



Environment and Climate Change

Environmental Approvals Branch
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EABDirector@gov.mb.ca

File No.: 4738.10

June 17, 2024

Shawna Paulson
Chief Administrative Officer
RM of Elton
Forrest MB R0K 0W0
cao@elton.ca

Dear Shawna Paulson:

**Re: RM of Elton – Forrest Wastewater Treatment Lagoon Expansion
Environment Act Licence No. 2560 R**

Please find enclosed the Environment Act Licence in response to your proposal dated December 8, 2022. You wish to construct and operate a wastewater treatment lagoon at the community of Forrest in the Rural Municipality of Elton.

All licence requirements and federal, provincial, and municipal regulations and by-laws must be followed. The licensee must get approval from the director per The Environment Act to alter the development.

Anyone affected by this decision may appeal, in writing, to the Minister of Environment and Climate Change at minecc@manitoba.ca by July 17, 2024. The licence is available on the public registry at <https://www.gov.mb.ca/sd/eal/registries/4738.1/index.html>

If you have any questions regarding this approval, please contact Kayla Hagenson, A/Regional Supervisor, Environmental Compliance and Enforcement Branch at EnvCEWestern@gov.mb.ca or 204-648-4794.

Sincerely,

Original Signed By
Agnes Wittmann
Director
The Environment Act

Enclosure

c. Kayla Hagenson

LICENCE

File No.: 4738.10

Licence No. / Licence n°: 2560 R
Issue Date / Date de délivrance : June 17, 2024

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)

Under Section 11(1) / Conformément au Paragraphe 11(1)

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

RURAL MUNICIPALITY OF ELTON; "the licensee"

for the expansion, operation, and maintenance of the development being a wastewater collection system, and a wastewater treatment lagoon with 230 days of hydraulic storage capacity of 17,014 cubic metres (approximately 74 cubic metres per day average) located at SW 31-11-18 WPM in the community of Forrest with treated wastewater being discharged into a drainage channel, then into a third-order drain that flows into Willow Creek, which joins the Assiniboine River, and in accordance with the proposal information filed under The Environment Act on December 08, 2022, 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 Environment and Climate Change 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;

"approvals branch" means the Environmental Approvals Branch of Manitoba Environment and Climate Change, or any future branch responsible for issuing licences under The Environment Act;

"approved" means approved by the director or 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 a lagoon;

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

"cut-off" means a vertical or slanted trench filled with compacted clay or a sand and bentonite mixture, or a wall constructed from compacted clay;

"day" or "daily" means any 24-hour period;

"director" means an employee so designated under The Environment Act;

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

"environment officer" means an employee so designated under The Environment Act;

"fecal coliform" means aerobic and facultative, Gram-negative, non-spore-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;

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

"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;

Further, there is odour nuisance if the odour, smell, or aroma is:

- d) 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;

"operator" means a person certified to operate the wastewater collection system and the wastewater treatment lagoon employed by the licensee to manage the functional day-to-day operation of the wastewater collection system and the wastewater treatment lagoon within the constraints of this licence;

"pollutant" means a pollutant as defined in The Environment Act;

"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;

"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;

"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;

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

"sludge solids" means solids in sludge;

"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;

"third order waterway" means a drain or watercourse formed at the point of confluence of at least two second order waterways and may have tributaries of the second order and lower;

"total coliform" means a group of aerobic and facultative anaerobic, Gram-negative, non-spore-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;

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

Retain Copy of Licence

1. The licensee shall at all times maintain a copy of this licence at the development or at the premises from which the development's operations are managed.

Direct All Wastewater To Lagoon

2. The licensee shall direct all wastewater generated within the Community of Forrest toward the wastewater treatment lagoon or other approved wastewater treatment facilities.

Sampling

3. In addition to any of the limits, terms, and conditions specified in this licence, the licensee 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, handling, treatment, and disposal systems, for such pollutants, ambient quality, aquatic toxicity, seepage characteristics, and discharge rates and for such duration and 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, bioassay data, flow rate measurements, and such other information as may from time to time be requested.
4. The licensee shall, unless otherwise specified in this licence:
 - a) carry out all preservations and analyses of liquid samples in accordance with the methods prescribed in the 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.

Reporting Format

5. The licensee shall submit all information required to be provided to the director or environment officer under this licence, in writing, 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 file number associated with this licence.

Odour Nuisances

6. The licensee 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

7. The licensee 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, estimated volume, and estimated duration of the event, and the reason for the event.
8. The licensee shall, following the reporting of an event under clause 7,
 - a) identify the repairs required to the mechanical equipment;
 - b) undertake all repairs to minimize unauthorized discharge 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.
9. The licensee 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 the Environmental Accident Reporting Regulation or any future amendment.

Certification

10. The licensee shall obtain and maintain classification of the development under the Water and Wastewater Facility Operators Regulation or any future amendment 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.
11. The licensee shall carry out the operation of the development with individuals properly certified to do so under the Water and Wastewater Facility Operators Regulation or any future amendments. In the event that the development is reclassified under the regulation, the licensee shall provide a development plan to the director to have their certified operator(s) upgrade their certification.

Compliance With Other Acts and Regulations

12. The licensee shall comply with the requirements of The Heritage Resources Act, and suspend construction and immediately notify the Historic Resources Branch if heritage resources are encountered during the construction of the development.
13. The licensee shall comply with the requirements of the Nutrient Management Regulation or any future amendments.
14. The licensee shall obtain all necessary provincial and federal permits and approvals for construction of relevant components of the development prior to commencement of construction.

Future Studies

15. The licensee shall actively participate in any future watershed-based management study, plan, or nutrient reduction program, approved by the director, for the Assiniboine River and associated waterways and watersheds.

SPECIFICATIONS, LIMITS, TERMS, AND CONDITIONS

Construction - General

16. The licensee shall notify the assigned environment officer 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.
17. The licensee 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 components of the development involving earthwork 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.
18. The licensee shall dispose of non-reusable construction debris from the development at a waste disposal facility operating under the authority of a permit issued under the Waste Management Facilities Regulation, or any future amendments, or a licence issued under The Environment Act.
 19. The licensee 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 and complying with the requirements of the Aquatic Invasive Species Regulation, or any future amendments.
 20. The licensee 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 the Storage and Handling of Petroleum Products and Allied Products Regulation, or any future amendments.
 21. The licensee shall, during construction and maintenance 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.
 22. The licensee 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 locking gates, which shall be locked at all times except to allow access to the wastewater treatment lagoon.

Construction – Clay Liner

23. The licensee shall, prior to the construction of the dykes for the wastewater treatment lagoon:
 - a) remove all organic material from the area where the wastewater treatment lagoon will be constructed; or
 - b) remove all organic material down to a depth to the top of the liner material and for a width of 3.0 metres from the area where the liner will be constructed.

24. The licensee shall construct and maintain 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 1.0×10^{-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 base of each cell.
25. The licensee shall arrange with the designated environment officer of the approvals branch 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 of the approvals branch.
26. The licensee shall, to the satisfaction of the designated environment officer of the approvals branch, arrange to take and test undisturbed soil samples, in accordance with Appendix 'A' attached to this licence.
27. The licensee shall, not less than 2 weeks before the wastewater treatment lagoon is placed in operation, submit for the approval of the environment officer of the approvals branch the results of the tests carried out under clause 26 of this licence.

Record Drawings

28. The licensee 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 reports required by clause 27 of this licence, an electronic copy of the "record drawings".

Operation

29. The licensee 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 (BOD₅), is not in excess of 56 kilograms per hectare per day;
 - b) the depth of liquid in the primary and the secondary cells does not exceed 1.5 metres; and
 - c) a minimum of 1.0 metre freeboard is maintained in the primary and the secondary cells at all times.
30. The licensee shall not discharge septage into the wastewater treatment lagoon between the 15th day of October of any year and the 15th day of June of the following year.

Operation – Effluent Discharge from the Lagoon System

31. The licensee 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 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 coliform content of the effluent, as indicated by the *E. coli* content measured 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°C ±1°C;
 - e) where the total phosphorus content of the effluent is in excess of 1.0 milligrams per litre;
 - 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 discharge route; or
 - h) when the discharge of effluent will cause or contribute to flooding in or along the discharge route.
32. The Licensee shall, when chlorine is used as a disinfecting agent:
- a) notify the environment officer 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.

Maintenance

33. The licensee shall, if in the opinion of the environment officer, significant erosion of the interior surfaces of the dykes occurs, repair the dykes of the wastewater treatment lagoon to the satisfaction of the environment officer. Upon approval of the environment officer, 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.
34. The licensee 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.
35. The licensee 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.
36. The licensee shall implement an ongoing program to remove burrowing animals from the site of the wastewater treatment lagoon.

Biosolids Application

37. The licensee shall:
- a) at least thirty days prior to any land application of biosolids, submit to the director for approval certificates of title and land ownership agreements for each parcel of land on which biosolids are to be applied; and
 - b) remove biosolids from the development only to land apply to agricultural land in accordance with Schedule B to this licence and any terms and conditions of approval provided under subclause a) of this section.

MONITORING AND REPORTING SPECIFICATIONS

Operating Depth and Freeboard Non-Compliance Events

38. The licensee shall immediately notify the director each time the operating depth of any cell of the lagoon system does not comply with the maximum operating depth and minimum freeboard requirements for that cell as specified in subclause 29. c) of this licence.
39. The licensee shall, if reporting is required under clause 38 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 wastewater collection system;
 - 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 under clause 38 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 under subclause 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.

Effluent Monitoring

40. The licensee 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 coliform content as indicated by the *E. coli* content measured by the MPN index and expressed as MPN per 100 millilitres per sample;
 - d) the unionized ammonia nitrogen expressed as milligrams per litre; and
 - e) the total phosphorus content expressed as milligrams per litre.
41. The licensee 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 C attached to this licence.

Records Maintenance and Reporting

42. The licensee 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) cell isolation dates (i.e., valve operation records);
 - f) effluent discharge dates;
 - g) estimated effluent discharge volumes;
 - h) maintenance and repairs;
 - i) whether or not biosolids were removed and land applied and, if so, the records required by Schedule B of this licence;
 - j) expansions to any collection system with associated capacity assessment;
 - k) updated organization charts identifying all certified operators, including backup operators; and
 - l) a summary of any wastewater collection system overflows.

Annual Reporting

43. The licensee shall submit an annual report to the environment officer by February 28 of the following year, including all records required by clause 42 of this licence.

Alterations

44. The licensee shall notify the director and receive the approval of the director for any alterations to the development as licensed, prior to proceeding with such alterations.

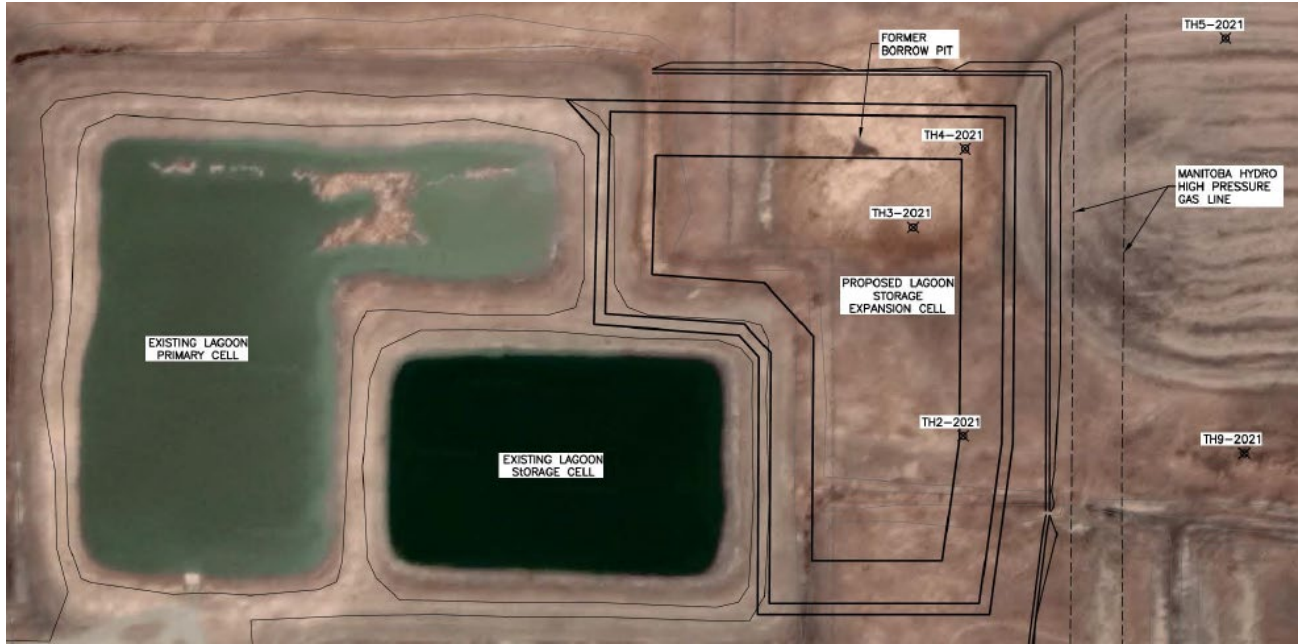
REVIEW AND REVOCATION

- A. This licence replaces Licence No. 2560, which is hereby rescinded.
- B. If, in the opinion of the director, the licensee has exceeded or is exceeding, or has failed 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, 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 under Section 11 of The Environment Act or request the filing of a Notice of Alteration.

Original Signed By
Agnes Wittmann
Director
The Environment Act

Figure 1 to Environment Act Licence No. 2560 R

Wastewater Treatment Cells



Schedule A to Environment Act Licence No. 2560 R

Liner Sampling and Testing Requirements Under Clause 26

Soil Sampling:

1. The licensee 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 licensee 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 licensee 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 and weathered soils.
5. The licensee 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.

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 where the sample was taken, whichever 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 B to Environment Act Licence No. 2560 R

Land Application of Biosolids Under Clause 37

General

1. The licensee shall, at least thirty days prior to the commencement of removal of biosolids from the lagoon and land application of biosolids at any location(s) in any year, provide public notice that presents information of each intended land application of biosolids that is to occur at any and all locations in that year to the satisfaction of the environment officer.
2. The licensee shall notify the assigned environment officer not less than ten days prior to the commencement of removal, transportation, and land incorporation of biosolids. The notification shall include the intended starting date of the activities and the name of the contractor responsible for the activities.
3. The licensee shall, during removal, transportation, surface application, and incorporation of biosolids to land, operate, maintain, and store all materials and equipment in a manner that prevents:
 - a) the loss of biosolids and associated liquids; and
 - b) any deleterious substances (fuel, oil, grease, hydraulic fluids, coolant, paint, uncured concrete, and concrete wash water, etc.) from entering the lagoon, the discharge route, and associated watercourses.
4. The licensee 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 the Storage and Handling of Petroleum Products and Allied Products Regulation or any future amendments.

Land Application

5. The licensee shall:
 - a) apply biosolids to the identified agricultural land by incorporating it into the soil a minimum of 15 centimetres below the soil surface within 24 hours of application; and
 - b) complete the application and incorporation of the biosolids such that it is acceptable to an environment officer.
6. The licensee shall apply biosolids such that the amounts of residual nitrate-nitrogen in the 0-24 inch soil depth and Olsen-P phosphorus in the 0-6 inch soil depth do not exceed the limits of the most limiting Nutrient Management Zone, regardless of size, set forth in the Nutrient Management Regulation under The Water Protection Act or any future amendments.
7. The licensee shall not apply biosolids:
 - a) between November 10th of any year and April 10th of the following year, unless otherwise authorized in writing by the director;
 - b) to frozen soil;
 - c) less than 75 metres from any occupied residence (other than the residence occupied by the owner of the land on which the biosolids are to be applied);
 - d) less than 400 metres from a residential area;
 - e) less than 8 metres from a major wetland, bog, marsh or swamp;

- f) less than 15 metres from a first order waterway;
 - g) less than 30 metres from a second, third or fourth order waterway and less than 90 metres from any other waterway;
 - h) less than 50 metres from any groundwater well; or
 - i) on land that is subject to flooding.
8. The licensee shall not apply biosolids on land:
- a) with a depth of clay or clay till of less than 1.5 metres between the soil surface and the water table;
 - b) within 100 metres of an identifiable boundary of an aquifer which is exposed to the ground surface;
 - c) where, prior to the application of biosolids, the soil pH is less than 6.0;
 - d) where the surface slope of the land is greater than five per cent;
 - e) where, prior to the application of biosolids, the level of nitrate-nitrogen exceeds 100 kilograms per hectare in the upper 60 centimetres of the soil; or
 - f) where, prior to the application of biosolids, the concentration of sodium bicarbonate extractable phosphorous, as P, exceeds 60 micrograms per gram in the upper 15 centimetres of the soil.
9. The licensee shall not allow cattle to pasture on land on which biosolids have been applied, for a period of three years from the date of application of the biosolids. For application on land not owned by the licensee, this requirement shall be included in any agreement between the licensee and the landowner.
10. The licensee shall, on all agricultural land onto which biosolids have been applied, plant one of the following crops at the commencement of the next growing season following such application and for a period of three years from the date of application of biosolids:
- a) a cereal crop;
 - b) a forage crop;
 - c) an oil seed crop;
 - d) field peas; or
 - e) lentils.

For application on land not owned by the licensee, this requirement shall be included in any agreement between the licensee and the landowner.

11. The licensee shall apply biosolids onto agricultural land such that the cumulative weight per hectare of each heavy metal in the soil, as calculated by adding the amount of each heavy metal in the biosolids applied to the background level of the same metal, does not exceed the following levels*:

Metal	Kilogram per Hectare
Arsenic	21.6
Cadmium	2.5
Chromium (total)	115.2
Copper	113.4
Lead	126
Mercury	11.9
Nickel	90
Zinc	360

* Calculated values shall be based on a soil bulk density of 1200 kilograms per cubic metre and a soil depth of 15 centimetres. Analysis for heavy metals shall be carried out in accordance with Appendix 2 of this schedule.

Monitoring and Reporting

12. The licensee shall conduct a monitoring and analysis program that is acceptable to the director, and in accordance with Appendices 1 and 2 of this schedule to determine:
 - a) the composition of the biosolids;
 - b) the background levels of selected soil parameters for each parcel of land;
 - c) the surface slope of each parcel of land;
 - d) the presence of clay or clay till to a depth of 1.5 metres for each parcel of land;
 - e) whether metals-based, phosphorus-based, or nitrogen-based application limits are most appropriate for field-specific application rates for the lands on which the biosolids are to be applied; and
 - f) the crops grown on land on which biosolids have been applied during the previous 3-year period.

13. The licensee shall include the following in the annual report required by clause 43 of this licence in the year following any land application of biosolids:
 - a) details of the biosolids land application programs carried out during the previous year including:
 - i) a description of each parcel of land on which biosolids were applied;
 - ii) the background levels of soil parameters as listed in Appendix 1 of this schedule, for each parcel of land;
 - iii) the dry weight of biosolids applied per hectare;
 - iv) the weight of each heavy metal, in milligrams per kilogram of soil, added to each parcel of land for the metals listed in Appendix 1 of this schedule; and
 - v) the cumulative weight, in kilograms per hectare, of each heavy metal for each parcel of land as calculated by adding the amount of each heavy metal applied to the background level of the same metal;
 - b) the amount of nitrogen, phosphorus, and potassium which was added per hectare for each parcel of land;
 - c) the results of analysis of the biosolids and soil required by this licence; and
 - d) a copy of the analytical procedures used and the results of analysis of reference materials in accordance with Appendix 2 of this licence.

14. The licensee shall undertake annual post-harvest soil testing of each field for nitrate-N (0 – 24”) and phosphorus using the Olsen-P test (0 – 6”) for 3 years following biosolids application. Additionally, the licensee shall supply information from the producer regarding the amounts of nutrients from other sources (fertilizer, manure, etc.) being added to the field. Such soil test, fertilization, and cropping information shall be submitted to Manitoba Environment and Climate Change as part of the annual report required by clause 43 of this licence.

* Calculated values shall be based on a soil bulk density of 1200 kilograms per cubic metre and a soil depth of 15 centimetres. Analysis for heavy metals shall be carried out in accordance with Appendix 2 of this schedule.

Appendix 1 to Schedule B of Environment Act Licence No. 2560 R

Per clause Nos. 12 and 13 of Schedule B for biosolids sampling and analysis requirements.

Biosolids

1. A representative sample of biosolids shall be collected from each cell of the wastewater treatment lagoon from which biosolids will be removed. A representative sample of biosolids shall be a composite of biosolids samples taken from a minimum of 5 locations distributed over the surface of the cell.
2. The sample of biosolids shall be analyzed for the following parameters: *
 - a. conductivity
 - b. pH
 - c. total solids
 - d. volatile solids
 - e. nitrate nitrogen
 - f. total Kjeldahl nitrogen
 - g. ammonia nitrogen
 - h. organic nitrogen
 - i. total phosphorus
 - j. lead
 - k. mercury
 - l. nickel
 - m. potassium
 - n. cadmium
 - o. copper
 - p. zinc
 - q. chromium
 - r. arsenic

* Analysis for heavy metals must be carried out in accordance with Appendix 2 of this schedule.

Soil

1. Composite samples from each field onto which biosolids will be applied shall be taken prior to application of biosolids. Each field of twenty-four hectares or less shall be sampled from a minimum of twelve representative sites or a minimum of one sample site per two hectares for larger fields. Each sample site shall be sampled from 0 to 15 centimetres and from 0 to 60 centimetres. The entire core extracted for each sample shall be collected. All samples from similar depths within a field shall be bulked in one container for thorough mixing prior to analysis yielding two samples per field.
2. Soil samples from 0 centimetres to 15 centimetres shall be analyzed for the following: *
 - a. pH
 - b. potassium
 - c. nickel
 - d. mercury
 - e. zinc
 - f. sodium bicarbonate extractable phosphorus, as P
 - g. cadmium
 - h. chromium
 - i. copper
 - j. lead
 - k. arsenic

* Analysis for heavy metals must be carried out in accordance with Appendix 2 of this schedule.

3. Soil samples from 0 to 60 centimetres shall be analyzed for the following:
 - a. nitrate nitrogen
 - b. total nitrogen

* Calculated values shall be based on a soil bulk density of 1200 kilograms per cubic metre and a soil depth of 15 centimetres. Analysis for heavy metals shall be carried out in accordance with Appendix 2 of this schedule.

Crops

1. The type of crop grown on lands on which biosolids have been applied during the previous 3-year period shall be listed along with the legal description of the land and the date of application of biosolids.

* Calculated values shall be based on a soil bulk density of 1200 kilograms per cubic metre and a soil depth of 15 centimetres. Analysis for heavy metals shall be carried out in accordance with Appendix 2 of this schedule.

Appendix 2 to Schedule B of Environment Act Licence No. 2560 R

Per clause Nos. 11, 12, and 13 of Schedule B for analysis of metals

The analysis for all metals shall be carried out in accordance with the following requirements:

1. The laboratory performing these analysis shall:
 - a) possess and maintain accreditation with the Canadian Association for Laboratories Accreditation Inc. (CALA) and/or the Standards Council of Canada (SCC);
 - b) operate a quality assurance program acceptable to the assigned environment officer;
 - c) monitor the accuracy of the sludge and soil analyses for each set of ten or fewer samples of sludge or soil through the use of a suitable reference material acceptable to the assigned environment officer; and
 - d) analyse field duplicates of samples based on a frequency of one in each set of ten or fewer field samples and that the acceptance criteria for duplicate analysis should be within +/- 10 percent.
2. A copy of the analytical procedures and the analytical results for associated reference materials used in the laboratory, and any other controls used in the analysis, shall be submitted with the field sample results.
3. If the analytical results of any associated reference materials do not meet the following criteria, the soil and/or sludge samples must be re-analyzed:

- Arsenic	± 35 percent from the reference value
- Cadmium	± 25 percent from the reference value (for values above 1 µg/g)
- Cadmium	± 35 percent from the reference value (for values below 1 µg/g)
- Chromium	± 25 percent from the reference value
- Copper	± 25 percent from the reference value
- Lead	± 25 percent from the reference value
- Mercury	± 35 percent from the reference value
- Nickel	± 25 percent from the reference value
- Zinc	± 25 percent from the reference value

Schedule C to Environment Act Licence No. 2560 R

Initial Characterization of Wastewater Under Clause 41

Facility Size: Very small (less than 500 m³/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.)
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 *Esherichia 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) total residual chlorine expressed as milligrams per litre if chlorine was used;
 - 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.