Manitoba
Conservation and Climate
Environmental Stewardship Division
Environmental Approvals Branch
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File No.: 144.40

June 11, 2021

Sam Mirza-Agha
Municipal Superintendent
Town of The Pas
Box 870
The Pas MB R9A 1K8
sam@townofthepas.ca

Dear Sam Mirza-Agha:

Re: Notice of Alteration Response

I am responding to the March 2, 2021 Notice of Alteration (NoA) respecting proposed minor alterations to the Town of The Pas wastewater treatment lagoon upgrade. Environment Act Licence No. 3313 applies to this lagoon.

The NoA describes three components associated with the request: changing the liner of the Submerged Attached Growth Reactor (SAGR) cells to soil liners rather than HDPE liners, adding an emergency discharge between the aerated lagoon and the SAGR cells, and adding an additional baffle curtain to the lagoon cell.

Additional information regarding the design and characteristics of the proposed soil liner and potential frequency and extent of use of the proposed emergency discharge was requested. No additional information regarding the baffle curtain was requested. Additional information regarding re-designs of the soil liners of the SAGR cells was provided in emails dated April 6, 21, 23, and 27, 2021. Additional information regarding the anticipated frequency and extent of use of the proposed emergency discharge and a statement indicating that a gate valve was to be added were provided in May 26, 2021 and June 1, 2021 emails, respectively.

After careful review of the March 2, 2021 NoA letter and the supplementary information identified above, I have concluded that the environmental effects of the identified alterations described above will be insignificant, and, therefore, pursuant to Section 14(2) of The Environment Act are approved as follows:

1. The Licencee shall, at least once every two-week period that construction is occurring, provide updates to the Environmental Approvals Branch engineer regarding construction activities associated with the soil liners of the SAGR cells and other key components of the development to facilitate timely scheduling of required inspections.

2. The Licencee shall immediately notify the Director each time a discharge occurs through the emergency discharge located between the lagoon and SAGR cells.

3. The Licencee shall obtain representative grab samples of the effluent being discharged through the emergency discharge located between the lagoon and SAGR cells near the onset, during, and near the anticipated completion of each such discharge event, have each sample analyzed for the characteristics identified in Clause 48 of the Licence, and report the results in accordance with the requirements of the Licence or as requested by an Environment Officer.

4. The Licencee shall, if reporting is required pursuant to Item 2 above more than once in any twenty-four consecutive month period:
   a) engage the services of a qualified consultant, acceptable to the Director, to undertake investigations of the wastewater collection system, aerated wastewater treatment lagoon, SAGR, and related infrastructure, to determine the ability or inability of the existing system to meet the hydraulic loading capacity of the Development. The investigation shall include but not be necessarily limited to:
      i) diagnosis of the cause(s) of the emergency discharges;
      ii) diagnosis of the cause(s) of possible recent exceedances of maximum operating depths of the aerated wastewater treatment lagoon;
      iii) sources of infiltration into the wastewater system including the infrastructure of the Development;
      iv) current hydraulic loading of the system;
      v) lack of storage capacity due to sludge build-up within existing cells;
      vi) the organic loading on the aerated cell in terms of the five day biochemical oxygen demand; and
      vii) operating procedures;
   b) provide to the Director, within four months of the notification given pursuant to Item 1 above, 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 Item 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 loadings on the components of the system.

5. The Licencee shall avoid flushing of water mains during periods that would contribute to overflows through the emergency discharge located between the lagoon and SAGR system.

6. The Licencee shall develop and submit to the Director for approval, prior to the completion of the construction of the emergency discharge located between the lagoon and SAGR, a written operating plan for the associated gate valve and other control mechanisms of the emergency discharge.

This approval is conditional on the acceptance of a revised licence to be issued in the near future.

If you have any questions, please contact Robert Boswick, Senior Environmental Engineer, Environmental Approvals Branch, at (204) 918-5853 or Robert.Boswick@gov.mb.ca .

Sincerely,

Original Signed By
Siobhan Burland Ross
for Shannon Kohler, Director
The Environment Act

cc: David Kelly, P.Eng. - J.R. Cousin Consultants Ltd
Kristal Harman, Yvonne Hawryliuk, Tyler Kneeshaw - Environmental Compliance and Enforcement
Siobhan Burland Ross, Robert Boswick - Environmental Approvals
Public Registry

THE ENVIRONMENT ACT
LOI SUR L'ENVIRONNEMENT

LICENCE

Manitoba

Client File No.: 144.40 **Licence No. / Licence n° 3313**

Issue Date / Date de délivrance February 19, 2020

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:

THE TOWN OF THE PAS;
"the Licencee"

for the construction, operation and maintenance of the Development being a wastewater collection system, a dewatering cell, land application of biosolids generated from the existing aeration cell and the dewatering cell, six Submerged Attached Growth Reactor (SAGR) cells, an aeration building, a baffle curtain in the existing lagoon cell, a phosphorus treatment facility, an ultra violet (UV) disinfection system, and an existing single aerated cell all located on portions of north half of 2-56-26 WPM with an average daily hydraulic loading of 9,431 cubic metres per day for a design population equivalent of 9,950 with continuous discharge of treated wastewater from the Development into Grace Lake via a drainage ditch and a wetland area, and in accordance with the proposal filed under The Environment Act on March 28, 2018 and additional requested information submitted on October 24, 2018, June 11, 2019, and November 4, 2019 subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"access road" means a road that leads from a Provincial Trunk Highway, Provincial Road, or a municipal road;

"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 Climate 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;

"acute lethality" means a toxic effect resulting in death in an organism by a substance or mixture of substances within a short exposure period (usually 96 hours or less);

"aerated" means the bringing about of intimate contact between air and a liquid by bubbling air through the liquid;

"aerated cell" means a cell of a wastewater treatment lagoon system in which mechanical or diffused-air aeration is used to supplement the oxygen supply;

"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;

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

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

“aquifer” means a water saturated geologic unit that will yield water to wells or springs at a sufficient rate so that the wells or springs can serve as practical sources of water supply;

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

"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;

"biosolids" means accumulated organic solids, resulting from wastewater treatment processes, that have received adequate treatment to permit the material to be recycled;

"composite sample" means a quantity of undiluted wastewater consisting of a minimum of 10 equal volumes of effluent, or flow proportional volumes collected over a 24-hour period, and may be collected manually or by means of an automatic sampling device;

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

"day" means any 24-hour period;

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

"E. coli" means Escherichia coli, a species of enteropathogenic microorganism occurring in the feces of warm-blooded animals;

"effluent" means treated wastewater flowing or pumped out of the aerated 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^{o}C, and associated with fecal matter of warm-blooded animals;

"final discharge point" means the outlet from the ultra violet unit where the effluent monitoring station is located as identified in Schedule B to this Licence.

“first order waterway” means a drain or watercourse serving a watershed with a drainage area of up to one square mile;

"five-day biochemical oxygen demand (BOD_5)" means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within 5 days at a temperature of 20^{o}C;

"five-day carbonaceous biochemical oxygen demand ($CBOD_5$)" 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;

"HDPE" means high density polyethylene;

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

"high water mark" means the line on the interior surface of the aerated cells and a two cell dewatering pond 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;

"**Wastewater Services Agreement**" means an agreement between Berscheid Meat Industry and the Licencee for collection and treatment of wastewater generated from the Berscheid Meat Industry at the Town of the Pas’ wastewater treatment facility;

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

"in-situ" means on the site;

"mg/L" means milligrams per litre;

"low water mark" means the line on the interior surface of the aerated cells and two dewatering pond 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;

"noise nuisance" means an unwanted sound, in an affected area, which is annoying, troublesome, 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 unwanted sound

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 unwanted sound 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;

"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;

“reference material” means soil or sludge material which is used as a reference;

“reference value” means the value established by the agency that supplied the reference material;

"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 earth surfaces against wave action or current;

"SAGR" means submerged attached growth reactor;

“second order waterway” means a drain or watercourse servicing a watershed with a drainage area greater than one square mile or having a tributary or tributaries which are first order waterways;

"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;

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

"truck dumping station" means a facility used to receive, store and meter wastewater, including septage, which has been hauled to the sewage treatment plant with a truck;

"UV disinfection" means a disinfection process for treating wastewater using ultraviolet radiation;

"UV germicidal dose" means the units of intensity of ultra violet light that is required to kill bacteria and viruses present in the wastewater effluent;

"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;

"waste disposal ground" means an area of land designated by a person, municipality, provincial government agency, or crown corporation for the disposal of waste and approved for use in

accordance with Manitoba Regulation 37/2016, or any future amendments thereto, or a Licence pursuant to The Environment Act; and

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

"**water table"** means the upper surface of the zone of saturation of a water bearing geologic unit.

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.

Retain Copy of Licence

1. The Licencee 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.

Wastewater Source

2. The Licencee shall:
   a) direct all wastewater generated within the Town of The Pas and the Rural Municipality of Kelsey toward the Development or other approved wastewater treatment facilities; and
   b) only direct wastewater as defined in this Licence into the wastewater treatment lagoon.

Wastewater Services Agreement

3. The Licencee shall:
   a) prior to the commencement of the operation of the SAGR cells, prepare and execute a current, comprehensive and enforceable Wastewater Services Agreement, which is acceptable to the Director, to address pre-treatment of wastewater generated from Berscheid Meats such that the non-organic solids (primary screenings) in the wastewater are captured in the pre-treatment facility before the wastewater is discharged into the aerated cell of the wastewater treatment facility and the primary screenings are disposed of in a waste disposal ground;
   b) provide the Director with a copy of the Wastewater Services Agreement upon being signed by both parties; and
   c) provide the Director with a copy of any future revised Wastewater Services Agreement.

Future Sampling

4. 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

5. 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 Noise Nuisance

6. The Licencee shall not cause or permit a noise 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 a noise nuisance.

Respecting Odour Nuisance

7. 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.

Respecting Emergency Response Plan

8. The Licencee shall, prior to the commencement of the operation of the SAGR cells, submit to the Director for approval a contingency plan, in accordance with the Manitoba Industrial Accidents Council (MIAC) Industrial Emergency Response Planning Guide, outlining procedures to be used in the event of a leak, spill, fire or other hazardous

condition, should the effluent ammonia loading discharged into Grace Lake be greater than the permitted level, and upon failure to meet the acute toxicity level in the effluent.

Respecting Equipment Breakdown or Process Upset

9. 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.

10. The Licencee shall, following the reporting of an event pursuant to Clause 9:
    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.

11. 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.

Respecting Compliance with Other Acts and Regulations

12. The Licencee shall comply with the requirements of Manitoba Regulation 62/2008 respecting Nutrient Management or any future amendment thereof.

13. The Licencee shall, prior to commencement of construction of relevant components of the Development, obtain all necessary provincial and federal permits and approvals.

Respecting All Weather Access Road

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.

Future Studies

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

Respecting Land Application of Biosolids

16. The Licencee shall land apply the biosolids generated from the existing aerated cell and the dewatering cell in accordance with the Environment Act Proposal submitted on March 28, 2018 and the additional information submitted on October 16, 2018, and in accordance with the specifications, limits, terms, and conditions prescribed under Schedule A of this Licence.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Respecting Construction - General

17. 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.

18. 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 Development 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.

19. The Licencee shall, during construction of the Development and during removal, transportation and land incorporation or land injection of biosolids, 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 aerated wastewater treatment lagoon, the discharge route and associated watercourses, and have an emergency spill kit for in water use available on site during construction.

20. The Licencee shall dispose of non-reusable construction debris from the Development at a waste disposal ground.

21. 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 or any future amendment thereof.

22. The Licencee shall not alter local drainage patterns by the construction of the Development.

23. The Licencee shall, during construction and maintenance of the Development, and during all biosolids land application activities, prevent the introduction and spread of foreign aquatic and terrestrial biota by cleaning equipment prior to its delivery to the site of the Development in accordance with the requirements of Manitoba Regulation 173/2015 respecting Aquatic Invasive Species, or any future amendment thereof.

24. The Licencee shall, prior to the approved commissioning of the SAGR cells in accordance with Clause 29(g) of this Licence:
    a) construct and make available for use by an Environment Officer, secured and heated monitoring stations, allowing direct accesses to the final discharge point;
    b) have the monitoring stations accessible to an Environment Officer at all times;
    c) install and maintain flow measuring devices at the monitoring stations or at locations acceptable to the Director which are capable of measuring the volumes of effluent with an accuracy of ± 2 percent;
    d) have the flow measuring devices re-calibrated on the request of an Environment Officer;
    e) equip the monitoring stations with sampling devices available on request for use by an Environment Officer; and
    f) equip the monitoring stations with an electrical power source of 15 amperes at 110 volts.

Respecting Fence

25. The Licencee shall install and maintain a fence around all cells of the Development including the wastewater treatment facility building and SAGR components 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, SAGR components, and wastewater treatment facility buildings.

Respecting Prevention of Erosion of Ditch Bed and Bank

26. The Licencee shall install and maintain riprap on the ditch bed and bank at the location of the outfall of the effluent discharge to prevent erosion of the ditch bed and bank to the satisfaction of an Environment Officer.

Respecting Construction of the Continuous Clay Soil Liners of the Aerated Cell and the Dewatering Cell

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

28. The Licencee shall construct and maintain the aerated cell and the dewatering cell of the wastewater treatment lagoon as indicated in Schedule B to this Licence with a continuous liner, including cut-offs, under all interior surfaces of each 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 of the aerated cell, as identified in Schedule B to this Licence, shall be constructed to an elevation of 6 metres above the base of the aeration cell of the wastewater treatment lagoon; and
    e) the liner of the dewatering cell, as identified in Schedule B to this Licence, shall be constructed to an elevation of 3.8 metres above the base of the dewatering pond.

Respecting Construction and Testing of the SAGR Facility

29. The Licencee shall construct and maintain SAGR Cells #1, 2, 3, 4, 5, and 6 of the Development as indicated in Schedule B of this Licence with continuous liners under all interior surfaces of each cell such that:
    a) the liners are constructed from HDPE geomembrane;
    b) the liners have a minimum thickness of 60 mils;
    c) all sections of the liners are joined by dual track seaming;
    d) the liners are installed in accordance with ASAE Standard EP340.2 for the Installation of Flexible Membrane Linings;
    e) the liners are installed to a minimum elevation that will effectively contain the material components of the SAGR cells and prevent loss of liquid by overflowing of the cells;
    f) non-destructive test methods are used to test the integrity of:
        i) all field seams joining sections of the liners 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) a testing report is prepared and submitted to the assigned Environment Officer of the Approvals Branch for approval within 30 days of commencing the installation of the liners The installation report shall include the test results, a discussion of

the results, and a statement that the liner was installed in accordance with the manufacturer's requirements; and

h) the liners are covered on the operating side with protective non-woven geotextile cover material.

Respecting Certification

30. 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.

31. 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.

Respecting Operation – Wastewater Treatment Lagoon

32. 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.

33. The Licencee shall, from the date of issuance of this Licence until and including December 31, 2021, limit the influent wastewater loading to the wastewater treatment plant, such that:
    a) the organic loading on the existing aerated wastewater treatment lagoon cell, in terms of the five-day biochemical oxygen demand, does not exceed 510 kilograms per day;
    b) the hydraulic loading on the aerated cells of the wastewater treatment lagoon does not exceed 3,563 cubic metre per day;
    c) a minimum of 2 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.0 metres of the liquid column in the aerated cell;
    d) the depth of liquid in the aerated cell does not exceed 4.5 metres;
    e) the depth of liquid in the dewatering cell does not exceed 2.8 metres;
    f) a minimum of 1.5 metre freeboard is maintained in the aerated cell at all times; and
    g) a minimum of 1.0 metre freeboard is maintained in the dewatering cell at all times.

34. The Licencee shall, on and after December 31, 2021, operate and maintain the existing aerated cell of the existing wastewater treatment lagoon as identified in Schedule B to this Licence in such a manner that:
    a) the organic loading on the existing aerated wastewater treatment lagoon cell, in terms of the five-day biochemical oxygen demand, is not in excess of 669.5 kilograms per day;

b) the average daily wet weather hydraulic loading on the aerated cells of the wastewater treatment lagoon does not exceed 9,431 cubic metres per day;
c) a minimum of 2 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.0 metres of the liquid column in the aerated cell;
d) the depth of liquid in the aerated cell does not exceed 4.5 metres;
e) the depth of liquid in the dewatering cell does not exceed 2.8 metres;
f) a minimum of 1.5 metre freeboard is maintained in the aerated cell at all times; and
g) a minimum of 1.0 metre freeboard is maintained in the dewatering cell at all times.

35. The Licencee shall operate and maintain SAGR Cells #1, 2, 3, 4, 5, and 6 of the Development, as identified in Schedule B of this Licence, in such a manner that
a) the depth of liquid in each cell does not exceed 2.4 metres;
b) the liquid level in each cell does not exceed the elevation of the non-woven geotextile located between the top of the granular media and the insulating peat layer; and
c) the elevation of the top of the vertical wall HDPE liners in each cell exceeds the elevation of the top of the insulating peat layer.

36. The Licencee shall, from the date of issuance of this Licence until and including December 31, 2021, not discharge effluent from the Development, as sampled at the existing chlorination building, where:
a) 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) the total suspended solids content of the effluent is in excess of 25 milligrams per litre;
c) the *Escherichia coli* (*E. Coli*) content of the effluent, as indicated by the MPN index, is in excess of 200 per l00 millilitres of sample, as determined by the monthly geometric mean of 1 grab sample collected at equal intervals on each of a minimum of 3 consecutive days per week; or
d) 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.

37. The Licencee shall, on and after December 31, 2020, not discharge effluent from the Development, as sampled at the final discharge point, where the total phosphorus content of the effluent is in excess of 1.0 milligrams per litre based on a 30 day rolling average.

38. The Licencee shall, on and after December 31, 2021, not discharge effluent from the Development, as sampled at the final discharge point, where:
a) 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) the total suspended solids content of the effluent is in excess of 25 milligrams per litre;
c) the *Escherichia coli* (*E. Coli*) content of the effluent, as indicated by the MPN index, is in excess of 200 per l00 millilitres of sample, as determined by the

monthly geometric mean of 1 grab sample collected at equal intervals on each of a minimum of 3 consecutive days per week;

d) 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; or

e) the total ammonia content of the effluent expressed as total ammonia nitrogen (N) in milligrams per litre is in excess of the ammonia concentration specified below in Table 1:

Table 1: Total Ammonia Concentration in milligrams per litre

Effluent pH	**Effluent, Total Ammonia expressed as N (mg/L)**
6.50	16.67
6.60	16.41
6.70	16.11
6.80	15.74
6.90	15.29
7.00	14.77
7.10	14.17
7.20	13.47
7.30	12.69
7.40	11.83
7.50	10.91
7.60	9.94
7.70	8.95
7.80	7.96
7.90	6.99
8.00	6.08
8.10	5.24
8.20	4.48
8.30	3.81
8.40	3.22
8.50	2.72
8.60	2.30
8.70	1.95
8.80	1.65
8.90	1.41
9.00	1.22

Respecting Acute Toxicity

39. The Licencee shall not, upon approved commissioning of the SAGR cells in accordance with Clause 29(g) of this Licence, release a quality of effluent from the wastewater treatment lagoon which:
    a) on any day, causes, or contributes to, the mixing zone for the effluent in Grace Lake being acutely lethal to aquatic life passing through the mixing zone; or
    b) can be demonstrated to be acutely lethal to fish within the mixing zone for the effluent in Grace Lake by using a 96-hour static acute lethality test which results in mortality to more than 50 percent of the test fish exposed to 100 percent concentration of effluent, with the test carried out in accordance with the protocol outlined in Environment Canada's "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout: EPS 1/RM/13 Second Edition - December 2000" or any future amendment thereof.

Respecting Disinfection – UV

40. The Licencee shall, upon a request from the Director following a reporting of non-compliance with Clause 38(c), submit a plan to complete the construction and commissioning of a UV disinfection treatment facility in accordance with the following:
    a) The Licencee shall have adequate instrumentation installed to provide constant monitoring of the UV disinfection treatment process to ensure compliance with the UV disinfection requirements. Such instrumentation shall include but not be limited to the following:
        i) a UV sensor to monitor lamp intensity;
        ii) an appropriate alarm and shutdown systems;
        iii) a lamp monitoring system to identify the location of individual lamp failures;
        iv) an hour meter which cannot be reset to display actual hours of UV lamp operation; and
        v) protective circuits for overcurrent and ground current leakage detection;
    b) The Licencee shall utilize UV lamps in the UV disinfection process that have a rated output of at least 254 nanometres (nm) capable of delivering a germicidal dose in excess of 30,000 microwatt seconds/sq cm; and
    c) The Licencee shall operate and maintain the UV disinfection system to give a germicidal dose of 80% or more of the design UV germicidal dose, at the end of the lamp life.

Respecting Disinfection – Chlorine

41. The Licencee shall, from the date of issue of this Licence, 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

42. The Licencee shall, if in the opinion of the Environment Officer significant erosion of the interior surfaces of the dykes occurs, repair the dyke 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 0.6 metres below the low water mark to protect the dykes from wave action.

43. The Licencee shall provide and maintain a grass cover on the dykes of the aerated cell and of the dewatering cell of the Development, and shall regulate the growth of the vegetation so that the height of the vegetation does not exceed 0.3 metres on all dykes.

44. The Licencee shall annually remove by mechanical methods all reeds, rushes and trees located above the low water mark in the aerated cell and the dewatering cell of the Development.

45. The Licencee shall implement an ongoing program to remove burrowing animals from the site of the Development.

MONITORING AND REPORTING

General

46. 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 and Reporting

47. The Licencee shall arrange for the taking of samples of effluent at locations that are accessible during all weather conditions and have been approved by the Director.

Respecting Continuous Discharge - Grab Samples

48. The Licencee shall, prior to approved commissioning of the SAGR cells in accordance with Clause 29(g) of this Licence, obtain grab samples of the treated wastewater during the discharge period 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 over every two weeks;
    b) the total suspended solids content expressed as milligrams per litre over every two weeks;
    c) the fecal coliform content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample;
    d) the total phosphorus content expressed as milligrams per litre every week;
    e) the unionized ammonia nitrogen expressed as milligrams per litre over every two weeks;
    f) pH;
    g) temperature;
    h) the total ammonia content of the effluent expressed as total ammonia nitrogen (N) in milligrams per litre over every week; and
    i) residual chlorine expressed as milligrams per litre every day.

49. The Licencee shall:
    a) take one grab sample of the effluent from the effluent monitoring station collected at equal intervals on each of a minimum of 3 consecutive days per week during the discharge period;
    b) have the grab samples analyzed for *Escherichia coli* (*E. Coli*) content as indicated by the MPN index and expressed as MPN per 100 millilitres per sample; and
    c) determine and record the monthly geometric mean for each of the *Escherichia coli* (*E. Coli*) counts based on all the data collected during each month, from a minimum of twelve (12) grab samples per month.

Respecting Continuous Discharge - Flow Proportional Composite Samples

50. The Licencee shall, upon approved commissioning of the SAGR Cells in accordance with Clause 29(g) of this Licence:
    a) take one flow proportional composite sample of effluent from the effluent monitoring station over a 24 hour period during the discharge period once each week from January 1 to December 31 of any year;
    b) have the flow proportional composite sample of effluent, as sampled in accordance with Clause 50(a) of this Licence, analyzed for the following:
        i) total nitrogen expressed as milligrams per litre;
        ii) total phosphorus expressed as milligrams per litre; and
        iii) total ammonia expressed as nitrogen (N) as milligrams per litre;
    c) calculate the thirty-day rolling average value for total nitrogen and total phosphorus for the day during which sample was collected; and

d) prepare and submit to the designated Environment Officer a monthly report on total ammonia load and the thirty-day rolling average for total nitrogen and total phosphorus load.

51. The Licencee shall, upon approved commissioning of the SAGR Cells in accordance with Clause 29(g) of this Licence:
    a) take one flow proportional composite sample of effluent from the effluent monitoring station over a 24 hour period during the discharge period every two weeks from January 1 to December 31 of any year;
    b) have the flow proportional composite sample of effluent, as sampled in accordance with Clause 51(a) of this Licence, analyzed for the following:
        i) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand (CBOD5) and expressed as milligrams per litre;
        ii) total suspended solids expressed as milligrams per litre;
        iii) unionized ammonia expressed as nitrogen (N) as milligrams per litre;
        iv) pH; and
        v) temperature.

Respecting Acute Lethality

52. The Licencee shall, upon approved commissioning of the SAGR cells in accordance with Clause 29(g) of this Licence:
    a) take one flow proportional composite samples of effluent from the effluent monitoring station over a 24 hour period every three months each year with a minimum separation time of 90 days between samples;
    b) have one bioassay sample of the effluent analyzed at 100 percent concentration for acute lethality in accordance with the protocol outlined in Environment Canada's "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout: EPS 1/RM/13 Second Edition – December 2000", or any future amendment thereof; and
    c) report the results to the Director within 30 days of the end of the month during which the samples were taken.

Respecting Records Maintenance and Reporting

53. 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;
    d) a summary of laboratory analytical results;
    e) effluent discharge dates;
    f) continuous measurement of effluent discharge after approved commissioning of the SAGR cells in accordance Clause 29 (g) of this Licence;
    g) accurate effluent discharge volumes from the Development;
    h) maintenance and repairs;

i) expansions to the collection system with associated capacity assessment;
j) updated organization charts identifying all certified operators, including backup operators;
k) a summary of any wastewater collection system overflows; and
l) an annual report that assesses the Development's ammonia and nutrient (that is, total nitrogen and total phosphorus) reduction performance for the previous year.

54. The Licencee shall submit an annual report to the Environment Officer by February 28 of the following year including all records required by Clause 53 of this Licence.

Respecting Operating Depth and Freeboard Non-Compliance Events

55. The Licencee shall immediately notify the Director each time the operating depth of any cell of the Development does not comply with the maximum operating depth and minimum freeboard requirements for that cell as specified in Clause 33 or Clause 34 of this Licence.

56. The Licencee shall, if reporting is required pursuant to Clause 55 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 aerated wastewater treatment lagoon and related infrastructure including the cells of the dewatering pond, 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 aerated 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 55 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

57. The Licencee shall maintain, retain, and provide to an Environment Officer upon request, 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) prior to December 31, 2021, if the septage discharged in any one day exceeds 31,500 litres (approximately 7 septic tanks), an assessment of compliance with Clause 33(a); or
    f) on and after December 31, 2021, if the septage discharged in any one day exceeds 31,500 litres (approximately 7 septic tanks), an assessment of compliance with Clause 34(a).

Respecting Soil Liner Sampling, Testing and Reporting

58. 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.

59. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule C to this Licence, from the soil liners of the aerated cell and the dewatering cell 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 10 samples per cell.

60. The Licencee shall, not less than 2 weeks before any new or upgraded clay-lined cell (that is, the aerated cell and the dewatering cell) of the wastewater treatment lagoon is placed in operation, submit for the approval of the Environment Officer the results of the tests carried out pursuant to Clause 59 of this Licence.

Respecting Initial Characterization

61. The Licencee shall, during the first year of approved commissioning of the SAGR cells in accordance with Clause 29(g) of this Licence, obtain and analyze grab samples of the effluent from the final discharge point of the Development and report the results of the analysis in accordance with Schedule D attached to this Licence.

Respecting Record Drawings

62. 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 commissioning the SAGR cells of the Development, two electronic copies of the "record drawings" of the Development.

REVIEW AND REVOCATION

A. Licence No. 2209 S1 E is hereby rescinded.

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, 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

Shannon Kohler
Director
The Environment Act

Schedule A to Environment Act Licence No. 3313

Pursuant to Clause 16 Respecting Land Application of Biosolids

Respecting Land Application of Biosolids

1. The Licencee shall, during all biosolids land application activities, comply with the requirements of Manitoba Regulation 62/2008 respecting Nutrient Management or any future amendment thereof.

2. The Licencee shall only apply the biosolids to agricultural lands approved by the Director.

3. The Licencee shall temporarily suspend the continuous discharge of effluent from the aerated cell during the desludging process in order to avoid releasing additional suspended solids into Grace Lake.

4. The Licencee shall not cause spilling of wastewater from the aerated cell of the existing wastewater treatment lagoon during desludging activities.

5. The Licencee shall transport biosolids in containers in such a manner to prevent loss of biosolids, sludge solids and associated liquids to the satisfaction of an Environment Officer.

SPECIFICATIONS, LIMITS, TERMS, AND CONDITIONS

6. The Licencee shall, prior to land application of biosolids generated from the existing aerated cell and dewatering cell located on portions of north half of 2-56-26 WPM, submit a detailed plan, for review and approval of the Director of the Approvals Branch with supporting documentation demonstrating that the land application of biosolids materials are carried out in an environmentally sustainable and agronomically suitable manner.

7. The Licencee shall, not less than two weeks prior to land application of biosolids, publish a public notice in the local newspaper(s) to advise local residents of the intended biosolids application sites and submit a copy of the same to the designated Environment Officer of the Approvals Branch.

8. The Licencee shall not dispose of biosolids from the aerated cell and the dewatering cell located on portions of north half of 2-56-26 WPM in a manner other than that approved in Clause 6 of this Schedule.

Respecting Operation–Biosolids Management

9. The Licencee shall notify the assigned Environment Officer not less than ten days prior to the commencement of removal, transportation and land incorporation or land injection of biosolids. The notification shall include the intended starting date of the activities and the name of the contractor responsible for the activities.

10. The Licencee shall:
    a) apply the biosolids to the agricultural lands approved in accordance with

Clause 6 of this Schedule by injecting or incorporating biosolids originating from the aerated cell and dewatering cell located on portions of the north half of 2-56-26 WPM into the soil such that the depth at which the biosolids are introduced into the soil is a minimum of 15 centimetres below the soil surface and there is no surface expression; and

b) complete the incorporation or injection of the biosolids such that it is acceptable to an Environment Officer.

11. The Licencee 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 amendment thereof.

12. The Licencee shall not permit the application of 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 solids 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 the distance between the water's edge and the high water mark from a wetland, bog, marsh or swamp other than a major wetland, bog, marsh or swamp;
    g) less than 15 metres from a first order waterway;
    h) less than 30 metres from a second, or higher order waterway;
    i) less than 50 metres from any groundwater well;
    j) within 15 metres of the edge of a groundwater feature;
    k) less than 30 metres from a lake or reservoir designated as vulnerable;
    l) less than 15 metres from a lake or reservoir, not designated as vulnerable; or
    a) on land that is subject to flooding.

13. The Licencee 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 5 percent;
    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.

14. The Licencee 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.

15. The Licencee shall, on all agricultural land(s) 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.

16. The Licencee shall apply biosolids onto agricultural land(s) 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 must be carried out in accordance with Appendix 2 of this Schedule.

MONITORING AND REPORTING

17. The Licencee shall submit to the Director, at least two weeks prior to commencing with the biosolids land application activities, the details of the biosolids sampling and analysis program used to determine if phosphorus-based or nitrogen-based or metal-based biosolids application limits are most appropriate and for determining field-specific application rates for the lands on which the biosolids are to be applied.

18. The Licencee shall submit to the Director, not later than the 1st day of December in the year of biosolids applications, the details of the biosolids sampling and analysis programs used to determine the volumes and solids contents of the biosolids

removed on a daily basis and the volume and the solids content of biosolids applied to each field.

19. The Licencee shall submit to the Director, not later than the 1st day of December in the year of biosolids applications, the details of the field monitoring programs on the biosolids disposal operations used to determine the following:
    a) the sodium bicarbonate extractable phosphorous, as P, in the upper 15 centimetres of the soil;
    b) the nitrate-nitrogen and total nitrogen in the upper 60 centimetres of the soil;
    c) the background level of metals (i.e., Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Zinc) in the upper 60 centimeters of the soil;
    d) the pH of the soil;
    e) the surface slope of the land;
    f) the presence of clay and clay till to a depth of 1.5 metres;
    g) the number of hectares in each field that can receive biosolids in accordance with the Licence; and
    h) the number of hectares on which biosolids were applied on a daily basis.

20. The Licencee 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; and
    c) the crops grown on land on which biosolids have been applied during the previous 3-year period.

21. The Licencee shall, on or before the 1st day of December of each year that this Licence is in effect, submit to the Director a report, which will include the following:
    a) details of the biosolids land application programs carried out during the previous 12 month period including:
        (i) a description of each parcel of land on which biosolids were distributed;
        (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;
    d) a copy of the analytical procedures used and the results of analysis of reference materials in accordance with Appendix 2 of this Schedule; and

e) the type of crops grown on land on which biosolids were applied during the previous 3-year period.

22. The Licencee 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 Licencee 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 the Director on or before the 15th day of March of each year following a year when application of biosolids occurred for three successive years.

Appendix 1 to Schedule A of Environment Act Licence No. 3313

Pursuant to Clauses No. 20 and 21 of Schedule A outlining the 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	j.	lead
b.	pH	k.	mercury
c.	total solids	l.	nickel
d.	volatile solids	m.	potassium
e.	nitrate nitrogen	n.	cadmium
f.	total Kjeldahl nitrogen	o.	copper
g.	ammonia nitrogen	p.	zinc
h.	organic nitrogen	q.	chromium
i.	total phosphorus	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	g.	cadmium
b.	potassium	h.	chromium
c.	nickel	i.	copper
d.	mercury	j.	lead
e.	zinc	k.	arsenic
f.	sodium bicarbonate extractable phosphorus, as P		

* 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

Crops 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.

Appendix 2 to Schedule A of Environment Act Licence No. 3313

Pursuant to Clauses No. 16, 20, 21 of Schedule A for analysis of metals.

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

1. The laboratory performing these analyses shall
   a) possess and maintain accreditation with the Canadian Association for Laboratories Accreditation Inc. (CALA);
   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) analyze 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

<u>Schedule B to Environment Act Licence No. 3313</u>
Pursuant to Clauses 28, 29, 34, and 35

Figure 1: The Town of the Pas Wastewater Treatment Facility

Not to Scale

Schedule C to Environment Act Licence No. 3313

Soil Sampling and Testing Pursuant to Clause 59

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.

Schedule C to Environment Act Licence No. 3313 (cont'd)

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, 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 D to Environment Act Licence No. 3313

Initial Characterization of Wastewater Pursuant to Clause 61

Facility Size: Medium (greater than 2500 m^3/day but less than 17,500 m^3/day)
Facility Type: Sewage Treatment Plant - Continuous discharge

Effluent Sampling:

During the first year of operation:
1. a grab sample shall be collected every two weeks;
2. a grab sample shall be collected on a quarterly basis; and
3. a grab sample shall be collected on a daily basis, if chlorine is used.

Effluent Analysis:

1. Have the bi-weekly 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 indicted 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 ammonia nitrogen expressed as milligrams per litre;
    h) nitrate-nitrite nitrogen expressed as milligrams per litre;
    i) total Kjeldahl nitrogen, TKN (ammonia + organic N) expressed as milligrams per litre;
    j) dissolved phosphorus expressed as milligrams per litre;
    k) total phosphorus expressed as milligrams per litre;
    l) temperature; and
    m) pH.

2. Have the quarterly sample analyzed for:
    a) fluoride;
    b) nitrate;
    c) nitrate + nitrite;
    d) total extractable metals and metal hydrides (full range);
    e) chemical oxygen demand (COD);
    f) organochlorine pesticides;
    g) polychlorinated biphenyls (PCBs);
    h) polycyclic aromatic hydrocarbon (PAHs);
    i) cyanide (total);
    j) pH;

k) volatile organic compounds;
l) mercury;
m) phenolic compounds;
n) surfactants;
o) acute toxicity; and
p) chronic toxicity.

3. Have the daily sample analyzed for total residual chlorine (TRC), if required.

Effluent Reporting:

1. Report the results to the Director, in writing and 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.