Manitoba

Conservation and Water Stewardship

Climate Change and Environmental Protection Division
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Mr. Douglas E. Cavers, CAO
Rural Municipality of Hanover
Box 1720
Steinbach MB R5G 1N4

April 25, 2013

Dear Mr. Cavers:

Re: Grunthal Wastewater Treatment Lagoon Alteration – Aeration Cells
Environment Act Licence No. 2984, Client File: 935.20

This is in response to a letter of April 19, 2013 from Jason Bunn of GENIVAR, requesting an alteration to Environment Act Licence No. 2984 to address a change in the configuration of aerated primary cells for the expanded Grunthal wastewater treatment lagoon. A counterberm would be constructed on the east side of the primary cells, the sideslope of these cells would be reduced to 6:1 and the centre dyke would be reduced to 2.0 m in height, with an additional 2.0 m high floating baffle curtain.

As the environmental effects of the proposed alteration are insignificant, approval is hereby provided in accordance with Section 14(2) of *The Environment Act* to implement the proposed alteration.

Please contact Bruce Webb at (204) 945-7021 or Bruce.Webb@gov.mb.ca if you have any questions concerning this authorization.

Yours truly,

Original signed by

Tracey Braun, M. Sc.
Director

c. Jason Bunn, GENIVAR
Don Labossiere, Environmental Compliance and Enforcement Branch, Winnipeg
Jason Lasuik, Environmental Compliance and Enforcement Branch, Steinbach

THE ENVIRONMENT ACT
LOI SUR L'ENVIRONNEMENT

LICENCE

Manitoba

Licence No. / Licence n° 2984

Issue Date / Date de délivrance September 15, 2011

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) / Conformément au Paragraphe 11(1)

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

RURAL MUNICIPALITY OF HANOVER; "the Licencee"

for the construction and operation of the Development being a wastewater collection system and a wastewater treatment lagoon system with a hydraulic storage capacity of 237,035 cubic metres (1,044 cubic metres per day average), located in NW, SW, and SE 20-5-5E and serving the community of Grunthal, as shown in Figures 1 and 2 attached to this Licence, with treated effluent to be discharged to Sarto Creek, which flows to Joubert Creek and then to the Rat River, in accordance with the Proposal filed under The Environment Act dated January 11, 2011 and additional information dated July 7, 2011, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"accredited laboratory" means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation 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;

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

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

"approved" means approved by the Director in writing;

"ASAE" means the American Society of Agricultural Engineers;

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

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

"day" means any consecutive 24-hour period;

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

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

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

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

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

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

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

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

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

"industrial use agreement" means a signed agreement between an industry and a municipality to discharge industrial wastewater into a specified municipal wastewater collection and treatment system;

"industrial wastewater" means wastewater derived from an industry which manufactures, handles or processes a product and does not include wastewater from commercial and residential buildings;

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

"Lift Station #1" means the wastewater pumping station located near the junction of Provincial Trunk Highway 216 and Church Avenue in the community of Grunthal;

"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;

"mg/L" means milligrams per litre;

"mil" means one thousandth of a inch;

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

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

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

if the odour, smell or aroma

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

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

"PVC" means polyvinyl chloride;

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

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

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

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

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

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

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

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

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

GENERAL TERMS AND CONDITIONS

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

1. In addition to any of the following specifications, limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
   a) sample, monitor, analyze or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such pollutants, ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, and for such duration and at such frequencies as may be specified;
   b) determine the environmental impact associated with the release of any pollutant from the Development; or
   c) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and

analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

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

3. The Licencee shall direct all wastewater generated within the community of Grunthal toward the wastewater treatment lagoon system, except for such categories of wastewater which are restricted by an industrial use agreement or which are approved by licence, permit, regulation or by the Director to be disposed of by alternative means and /or at alternative locations.

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

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

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Respecting Construction - General

6. The Licencee shall notify the assigned Environment Officer not less than two weeks prior to beginning construction of the Development. The notification shall include the intended starting date of construction and the name of the contractor responsible for the construction.

7. The Licencee shall:
   a) conduct all ditch related work activities during no flow or dry conditions;
   b) not construct the wastewater treatment lagoon during periods of heavy rain;
   c) place and/or isolate all excavated and construction material where it will not erode into any watercourse;
   d) implement effective long-term sediment and erosion control measures to prevent soil-laden runoff, and/or silt from entering any watercourse during construction and until vegetation is established;
   e) routinely inspect all erosion and sediment control structures and immediately complete any necessary maintenance or repair; and
   f) use rock that is free of silt and clay for riprap.

8. The Licencee shall dispose of non-reusable construction debris from the Development at a waste disposal ground operating under the authority of a permit issued pursuant to *Manitoba Regulation 150/91* respecting *Waste Disposal Grounds*, or any future amendment thereof, or a Licence issued pursuant to The Environment Act.

9. The Licencee shall locate fuel storage and equipment servicing areas established for the construction and operation of the Development a minimum distance of 100 metres from any waterbody, and shall comply with the requirements of *Manitoba Regulation 188/2001* respecting *Storage and Handling of Petroleum Products and Allied Products* or any future amendment thereof.

10. The Licencee shall, during construction of the Development, operate, maintain and store all materials and equipment in a manner that prevents any deleterious substances (fuel, oil, grease, hydraulic fluids, coolant, paint, uncured concrete and concrete wash water, etc.) from entering the wastewater treatment lagoon, the discharge route, and watercourses, and have an emergency spill kit for in-water use available on site during construction.

11. The Licensee shall, in the event of a release, spill, leak, or discharge of a pollutant or contaminant in an amount or concentration, or at a level or rate of release, that exceeds the limit that is expressly provided under this Act, another Act of the Legislature, or an Act of Parliament, or in a regulation, licence, permit, order, instruction, directive or other approval or authorization issued or made under one of those Acts, immediately report the release, spill, leak, or discharge by calling 204-944-4888. The report shall indicate the nature of the release, leak, or discharge, the time and estimated duration of the event and the reason for the release, spill, leak, or discharge.

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

13. The Licencee shall install and maintain a fence around the wastewater treatment lagoon to limit access. The fence shall be a minimum of 1.2 metres high and have a locking gate, which shall be locked at all times except to allow access to the wastewater treatment lagoon.

14. The Licencee shall construct and maintain an all-weather access road and a wastewater dumping station for truck-hauled wastewater. The dumping facility shall have a surface splash ramp with a smooth hard surface that can be easily washed free of solids.

15. The Licencee shall:
    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 later of the reports required by clauses 20 and 21 f) of this Licence, two copies of the "record drawings".

Respecting Construction – New Aeration Cells and Upgraded Secondary Cells 1 and 2 with Clay Liner

16. The Licencee shall construct and maintain the clay-lined cells of the wastewater treatment lagoon with a continuous liner 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; and
    c) the liner shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less at all locations.

17. The Licencee shall construct and maintain any cut-off in the dykes of the wastewater treatment lagoon in accordance with the following specifications:
    a) the cut-off shall be constructed of clay which has been mechanically compacted;
    b) the cut-off shall be at least 1.0 metre in thickness;
    c) the cut-off shall have a hydraulic conductivity of 1×10^{-7} centimetres per second or less at all locations;
    d) the cut-off shall be keyed into the underlying clay liner a minimum of 0.3 metres;
    e) the cut-off shall be constructed to an elevation of 5.0 metres above the floor elevation of all aerated primary cells; and
    f) the cut-off shall be constructed to an elevation of 3.1 metres above the floor elevation of upgraded secondary cells 1 and 2.

18. 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.

19. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "A" attached to this Licence, from the liner of the wastewater treatment lagoon; the number and location of samples and test methods to be specified by the designated Environment Officer up to a maximum of 20 samples.

20. The Licencee shall, not less than 2 weeks before any new or upgraded clay-lined 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 19 of this Licence.

Respecting Construction – New Secondary Cell with PVC Liner

21. The Licencee shall construct and maintain a continuous liner, including cover material, underlying the new secondary cell of the wastewater treatment lagoon, such that:
    a) the liner is constructed from PVC geomembrane that has been manufactured in accordance with ASTM Standard D 7176-06;
    b) the liner has a minimum thickness of 30 mils;
    c) the liner is installed in accordance with ASAE Standard EP340.2 for the Installation of Flexible Membrane Linings;
    d) the liner is installed to a minimum elevation of 3.1 metres above the base of the new secondary cell;
    e) the liner is free of holes and has a hydraulic conductivity not exceeding 3.0 x 10^{-9} centimetres per second over the entire surface area of the liner;
    f) the liner is tested for the integrity of all field seams by the air lance or ultrasonic pulse echo test method, in accordance with ASTM Standard D 4437-99, and a testing report is prepared and submitted to the Environment Officer for approval; and
    g) the liner is covered with sand or other granular cover material to a minimum depth of 0.30 metre measured perpendicular to the surface of the liner.

22. The Licencee shall construct and maintain an effective gas relief system under the liner for the new secondary cell of the wastewater treatment lagoon.

23. The Licencee shall notify the assigned Environment Officer one week prior to commencing the installation of the liner and the gas relief system.

24. The Licencee shall not cover the liner or use the new secondary cell of the wastewater treatment lagoon until receiving the approval of the assigned Environment Officer of the report submitted pursuant to sub-Clause 21 f) of this Licence.

25. The Licencee shall complete the installation of the PVC liner of the new secondary cell of the wastewater treatment lagoon between the 15th day of May and the 15th day of October of any year, unless otherwise approved by the Environment Officer.

Respecting the Secondary Cells of the Original Facility in SE 20-5-5E

26. The Licencee shall maintain the liner of the secondary cells of the original wastewater treatment lagoon in SE 20-5-5E in accordance with the requirements of Clause 16 of this Licence.

27. The Licencee shall obtain samples from the liner of the secondary cells of the original wastewater treatment lagoon in SE 20-5-5E in accordance with the requirements of clauses 18 and 19 of this Licence, and provide the results of the

tests of the samples to the Environment Officer within two weeks of the receipt of the test results.

Respecting Operation

28. 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.

29. 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.

30. The Licencee shall:
    a) not accept any industrial wastewater into the Development, unless the industry wishing to discharge the industrial wastewater has first entered into an industrial use agreement with the Licencee. The agreement would specify and limit the quality, quantity and timing of discharges into the wastewater collection system and would require the industry to advise the Licencee of any subsequent changes to these parameters;
    b) not enter into an industrial use agreement with an industry whereby the quality, quantity or timing of discharges from such an industry is likely to cause an exceedance of the design hydraulic and/or organic loading capability of the Development, or is likely to cause periodic upsets of the said system; and
    c) enforce any industrial use agreement which is being violated.

31. The Licencee shall deposit all wastewater directed to the Development only in the aerated primary cells of the Development, unless otherwise authorized by the Director.

32. The Licencee shall operate and maintain the Development in such a manner that:
    a) the organic loading on the aerated primary cells, as indicated by the five-day biochemical oxygen demand, does not exceed 529.1 kilograms per day;
    b) a minimum of 2 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.0 metres of the liquid in the aeration cells; and
    c) the depth of wastewater and settled solids:
        i) does not exceed 4.0 metres in the aerated primary cells;
        ii) does not exceed 2.1 metres in upgraded secondary cells 1 and 2 and the new secondary cell; and
        iii) does not exceed 1.5 metres in the secondary cells of the original wastewater treatment lagoon in SE 20-5-5E.

33. 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.

34. The Licencee shall not discharge effluent from the wastewater treatment lagoon:
    a) where the organic content of the effluent, as indicated by the five-day biochemical oxygen demand, is in excess of 25 milligrams per litre;
    b) where the total suspended solids content of the effluent is in excess of 25 milligrams per litre, unless the exceedance is caused by algae;
    c) where the fecal coliform content of the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample;
    d) where the total coliform content of the effluent, as indicated by the MPN index, is in excess of 1500 per 100 millilitres of sample;
    e) where the total ammonia content of the effluent, expressed as nitrogen, is greater than 10.0 milligrams per litre;
    f) where the total phosphorus content of the effluent is in excess of one milligram per litre;
    g) between the 1st day of November of any year and the 15th day of June of the following year;
    h) when flooding from any cause is occurring along the discharge route; or
    i) when the discharge of effluent will cause or contribute to flooding in or along the discharge route.

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

36. The Licencee shall, when discharging effluent from the wastewater treatment lagoon, limit the rate of discharge so that an approximately uniform discharge over a minimum two week period is achieved for each discharge period. A higher rate of discharge may be used during a discharge after October 15 of any year.

37. The Licencee shall immediately notify the Director each time the operating depth of any cell of the wastewater treatment lagoon exceeds the maximum operating depth for that cell as specified in this Licence.

38. The Licencee shall, if reporting is required pursuant to Clause 37 of this Licence in two consecutive years:
    a) engage the services of a qualified consultant, acceptable to the Director, to undertake an investigation of the Facility and related infrastructure, to determine the ability or inability of the existing system to meet the hydraulic loading capacity of the community. The investigation shall include but not be necessarily limited to:

i) diagnosis of the cause(s) of the recent exceedances of maximum operating depth;
ii) sources of infiltration into the wastewater system including the municipal infrastructure;
iii) current hydraulic loading of the system; and
iv) lack of storage capacity due to sludge build-up within existing cells and the organic loading on the primary cell in terms of the five day biochemical oxygen demand;

b) provide to the Director, within four months of the notification given pursuant to Clause 37 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 Maintenance

39. The Licencee shall, if in the opinion of the Director, significant erosion of the interior surfaces of the dykes occurs, repair the dykes and place riprap 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.

40. The Licencee shall provide and maintain a grass cover on the dykes of the wastewater treatment lagoon and shall regulate the growth of the vegetation so that the height of the vegetation does not exceed 0.3 metres on all dykes.

41. The Licencee shall annually remove by mechanical methods all reeds, rushes and trees located above the low water mark in every cell of the wastewater treatment lagoon.

42. The Licencee shall implement an ongoing program to remove burrowing animals from the site of the wastewater treatment lagoon.

43. The Licencee shall:
a) annually inspect the aeration system and make any necessary repairs;
b) maintain an ongoing record of the most recent five years of inspection dates, observations, maintenance and repairs; and
c) make this record available to an Environment Officer upon request.

MONITORING AND REPORTING SPECIFICATIONS

44. The Licencee shall, unless otherwise specified in this Licence:
a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in the Standard Methods for the Examination of

Water and Wastewater, or in accordance with equivalent preservation and analytical methodologies approved by the Director;

b) have all analytical determinations undertaken by an accredited laboratory; and

c) 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.

45. The Licencee shall:

a) install and maintain a flow measuring device, satisfactory to the Director, at Lift Station #1 which is:

i) capable of measuring the pumped volume of wastewater to within an accuracy of +/- five percent, and is re-calibrated annually or at the request of an Environment Officer; and

ii) capable of activating a flow-proportional wastewater composite sampling device or such device as constitutes a reasonable substitute to the requirements of Sub-clause 46 a) of this Licence and is satisfactory to the Director;

b) make the flow measuring device accessible to an Environment Officer upon request;

c) continuously measure the quantity of wastewater being pumped to the aeration cells of the Development; and

d) in each month of each year determine and record (in cubic metres) the total quantity of wastewater pumped to the aeration cells in that month.

46. The Licencee shall:

a) equip Lift Station #1with a flow-proportional composite wastewater sampler capable of functioning with the continuous flow measuring device and make the sampler available on request for use by an Environment Officer, or otherwise compile representative composite samples in a manner satisfactory to the Director;

b) at least twice a year, once in April and once in October:

i) obtain daily 24-hour flow-proportioned composite samples over five consecutive days of the wastewater being directed to the aeration cells;

ii) obtain one grab sample, on each of the same five consecutive days, of the wastewater being directed from the aeration cells to the secondary cells via the weir manhole; and

iii) record the daily volumes of wastewater pumped to the aeration cell over the same 24-hour composite sampling periods on each of the same five consecutive days; and

c) analyze the obtained samples for the following parameters:

i) five-day biochemical oxygen demand;

ii) total nitrogen (kjeldhal and nitrate+nitrite nitrogen); and

iii) total phosphorus.

47. The Licencee shall initiate and maintain a daily record of each hauled truck of wastewater and/or septage which is dumped into the aeration cell, including the

volume of each load, the name of the hauler, and the source and nature of the contents.

48. The Licencee shall, during periods in which effluent is being discharged from the Development into the environment:

a) collect one set of grab samples of the effluent at each final discharge point upon initiating a discharge event and then again subsequent to every 30,000 cubic metres of effluent released from each final discharge point during the duration of the discharge period;

b) analyze each set of samples for the following parameters:

i)	pH	expressed as pH units;
ii)	field temperature	expressed as degrees Celsius;
iii)	conductivity	expressed as microsiemens per centimeter;
iv)	total alkalinity	expressed as mg/L of CaCO3;
v)	5-day biochemical oxygen demand	expressed as mg/L;
vi)	5-day carbonaceous biochemical oxygen demand	expressed as mg/L;
vii)	total suspended solids	expressed as mg/L;
viii)	total dissolved solids	expressed as mg/L;
ix)	total kjeldhal nitrogen	expressed as mg/L of nitrogen;
x)	nitrate-nitrite nitrogen	expressed as mg/L of nitrogen;
xi)	total ammonia	expressed as mg/L of nitrogen;
xii)	total phosphorous	expressed as mg/L;
xiii)	dissolved phosphorous	expressed as mg/L;
xiv)	calcium	expressed as mg/L;
xv)	magnesium	expressed as mg/L;
xvi)	sodium	expressed as mg/L;
xvii)	chloride	expressed as mg/L;
xviii)	sulphate	expressed as mg/L;
xix)	total coliform content	expressed as MPN/100 ml of sample; and
xx)	fecal coliform content	expressed as MPN/100 ml of sample; and

c) determine daily, and record, the amount of effluent discharged from each final discharge point into the environment by means of a method of measurement satisfactory to the Director.

49. The Licencee shall:

a) during each year maintain records of:
   i) reports of visual inspections conducted a minimum of once per month;
   ii) wastewater sample dates;

iii) original copies of laboratory analytical results of the sampled wastewater; and
iv) effluent discharge dates;

b) report the results obtained pursuant to Clauses 45 to 48 inclusive and sub-Clause 49 a) of this Licence to the Environment Officer within 60 days of the end of the month during which the samples were taken or the required determinations were made, as the case may be.

50. The Licencee shall, during the first year of operation of the Development following the construction of the wastewater treatment lagoon that a discharge must occur, obtain two representative grab samples of the effluent during each effluent discharge campaign. The grab samples shall be obtained near the start of each discharge and near the end of each discharge, and shall be analysed and reported in accordance with Schedule "B" attached to this Licence.

REVIEW AND REVOCATION

A. Environment Act Licence No. 1940 RR is hereby rescinded upon approved commissioning of the new wastewater treatment lagoon components in NW 20-5-5E.

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

C. If the Licencee has not commenced construction of the Development within three years of the date of this Licence, the Licence is revoked.

D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

Tracey Braun, M. Sc.
Director
Environment Act

Client File No.: 935.20

Schedule "A" to Environment Act Licence No. 2984

Soil Sampling:

1. The Licencee shall provide a drilling rig, acceptable to the designated Environment Officer, to extract samples from the liner that is not placed or found at the surface of the lagoon structure. This includes all wastewater treatment lagoons constructed with clay cut-offs at the interior base of the dyke or with a clay cut-off in the centre of the dyke. The drill rig shall have the capacity to drill to the maximum depth of the clay cut-off plus an additional depth of 2 metres. The drill rig shall be equipped with both standard and hollow stem augers. The minimum diameter of the hole 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. Samples shall be collected and shipped in accordance with ASTM Standard D 1587 (Standard Practice for Thin-Walled Tube Sampling of Soils), D 4220 (Standard Practice for Preserving and Transporting Soil Samples) and D 3550 (Standard Practice for Ring-Lines Barrel Sampling of Soils). Thin-walled tubes shall meet the stated requirements including length, inside clearance ratio and corrosion protection. An adequate venting area shall be provided through the sampling head.

4. At the time of sample collection, the designated Environment Officer shall advise the Licencee as to the soil testing method that must be used on each sample. The oedometer method may be used for a sample where the Environment Officer determines that the soil sample is taken from an undisturbed clay soil which has not been remoulded and which is homogeneous and unweathered. The triaxial test shall be used for all samples taken from disturbed and remoulded soils or from non-homogenous or weathered soils.

5. The Licencee shall provide, to the designated Environment Officer and to the laboratory technician, a report on the collection of soil samples that 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 that contains the most porous material based on a visual inspection. The hydraulic gradient shall not exceed 30 during sample preparation and testing. Swelling of the soil specimen should be controlled to adjust for the amount of compaction measured during sample collection and extraction from the tube and the depth or elevation of the sample. The effective stress used during saturation or consolidation of the sample shall not exceed 40 kPa (5.7 psi) or the specific stress level, that is expected in the field location where the sample was taken, which ever is greater.
   c) A complete laboratory report, as outlined in ASTM D 5084, shall be supplied for each soil sample collected in the field.

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

Schedule "B" to Environment Act Licence No. 2984

Initial Characterization of Wastewater

Facility Size: Small (500 - 2500 m^3/day) with Industrial Influent
Facility Type: Aerated wastewater treatment lagoon – intermittent discharge

Effluent Sampling:

During the first year of operation:

1. a grab sample of the discharging effluent shall be collected near the beginning of the discharge period and near the end of the discharge period (i.e., two samples for each discharge event.)
2. a grab sample of the discharging effluent shall be collected on a quarterly basis for each quarter there was effluent discharged.

Effluent Analysis:

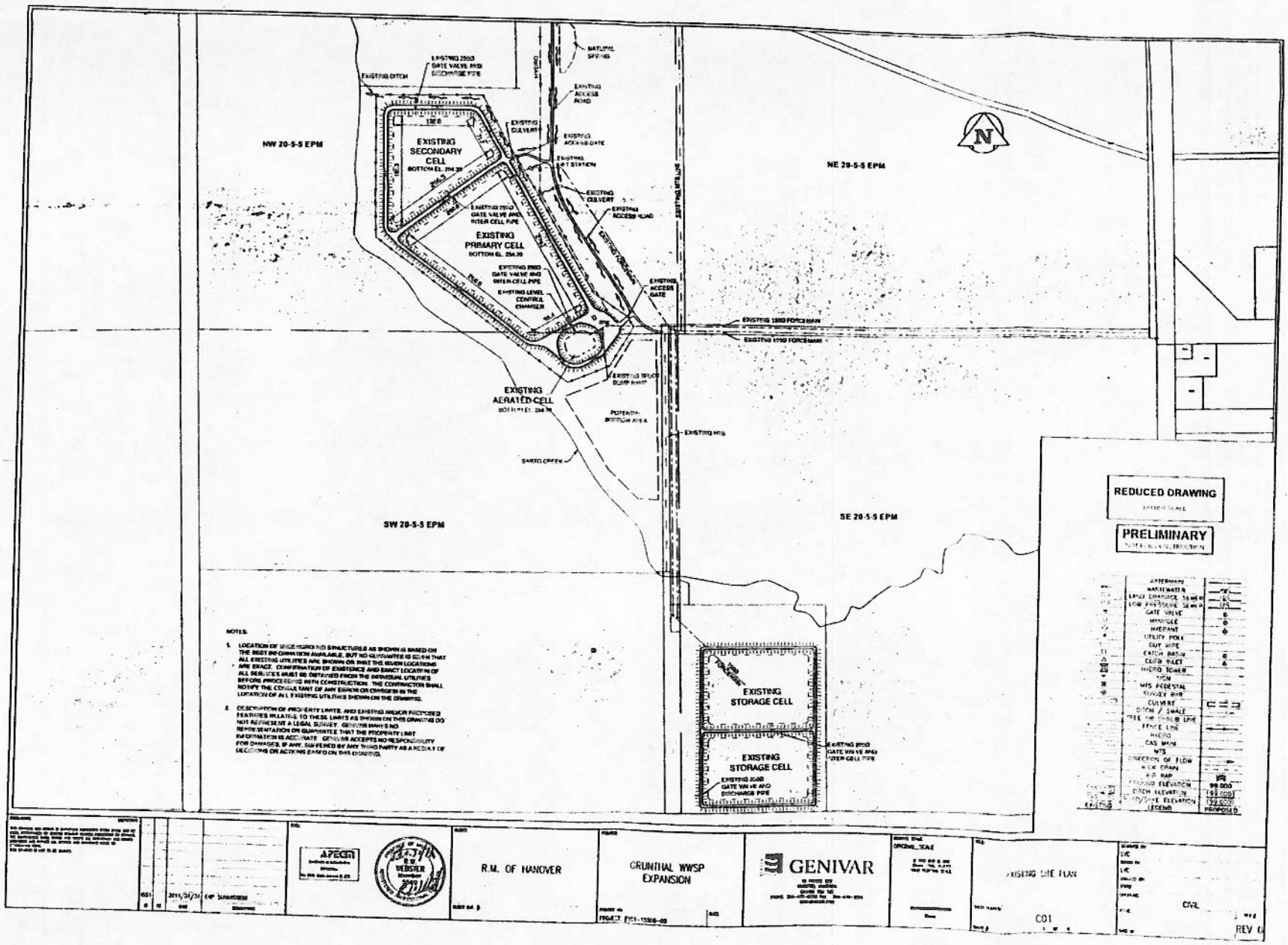
1. Have the discharge period grab samples analyzed for:
   - a) the organic content as indicated by the five-day biochemical oxygen demand and expressed as milligrams per litre;
   - b) the organic content as indicated by the five-day carbonaceous biochemical oxygen demand and expressed as milligrams per litre;
   - c) the total suspended solids content expressed as milligrams per litre;
   - d) the *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) if chlorine was used as a disinfecting agent, total residual chlorine expressed as milligrams per litre;
   - h) total ammonia nitrogen expressed as milligrams per litre;
   - i) nitrate-nitrite nitrogen expressed as milligrams per litre;
   - j) total kjeldahl nitrogen (TKN) expressed as milligrams per litre;
   - k) dissolved phosphorus expressed as milligrams per litre;
   - l) total phosphorus expressed as milligrams per litre;
   - m) temperature; and
   - n) pH.

2. Have the quarterly samples 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);

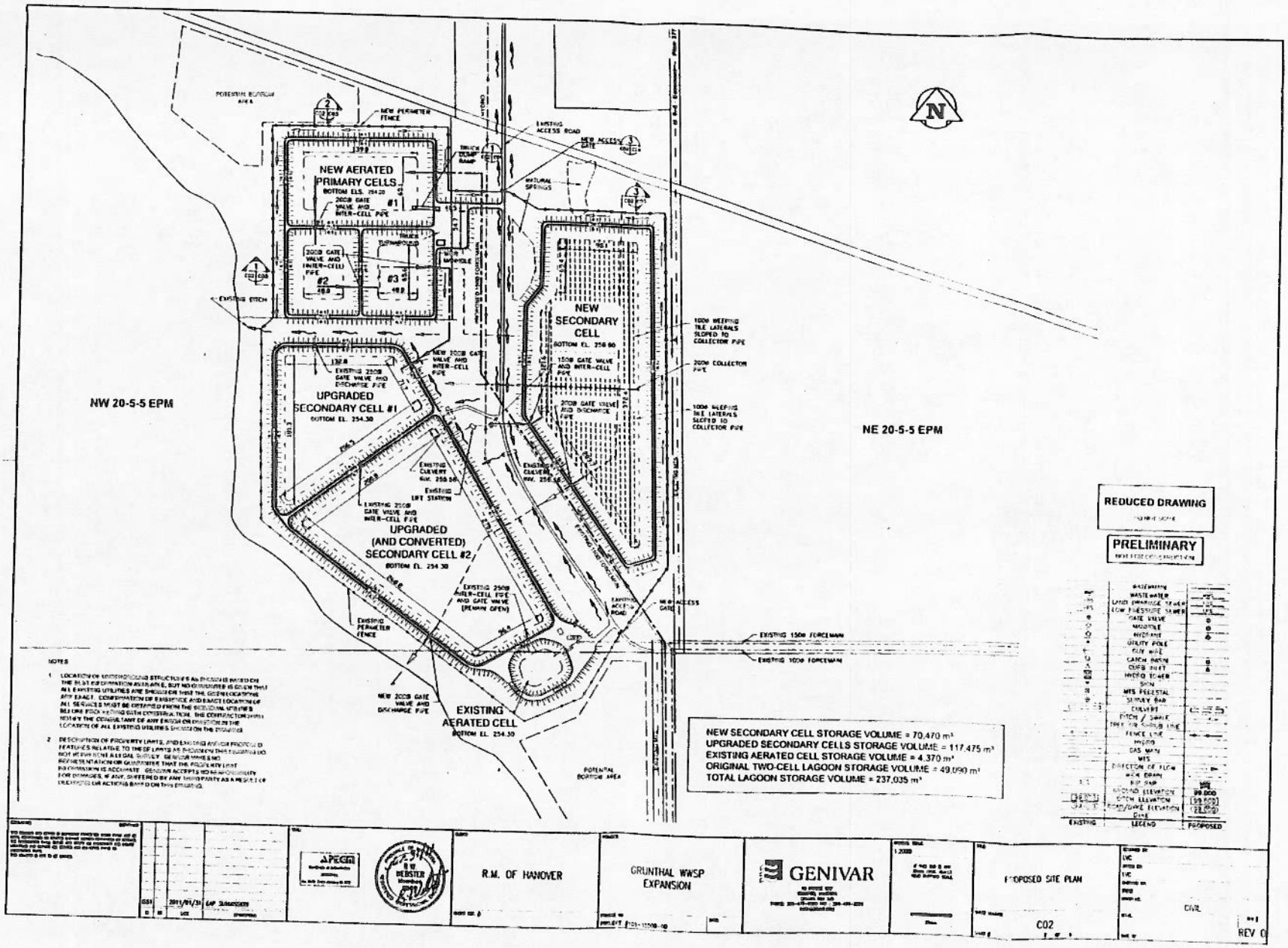
h) polycyclic aromatic hydrocarbon (PAHs);
i) cyanide (total);
j) pH;
k) volatile organic compounds (VOCs);
l) mercury;
m) phenolic compounds;
n) surfactants;
o) acute toxicity; and
p) chronic toxicity.

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.



Appendix 1
Figure 1 Existing Components
Licence No. 2984



Appendix 2
Figure 2 New and Modified Components
Licence No. 2984