the Rural Municipality of St. Andrews 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 Bruce Webb, Environmental Engineer at 204-945-7021.

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 Manitoba 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, Mike Baert - Environmental Compliance and Enforcement  
Tim Stratton, Stantec Consulting Ltd.; Dave Shwaluk, Manitoba Water Services Board  
Public Registries

**NOTE: Confirmation of Receipt of this Licence No. 2211 R (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 November 14, 2016**

---

On behalf of the RM of St. Andrews

Date

# LICENCE

Licence No. / Licence n°	<u>2211 R</u>
Issue Date / Date de délivrance	<u>September 10, 1996</u>
Revised:	<u>October 31, 2016</u>

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 Section 11(1) and 14(3) / Conformément au Paragraphe 11(1) and 14(3)

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

**RURAL MUNICIPALITY OF ST. ANDREWS;**  
**"the Licencee"**

for the construction and operation of the Development being a wastewater treatment lagoon treating truck hauled wastewater originating in the Rural Municipality of St. Andrews, with a hydraulic storage capacity of 26,228 cubic metres (116 cubic metres per day average), located in SW 36-15-4E in the Rural Municipality of St. Andrews as shown in Figure 1 attached to this Licence, with treated effluent to be discharged to a drain flowing to Netley Creek and Netley Lake, in accordance with the Proposal filed under *The Environment Act* dated July 13, 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 Sustainable Development 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 assigned Environment Officer in writing;

"**ASAE**" means the American Society of Agricultural Engineers;  
"**ASTM**" means the American Society for Testing and Materials;

"**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 (BOD<sub>5</sub>)**" means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within five days at a temperature of 20°C;

"**five-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>)**" 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;

"**grab sample**" means a quantity of wastewater taken at a given place and time;

"**HDPE**" means high density polyethylene;

"**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;

"**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;

"**mil**" means one-thousandth of an inch;

"**MPN index**" means the most probable number of coliform organisms in a given volume of wastewater or effluent 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;

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

**"secondary cell"** means a cell of a 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;

**"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;

**"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 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.

1. 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 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, ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, and for such duration and at such frequencies as may be specified;
  - b) determine the environmental impact associated with the release of any pollutant 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.
2. 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 labeled with the Licence Number and Client File Number associated with this Licence.
3. The Licencee shall direct all truck hauled wastewater generated within the Rural Municipality of St. Andrews toward the wastewater treatment lagoon or other approved wastewater treatment facilities.
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 or Environment Officer may require to eliminate or mitigate an odour nuisance.

5. The Licencee shall actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for Netley Creek and associated waterways and watersheds.

## **SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS**

### **Construction - General**

6. 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 of construction and the name of the contractor responsible for the construction.
7. 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 during periods of heavy rain;
  - c) place and/or isolate all excavated 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.
8. 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 37/2016* respecting *Waste Management Facilities*, or any future amendment thereof, or a Licence issued pursuant to *The Environment Act*.
9. The Licencee shall locate 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* or any future amendment thereof.
10. 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 watercourses, and have an emergency spill kit for in-water use available on site during construction.

11. 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.
12. The Licencee shall, following the reporting of an event pursuant to Clause 11,
  - 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/or the Environment Officer; and
  - d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.
13. 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.
14. 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.
15. The Licencee shall install and maintain a fence around the wastewater treatment lagoon to control access. The fence shall be a minimum of 1.2 metres 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:
  - a) prepare "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 report required by Clause 21 of this Licence, two electronic copies of the "record drawings".

### **Construction – HDPE Liner for New Primary Cells**

17. The Licencee shall, prior to the construction of the dykes for the new primary cells of the wastewater treatment lagoon, remove all organic material from the area where the new cells will be constructed.

18. The Licencee shall construct and maintain a continuous liner, including cover material, underlying the new primary cells of the wastewater treatment lagoon, such that:
  - a) the liner is constructed from HDPE geomembrane;
  - b) the liner has a minimum thickness of 60 mils;
  - c) all sections of the liner are joined by dual track seaming;
  - d) the liner is installed in accordance with ASAE Standard EP340.2 for the Installation of Flexible Membrane Linings;
  - e) the liner is installed to a minimum elevation of 2.8 metres above the base of the new primary cells;
  - f) non-destructive test methods are used to test the integrity of:
    - i) all field seams joining liner sections in accordance with ASTM Standard D 5820-95 (Reapproved 2006); and
    - ii) all other field seams in accordance with ASTM Standard D 4437-99;
  - g) the hydraulic conductivity of the liner does not exceed  $3 \times 10^{-9}$  centimetres per second over the entire surface area of the liner;
  - h) a testing report is prepared and submitted to the assigned Environment Officer for approval within 30 days of commencing the installation of the liner; and
  - i) the liner floor is covered with sand or other granular cover material to a minimum depth of 0.3 metres measured perpendicular to the surface of the liner.
19. The Licencee shall construct and maintain an effective gas relief system under the liner for the new primary cells of the wastewater treatment lagoon.
20. The Licencee shall notify the assigned Environment Officer one week prior to commencing the installation of the liner and the gas relief system.
21. The Licencee shall not cover the liner or use the new primary cells of the wastewater treatment lagoon until receiving the approval of the assigned Environment Officer of the report submitted pursuant to sub-Clause 18 h) of this Licence.
22. The Licencee shall complete the installation of the HDPE liner of the new primary cells of the wastewater treatment lagoon between the 15<sup>th</sup> day of May and the 15<sup>th</sup> day of October of any year, unless otherwise approved by the Environment Officer.

**Construction and Maintenance of Clay Liner for Original Primary and Secondary Cells**

23. The Licencee shall maintain the clay-lined original primary and secondary cells of the wastewater treatment lagoon with a continuous liner, including cut-offs, under all interior surfaces of the cells in accordance with the following specifications:
  - a) the liner shall be made of clay;
  - b) the liner shall be at least 1.0 metre in thickness;



- c) the liner shall have a hydraulic conductivity of  $1 \times 10^{-7}$  centimetres per second or less at all locations; and
  - d) the liner shall be constructed to an elevation of 2.5 metres above the floor elevation of both the primary and secondary cells.
24. 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.
25. The Licencee shall take and test undisturbed soil samples for any required soil sampling in accordance with Schedule "A" attached to this Licence, from the liner 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.
26. The Licencee shall, within two weeks of receiving the results of any testing carried out pursuant to Clause 25 of this Licence, submit the results for the approval of the Environment Officer.

### **Operation**

27. 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.
28. 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.
29. The Licencee shall operate and maintain the Development in such a manner that:
- a) the organic loading on the primary cells, as indicated by the five-day biochemical oxygen demand, does not exceed 56 kilograms per hectare per day;
  - b) the depth of liquid in all cells does not exceed 1.5 metres; and
  - c) a minimum 1.0 metre freeboard is maintained in the primary and secondary cells at all times.
30. The Licencee shall not discharge septage into the wastewater treatment lagoon between the 15<sup>th</sup> day of October of any year and the 1<sup>st</sup> day of June of the following year.
31. The Licencee shall not discharge effluent from the constructed wetland of 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 total suspended solids content of the effluent is in excess of 25 milligrams per litre, unless the exceedance is caused by algae;
  - c) where the fecal coliform content of the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample;
  - d) where the unionized ammonia content of the effluent is in excess of 1.25 milligrams per litre expressed as nitrogen (N), at  $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ;
  - e) where the total phosphorus content of the effluent is in excess of 1.0 milligrams per litre;
  - f) between the 1<sup>st</sup> day of November of any year and the 15<sup>th</sup> day of June of the following year;
  - g) when flooding from any cause is occurring along the discharge route; or
  - h) when the discharge of effluent will cause or contribute to flooding in or along the discharge route.
32. 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.
33. The Licencee shall discharge the secondary cell of the wastewater treatment lagoon over at least a two-week period, while accelerating discharge as necessary to maintain normal operation of the wastewater treatment lagoon.

### **Maintenance**

34. The Licencee shall, if in the opinion of the Director or Environment Officer, significant erosion of the interior surfaces of the dykes occurs, repair the dykes and install riprap as necessary. The riprap 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.
35. 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.
36. 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.
37. The Licencee shall implement an ongoing program to remove burrowing animals from the site of the wastewater treatment lagoon.

38. The Licencee shall take action to maintain the HDPE liner of the new primary cells in its design position. If the liner becomes displaced from its design position, the Licencee shall immediately report the displacement to the Director, and take any measures required by the Director to restore the liner to its design position.

### **MONITORING AND REPORTING SPECIFICATIONS**

39. The Licencee shall immediately notify the Director each time the operating depth of any cell of the wastewater treatment lagoon exceeds the maximum operating depth or minimum freeboard for that cell as specified in Clause 29 of this Licence.
40. The Licencee shall, if reporting is required pursuant to Clause 39 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 Facility 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 39 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.
41. 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 the most current edition of Standard Methods for the Examination of Water and Wastewater or in accordance with equivalent preservation and analytical methodologies approved by the Director;
  - b) carry out all sampling of, and preservation and analyses on, soil, compost, and air 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 and in an electronic format acceptable to the Director, within 60 days of the samples being taken.

42. 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 and expressed as milligrams per litre;
  - b) the total suspended solids content expressed as milligrams per litre;
  - c) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
  - d) the unionized ammonia nitrogen content expressed as milligrams per litre; and
  - e) the total phosphorus content expressed as milligrams per litre.
43. 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 a minimum of once per month;
  - b) wastewater sample dates;
  - c) original copies of laboratory analytical results of the sampled wastewater;
  - d) a summary of laboratory analytical results;
  - e) effluent discharge dates;
  - f) estimated effluent discharge volumes; and
  - g) maintenance and repairs.
44. The Licencee shall submit an annual report to the Environment Officer by February 28 of the following year including all records required by Clause 43 of this Licence.
45. The Licencee shall, during the first year of operation of the Development following the construction of the wastewater treatment lagoon 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 “B” attached to this Licence.

#### **REVIEW AND REVOCATION**

- A. Environment Act Licence No. 2211 is hereby rescinded upon approved commissioning of the new primary cells of the Development.
- 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*.

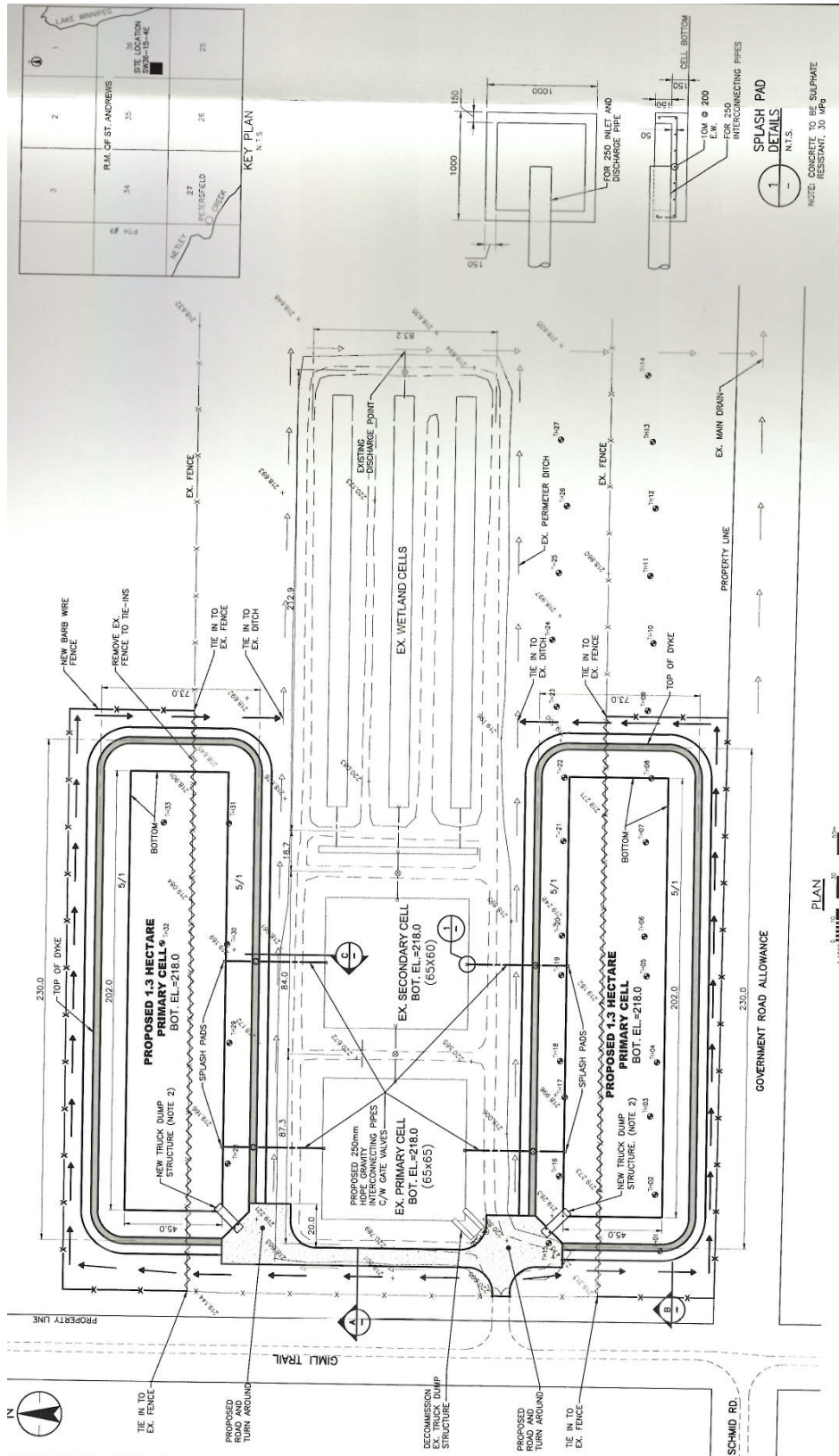
*“original signed by”*

---

**Tracey Braun, M.Sc.**  
**Director**  
**Environment Act**

**Client File No.: 4138.10**

**Figure 1 to Environment Act Licence No. 2211 R  
Rural Municipality of St. Andrews - Petersfield Wastewater Treatment Lagoon**



\*\* A COPY OF THE LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES \*\*

**Schedule "A" to Environment Act Licence No. 2211 R**  
Liner sampling and testing requirements pursuant to Clause 25

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 depth of 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 where 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 or 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 the following: a plot plan indicating all drill holes, onsite visual observations, 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.

## Schedule "A" to Environment Act Licence No. 2211 R (cont'd)

### Liner sampling and testing requirements pursuant to Clause 25 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 that 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 where the sample was taken, whichever is greater.
  - c) A 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 that 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) A complete laboratory report, as outlined in ASTM D 2435, shall be supplied for each soil sample collected in the field.



**Schedule "B" to Environment Act Licence No. 2211 R**  
Initial Characterization of Wastewater Pursuant to Clause 45

Facility Size: Very small (less than 500 m<sup>3</sup>/day)

Facility Type: Facultative wastewater treatment lagoon - intermittent discharge

Effluent Sampling:

During the first year of operation, for all discharge events:

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 analysed 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.