



Conservation and Water Stewardship

Environmental Stewardship Division
Environmental Approvals Branch
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CLIENT FILE NO.: 5597.00

August 25, 2015

Ian Broome, Director of Public Works
The City of Brandon
410 – 9th Street
Brandon MB R7A 6A2

Dear Mr. Broome:

Enclosed is **Environment Act Licence No. 3149** dated August 25, 2015 issued to the **City of Brandon** for the construction and operation of the Development being a Class 1 Waste Disposal Ground to be known as the Eastview Landfill located at 3610 Victoria Avenue East on NW ¼ 17-10-18 WPM in Brandon, Manitoba in accordance with the Proposal filed under *The Environment Act* on December 17, 2014, and additional information provided on March 18, 2015.

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

For further information on the administration and application of the Licence, please feel free to contact Peter Crocker, Environment Officer at 204-726-6565.

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

Yours truly,

“original signed by”

Tracey Braun, M.Sc.
Director
Environment Act

c: Don Labossiere, Director, Environmental Compliance and Enforcement
Tim Prawdzik, Provincial Manager, Environmental Compliance and Enforcement
Lyndsey MacBride, SNC Lavalin
Public Registries

NOTE: Confirmation of Receipt of this Licence No. 3149 (by the Licensee only) is required by the Director of Environmental Approvals. Please acknowledge receipt by signing in the space provided below and faxing a copy (letter only) to the Department by September 8, 2015.

On behalf of the City of Brandon

Date

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

Licence No. / Licence n° 3149

Issue Date / Date de délivrance August 25, 2015

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

Pursuant to Section 11(1) / Conformément au Paragraphe 11(1)

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

THE CITY OF BRANDON;
"the Licencee"

for the construction and operation of the Development being a Class 1 Waste Disposal Ground to be known as the Eastview Landfill located at 3610 Victoria Avenue East on NW ¼ 17-10-18 WPM in Brandon, Manitoba in accordance with the Proposal filed under *The Environment Act* on December 17, 2014, and additional information provided on March 18, 2015, and 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 Water Stewardship to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

"active area" means a designated trench, cell, or berm confined area of a waste disposal ground in which solid wastes are deposited, also known as waste disposal cell or landfill cell;

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

"all weather road" means a graded and/or graveled road or road of equivalent materials that is passable by vehicles under both wet and dry weather conditions;

"alternative daily cover" means materials approved by the Director for use in temporarily covering waste in an active area;

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

"background water quality" means the quality of water in any geologic zone monitored with regards to the chemical and microbiological parameters specified in a Licence issued pursuant to *The Environment Act* by the Director;

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

"body of water" means any body of flowing or standing water whether natural or artificially created;

"buffer" means a strip of land that is managed to reduce or eliminate the impacts of land use practices on sensitive areas or natural features;

"bulky metallic waste" means, but is not limited to, derelict vehicles, farm machinery, and large appliances which are capable of being salvaged for recycling or reuse;

"CCME" means Canadian Council of Ministers of the Environment;

"cell" means the location where waste is deposited;

"Class 1 Waste Disposal Ground" means a waste disposal ground serving a population in excess of 5,000 persons;

"closure plan" means a plan indicating the actions to be taken for the closure of the Development, or a portion of the Development;

"compliance boundary" means the planar surface that circumscribes the Development, extends vertically downward from the land surface, and constitutes the place at which the parameters of the background water quality as specified in a Licence issued pursuant to *The Environment Act* are not to be exceeded;

"component" means a landfill cell, pad or structure that forms a part of a process or system within an activity area of the Development;

"compost" means solid mature product resulting from composting;

"composting" means a managed process of bio-oxidation of a solid heterogeneous organic substrate including a thermophilic phase;

"concentration value" means a restriction established by a Licence issued pursuant to *The Environment Act* by the Director on quantities, discharge rates and concentrations of pollutants;

"condensate" means liquid created by condensing and removing gases from landfill gas;

"contaminant" means a contaminant as defined in *The Dangerous Goods Handling and Transportation Act*;

"cover material" means material which is non-flammable, does not interfere with landfill gas collection or extraction systems, does not biodegrade to produce landfill gas, is a deterrent to vectors, is free of roots, vegetation and frozen material, or is a material approved by the Director, that is used to cover compacted solid waste;

"daily" means any 24-hour period;

"dangerous goods" means a product, substance or organism as defined in *The Dangerous Goods Handling and Transportation Act*, or any amendments thereto;

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

"engineer(s)" means an engineer or engineers registered with the Association of Professional Engineers and Geoscientists of the Province of Manitoba;

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

"final cover" means earth compacted to a thickness of at least 0.5 metre applied to the surface of the compacted waste cell that has achieved the final elevation for cell closure, and is graded to minimize ponding of water on the surface;

"green waste" means leaf, grass, garden waste, prunings, shrubs, small branches and other yard wastes from residential and commercial generators, or other larger branches which are chipped for compost bulking;

"groundwater" means water below the ground surface and within a zone of saturation;

"groundwater monitoring program" means a plan developed for the monitoring and management of groundwater;

"hazardous waste" means thereof product, substance or organism as defined in *The Dangerous Goods Handling and Transportation Act*, or any amendments thereto;

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

"**household organic waste**" includes fruits and vegetables, table scraps, breads, rice, pasta, coffee grounds, filters, tea bags, eggshells, paper fibres, paper egg cartons, fast food drink trays, soiled paper towels, tissues and serviettes. The following items are excluded from the household organic waste: meats, bones, fish, dairy products, fat, plastics, metal, wood, tin and other non-compostable materials;

"**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 waste**" means waste product generated by industry other than hazardous waste and liquid industrial waste;

"**landfill**" means waste disposal ground;

"**landfill gas**" means a mixture of gases generated by the microbial decomposition and chemical reactions between wastes in a landfill;

"**leachate**" means liquid that has percolated through solid waste, and that contains dissolved and/or suspended materials from the solid waste;

"**leachate collection system**" means a system that gathers leachate so that it may be removed from a landfill and which could include a permeable drainage layer, a network of perforated piping, and sumps or manholes from which leachate can be removed;

"**Leachate Management System**" means all of the components of a system to transport, collect, and extract leachate from the Development; to include the leachate collection system, and any other infrastructure installed for the purpose of handling leachate;

"**liner**" means a continuous layer of reworked soil, or manufactured materials, placed beneath and on the sides of a waste disposal ground active area, a compost facility, or a storage area intended to restrict the downward or lateral escape of solid waste, leachate, and or gases, or to restrict the upward movement of groundwater into an area;

"**liquid industrial waste**" means waste generated by industrial processes that has a slump of more than 150 mm using the slump test method (slump test, C.S.A. Standards Test Method A 23.2-5C), and does not include hazardous waste or industrial waste;

"**liquid waste**" means sewage, sewage effluent and sludge from septic tanks, holding tanks and municipal sewage treatment systems and that has a slump of more than 150 mm using the slump test method (slump test, C.S.A. Standard Test Method A23.2-5C);

"Material Recovery Facility" means the existing facility which accepts for drop off and sorting recyclable materials including paper, and cardboard as well as aseptic, gable-top steel, aluminum, glass and plastic containers;

"material storage areas" means any area that is utilized for the accumulation or storage of recyclable, recoverable or reusable materials prior to sending for further use or processing; to include but not be limited to tires, metals, white goods, clean concrete, rubble, construction, demolition or renovation materials, or baled material from the Material Recovery Facility;

"manure and bedding waste" is specific to the composting process and means livestock manure, associated bedding materials and organic animal waste from the Keystone Centre, the Provincial Exhibition of Manitoba, Heartland Livestock, and various other feedlots, which have been approved, in writing, by the designated Environment Officer;

"mil" means one-thousandth of an inch;

"monitoring well" means a well drilled to measure groundwater levels and collect groundwater samples for the purpose of physical, chemical or biological analysis to determine the concentration of groundwater constituents;

"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;

"opacity" means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background;

"particulate matter" means any finely divided liquid or solid matter other than water droplets;

"particulate residue" means that part or portion of an atmospheric emission which is deposited onto a surface;

"point source" means any point of emission from a Development where pollutants are emitted to the atmosphere by means of a stack;

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

"post closure plan" means a plan indicating the actions to be taken for the care, maintenance, and monitoring of the Development after closure, that will prevent, mitigate, or minimize the threat to public health and the environment;

"QA/QC" means quality assurance/quality control;

"qualified professional" means an individual properly trained and authorized to practice in a specific area or field which may include assessment, design, or providing consultation for an aspect of the Development; to include but not be limited to Professional Engineers, Geoscientists or Landscape Architects;

"recyclable material" means a waste that is intended for reuse, recovery or recycling but does not include a product, substance or organism:

- a) that is to be applied into or onto land; or

b) that is to be disposed of in a thermal destruction process;

"representative sample" means a sample collected by a methodology acceptable to an Environment Officer;

"site" means the area both permanent and temporary which is required for the construction and operation of the Development;

"solid waste" means solid waste as defined in *Manitoba Regulation 150/91*, or any future amendments thereto, respecting waste disposal grounds, excluding waste rock;

"special waste" means bagged asbestos containing materials, dead animals including specified risk materials (SRM), slaughterhouse waste and food products deemed to be unacceptable by the Canadian Food Inspection Agency (CFIA), biosolids, and any other waste identified by the Director;

"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 Water Works Association and the Water Environment Federation;

"Surface Water Management System" means a system that manages surface water and storm water from all areas, within the Development;

"top soil" means soil that is free of roots, vegetation, weeds and stones larger than 50 mm, is capable of supporting good vegetative growth, and is suitable for use in top dressing, landscaping and seeding;

"waste disposal ground" means a parcel of land that is used for the disposal of solid or industrial waste, also referred to as a landfill; and

"wood waste" means clean, not treated, dimensional or manufactured wood products or natural trees or parts thereof, that are chipped or shredded for use in the composting process.

PROJECT SCOPE

Supporting documents and additional information for the Development, filed in accordance with *The Environment Act* include:

- a) City of Brandon Eastview Landfill Emergency Response Plan, dated February 18, 2011;
- b) City of Brandon Eastview Landfill, Landfill Gas Collection and Flaring System Monitoring Plan, dated November 1, 2010; and
- c) Eastview Landfill Environmental Act Proposal, December 15, 2014.

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains terms and conditions 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.

General Terms

1. The Licencee shall operate the Development in compliance with the provisions of Manitoba Regulation 150/91 or any future amendments.
2. The Licencee shall reduce the production and dissemination of wastes by initiating and maintaining waste reduction and waste recycling programs at the Development.

Reporting Format

3. The Licencee shall submit all information required to be provided to the Director or Environment Officer under this Licence, in written and electronic format, in such form (including number of copies) and of such content as may be required by the Director or Environment Officer, and each submission shall be clearly labelled with the Licence Number and File Number associated with this Licence.
4. The Licencee shall carry out any remedial measures, modifications, or alterations, as deemed necessary by the Director, in respect to matters authorized under this Licence.

Future Sampling

5. 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 pollutants 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.

Sampling Methods

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

7. The Licencee shall, unless otherwise specified in this Licence carry out all sampling of groundwater, surface water, leachate, soil, compost, and air in accordance with methodologies specified in the Operating Plan submitted pursuant to Clause 41 of this Licence.

Equipment Operation

8. 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.

9. The Licencee shall, following the reporting of an event pursuant to Clause 8,
 - 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 four (4) weeks of the repairs being completed.

10. The Licencee shall implement a high standard of equipment maintenance and good housekeeping and operational practices with respect to the Development, at all times.

Fire Reporting

11. The Licencee shall in the event of a fire which continues in excess of thirty (30) minutes, or requires implementation of the Emergency Response Plan in Clause 107, or requires fire suppression assistance from personnel outside of the Development (e.g. fire department) report the fire by calling (204) 944-4888 (toll free 1-855-944-4888), identifying the type of materials involved and the location of the fire.

Approvals and Permits

12. The Licencee shall locate fuel storage and equipment servicing areas established for the construction and operation of the Development in compliance with the requirements of *Manitoba Regulation 188/2001* respecting *Storage and Handling of Petroleum Products and Allied Products* or any future amendments thereof.
13. The Licencee shall obtain approval in writing from the Director for any proposed alteration to the Development before proceeding with the alteration.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Odours and Air Emissions

14. The Licencee shall not burn waste or combustible materials, or allow the burning of waste or combustible materials at the Development unless approved by the Director.
15. 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.
16. The Licencee, upon written request of and in a timeframe stipulated by the Director, shall comply with any air emission or ambient air quality criteria specified by the Director for any pollutant of concern to the Director which has been identified pursuant to Clauses 5 or 83 of this Licence.
17. The Licencee shall take action to minimize the entrainment of particulate matter into the air at the Development resulting from the operation of vehicles or the transportation, storage or handling of compost feedstock, wood wastes, construction, renovation and demolition waste or other materials.

Noise

18. 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.

Responsible Party

19. The Licencee shall assign an engineer(s) or a qualified person(s) to be responsible for the construction of the Development and any required remediation action in accordance with the plans, specifications and design report(s) submitted in support of the proposal or this Licence.
20. The Licencee shall designate an employee, within sixty (60) days of the date of issuance of this Licence, as the Licencee's Environmental Coordinator, whose job description will include assisting the Licencee in complying with the limits, terms and conditions in this Licence and assisting Senior Management of the Licencee to manage environmental issues at the Development. The name of the Environmental Coordinator shall be submitted in writing to the Director within fourteen (14) days of appointment and any subsequent appointment.

Site Preparation

21. The Licencee shall, prior to any new construction of any component of the Development, remove all top soil to a minimum depth of 150 mm and store this top soil at a suitable location for future use.

Mitigating Erosion and Runoff

22. The Licencee shall with respect to on-site earthen construction works, construct and maintain silt fences in the drainage routes transporting surface runoff off the property of the Development until vegetation has been re-established on the disturbed areas.
23. The Licencee shall construct and maintain the final side slopes of the above ground deposit of waste, including final cover, in the waste cell to not exceed one unit vertical to four units horizontal (1V:4H) and the final top slope to not less than one unit vertical to twenty units horizontal (1V:20H), unless otherwise specified in the Closure Plan by the qualified professional, or approved by the Director.

Construction

24. The Licencee shall, prior to initiating any construction at the Development, submit two paper copies and one electronic copy of final engineering design plans, sealed by an engineer(s), to the Director. The plans will show the engineering details of each new component and the location of each new component with respect to other components.

25. The Licencee shall construct the Development in accordance with the design plans submitted to the Director pursuant to Clause 24 of this Licence.
26. The Licencee shall, to facilitate inspection of the Development during construction and operation, provide such access as the Director deems necessary, to an Environment Officer throughout the duration of construction and operation of the Development.

Clay Components of the Development

27. The Licencee shall, where a component of the Development is to be constructed with a clay liner; construct the liner underlying the component as described in Clauses 28 to 31 of this Licence. For any component of the Development that is to be constructed with scarified in situ clay, the component shall be subject to Clauses 28 b), and 29 to 31 of this Licence.
28. The Licencee shall construct and maintain all clay lined component(s) of the Development in accordance with the following specifications:
 - a) the clay liner is recompacted to a minimum thickness of one (1) metre for the side slopes and for the base;
 - b) the hydraulic conductivity of the clay is 1×10^{-7} cm/second or less;
 - c) the liner extends a vertical distance of one (1) metre above normal operating level for any leachate storage component other than a landfill cell liner; and
 - d) the clay liner is installed under the entire base and side wall or berm of any waste containment cell(s).
29. 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.
30. The Licencee shall take and test undisturbed soil samples, in accordance with Appendix 'D' attached to this Licence, from:
 - a) the clay of new waste disposal cell(s);
 - b) the clay of the compost pad(s) and compost leachate pond, if applicable; and
 - c) any clay component of the Development requiring testing by the Director.

The number and location of samples and test methods will be specified by the designated Environment Officer up to a maximum of twenty (20) samples per cell, pond, compost pad or clay component of the Development.

31. The Licencee shall, prior to operation of the area tested in accordance with Clause 30, receive the approval of the Environment Officer for the results of the tests carried out pursuant to Clause 30 of this Licence.

Synthetic Lined Components of the Development

32. The Licencee shall, where a component of the Development is to be constructed with a synthetic HDPE liner; construct the liner underlying the component as described in Clauses 33 to 37 of this Licence and establish that the synthetic material is compatible with landfill leachate.
33. The Licencee shall construct and maintain a continuous liner underlying the component of the Development, such that:
 - a) the liner is constructed from HDPE geomembrane;
 - b) the liner has a minimum thickness of 60 mil;
 - c) all sections of the liner are joined by double channel fusion seaming;
 - d) the liner is installed under the entire base and side wall or berm of any waste containment cell(s);
 - e) the liner is installed in accordance with ASTM Standard D-4437, the integrity of all field seams are tested by non-destructive test methods, a testing report is prepared and submitted to an Environment Officer within 30 days of commencing the installation of the liner; and
 - f) the liner is secured to prevent lifting of the liner.
34. The Licencee shall complete the installation of the synthetic liner on any component at the Development in accordance with manufacturer recommendations regarding temperature and environmental conditions. Installation shall be completed between the 15th day of May and the 15th day of October of any year, unless otherwise approved by the designated Environment Officer.
35. The Licencee shall not cover the synthetic liner or use a synthetic lined component of the Development until receiving written approval of the report submitted pursuant to sub-Clause 33 e) of this Licence from the Environment Officer.
36. The Licencee shall notify the designated Environment Officer two (2) weeks prior to commencing the installation of the synthetic liner.
37. The Licencee shall cover all surfaces of the synthetic liner of a component of the Development with 0.3 metre of sand, other non-angular granular material, or material approved by the Environment Officer.

Alternative Liners for Components of the Development

38. The Licencee, upon written request and approval by the Director, may utilize an alternative geomembrane, synthetic or composite liner system that is at minimum: equivalent to the hydraulic conductivity of one metre of 1×10^{-7} cm/s compacted clay or a 60 mil HDPE liner; is compatible with landfill leachate; and subject to terms and conditions set by the Director at the time of approval.

39. The Licencee shall provide a written report regarding the installation, QA/QC, engineering oversight and any other identified requirements of the approval of Clause 38, within 90 days of completion of work of the component.
40. The Licencee shall not cover an alternative liner or use an alternative lined component of the Development until receiving written approval of the report submitted pursuant to Clause 39 of this Licence from the Environment Officer.

Operating Plan

41. The Licencee shall update and submit to the Director, for approval, within six (6) months of the date of issuance of this Licence, the Operating Plan which is to include information regarding all aspects of the Development, to include but not be limited to:
 - a) operational parameters and objectives, including method of tracking placement of special wastes and those wastes requiring unusual management considerations;
 - b) waste type acceptance parameters and limitations;
 - c) restrictions and procedures (if applicable) on volumes or ratios for organic based wastes;
 - d) incident tracking and reporting parameters;
 - e) composting parameters, objectives, standards and ultimate use;
 - f) dust and litter control procedures;
 - g) vector control procedures;
 - h) leachate management, monitoring and sampling schedule;
 - i) surface and ground water management, monitoring and sampling schedule;
 - j) identification of operational records to be maintained;
 - k) methodologies and processes for all sampling of groundwater, surface water, leachate, soil, compost and air; and
 - l) an overview of staffing qualifications and position.
42. The Licencee shall implement the Operating Plan submitted pursuant to Clause 41 of this Licence, and subject to any terms and conditions set by the Director in the approval.

Signage and Site Security

43. The Licencee shall post adequate signage at the entrance to the Development indicating, but not limited to the following:
 - a) the types of wastes not accepted at the site;
 - b) the hours and days of operation; and
 - c) 24-hour telephone numbers to be called in the event of an emergency occurring at the site.
44. The Licencee shall staff and secure the Development so that:

- a) an attendant is on duty at the scale at all times during hours of acceptance of materials to the Development;
- b) gates are provided for all access locations to the site;
- c) the gates are kept locked when the attendants are not on duty or the Development is closed; and
- d) other attendants to direct traffic and operate heavy equipment are on duty as necessary.

Materials Handling

45. The Licencee shall deposit all waste, other than material intended for recycling, composting or processing, in an active area within the Development.
46. The Licencee shall position fencing, including adequate portable litter fences around the active area or other locations where unloading or handling of materials occur, to prevent litter or other material from collecting on or escaping from the boundaries of the Development. The Licencee is responsible for litter clean up along access roads, facility fencing, surrounding bush and adjacent properties.
47. The Licencee shall not accept the following wastes at the Development:
 - a) hazardous waste;
 - b) biomedical waste;
 - c) liquid industrial waste;
 - d) liquid waste;
 - e) radioactive waste or materials;
 - f) unbagged asbestos; or
 - g) soils or sediments containing contaminants at concentrations in excess of the criteria specified for industrial occupancy in the Canadian Council of Ministers of the Environment (CCME) Environmental Quality Guidelines (latest edition), and the CCME Canada Wide Standards.
48. The Licencee may receive wastes prohibited in Clause 47 of this Licence if appropriate provisions have been provided in a proposal which has been submitted and approved by the Director.

Special Wastes

49. The Licencee shall not excavate in areas where special wastes have been previously buried without approval from an Environment Officer.
50. The Licencee shall keep record, by Global Positioning System (GPS), of the locations of buried special wastes.

WEIGH SCALES

Operation – Weigh Scales

51. The Licencee shall maintain federal certification of the weigh scales utilized at the entrance of the Development.

MATERIAL RECOVERY AND STORAGE

Operation - Material Recovery Facility

52. The Licencee shall operate the material recovery facility in a manner to prevent windblown waste, litter, odour generation, fire and other hazards, as well as preventing spills from contaminated runoff.

Operation – Material Storage Areas

53. The Licencee shall operate any and all material storage areas in a manner to prevent windblown waste, litter, odour generation, fire and other hazards, as well as preventing spills from contaminated runoff.
54. The Licencee shall remove ozone depleting substances from appliances using a certified contractor in accordance with *Manitoba Regulation 103/94*, or any future amendment thereof, respecting *Ozone Depleting Substances and Other Halocarbons*.

LANDFILL CELLS

Construction – Landfill Cells

55. The Licencee shall submit to the Director, at least sixty (60) days prior to construction of a new waste disposal cell, the engineering design plans, sealed by an engineer(s) which address construction specifications of any new active area and include, but are not limited to the following:
 - a) engineering design with respect to construction of the waste disposal cell base and sides;
 - b) engineering design with respect to the construction of the leachate collection system in each new cell, and connections, if applicable, to the overall leachate management system;
 - c) location of access road(s) to the waste disposal cell;
 - d) details of the location of the waste disposal cell with respect to property lines; and
 - e) details of a drainage system to prevent water from entering the waste disposal cell and to channel the surface run-off into the surface water system for the Development.

56. The Licencee shall construct new waste disposal cells in accordance with the design plans submitted pursuant to Clause 55 of this Licence.

Operation – Landfill Cells

57. The Licencee shall minimize the working face of each cell to reduce the generation of litter and leachate from the Development.
58. The Licencee shall compact waste deposited in the active area and cover the waste daily with cover material or alternative daily cover.
59. The Licencee, upon a written request to an Environment Officer, may, during extreme weather conditions, utilize temporary covering of wastes deposited in an active area. Such temporary covering material shall be replaced with permanent cover material when the extreme weather conditions cease, unless otherwise specified by an Environment Officer.

COMPOSTING FACILITY

Construction – Composting Facility

60. The Licencee shall submit to the Director, at least sixty (60) days prior to construction, engineering design plans, sealed by an engineer(s), which address construction specifications for any alterations to the composting facility and includes, but are not limited to the following:
- a) engineering design with respect to construction of the composting facility components;
 - b) specifications with respect to construction of a compost pad, designed with a minimum of 0.5-metre thick compacted clay liner with a hydraulic conductivity of not greater than 1×10^{-7} cm/sec or equivalent;
 - c) the location of all weather road(s) to the composting area;
 - d) details of the compost facility drainage system and integration into the surface water system for the Development or isolated compost surface water collection system (if applicable); and
 - e) specifications with respect to construction of the onsite compost leachate basin (if applicable) designed with a minimum one (1) metre thick compacted clay liner or equivalent as approved by the Director.
61. The Licencee shall alter the composting facility in accordance with the design plans submitted pursuant to Clause 60 of this Licence and subject to any terms and conditions set by the Director.

Operation – Composting Facility

62. The Licencee shall operate the ditches for the collection and conveyance of impacted water off the composting pad in such a manner that no standing water is present in the ditches.
63. The Licencee shall only accept and use green waste, household organic waste, wood waste and manure and bedding waste as compost feedstock for the Composting Facility. The Licencee shall obtain written approval from an Environment Officer prior to the use or collection of any other feedstock materials or institutional or commercial quantities.
64. The Licencee shall not sell or make available, to any third party, compost generated at the Development that does not achieve the quality requirements and specifications as contained in the most recent edition of the CCME publication entitled “*Guidelines for Compost Quality – PN 1340*” or equivalent standard approved by the Director.

SOIL REMEDIATION FACILITY

Temporary Storage of Materials – Soil Remediation Facility

65. In the event of a spill to the environment, the Licencee may receive petroleum contaminated soils at the Development and stockpile temporarily with the approval of and subject to any terms and conditions set by an Environment Officer.

Operation – Soil Remediation Facility

66. No petroleum contaminated soils classified as hazardous waste shall be received at the Development.
67. Notwithstanding Clause 66 of this Licence, petroleum contaminated soils received by the Licencee for remediation, shall be allowed in the designated soil treatment area of the Development.
68. The Licencee shall only receive petroleum contaminated soils for remediation at the Development that comply with the requirements of Manitoba Conservation and Water Stewardship Guideline “Treatment and Disposal of Petroleum Contaminated Soil (January 2015)” or any future amendment thereof.
69. Notwithstanding Clause 68 of this Licence, the Licencee shall only accept for treatment at the Soil Remediation Facility, unless otherwise approved by an Environment Officer, soils in accordance with the following acceptance criteria;

- a) Soil contaminated with Benzene, Toluene, Ethylbenzene or Xylenes up to 30,000 mg/kg for each constituent;
 - b) Soil contaminated with Canada Wide Standard for Petroleum Hydrocarbons Fraction 1, 2, 3, or 4 up to 30,000 mg/kg for each Fraction; and
 - c) Soil contaminated with metals at any concentration subject to capability to treat to achieve leachate extraction criteria.
70. The Licencee shall treat petroleum contaminated soils that will be used as cover on the landfill cells so that the treated soil complies with the requirements of Manitoba Conservation and Water Stewardship Guideline “Criteria for Acceptance of Contaminated Soil at Waste Disposal Grounds (January 2015)” or any future amendment thereof.
71. The Licencee shall maintain an operations manual for the operation of the soil remediation facility. The operations manual shall address but not be limited to:
- a) soil receiving and placement;
 - b) soil remediation procedures;
 - c) handling and treatment procedures;
 - d) inspection and maintenance;
 - e) surface water management;
 - f) leachate management; and
 - g) monitoring and reporting.
72. The Licencee shall operate the soil remediation facility in accordance with the operations manual developed pursuant to Clause 71 of this Licence.
73. The Licencee shall record the amount and type of petroleum contaminated soils treated at the soil remediation facility, a summary of the results of after treatment analyses of petroleum contaminated soils and the final disposition of the treated soils; and provide all records for the previous three (3) calendar years to an Environment Officer upon request.
74. The Licencee shall retain sample results from all soils received at the soil remediation facility; if results are not available from the source of the soils, the Licencee shall have the soils tested upon receipt. The parameters for which the soils shall be analyzed will be determined by considering the source of the soils and by using the CCME Canadian Environmental Quality Guidelines for soil.
75. The Licencee shall maintain, at the Development site office, records of all soils received at the soil remediation facility. These records shall contain, but not be limited to the following:
- a) the date soils were received at the soil remediation facility;
 - b) the original location of the soils;
 - c) the volume received, either estimated or actual;
 - d) preliminary analyses of the soils, e.g., head space results or filed composite results;

- e) results of laboratory analyses of the soils;
 - f) the frequency of sampling, area of sampling and the depth the sample was taken from within the soil remediation facility; and
 - g) the location within the soil remediation facility of the soil for treatment.
76. The Licencee shall maintain, at the Development site office, records of all soils removed from the soil remediation facility. These records shall contain, but not be limited to the following:
- a) the date the soils were removed;
 - b) the volume of soils removed;
 - c) the final end use destination of the soils removed;
 - d) the results of analyses to determine the concentrations of those parameters for which the soil was being remediated; and
 - e) any additional information as requested by the Director.

LANDFILL GAS COLLECTION AND FLARING SYSTEM

Construction – Landfill Gas Collection and Flaring System

77. The Licencee shall submit to the Director a copy of authorization for construction, expansion or major modification of a component which is under pressure, of the Landfill Gas Collection and Flaring System, issued by the Office of the Fire Commissioner, prior to any construction, expansion or major modification of the landfill gas system at the Development.
78. The Licencee shall, at least sixty (60) days prior to any future construction, major modification or expansion, provide to the Director complete design and construction details for the Landfill Gas Collection and Flaring System. The design and construction details shall include at a minimum:
- a) number and location of landfill gas extraction wells;
 - b) configuration of landfill gas extraction wells;
 - c) design and construction details of landfill gas extraction wells;
 - d) location of condensate traps;
 - e) description of pipe network; and
 - f) location, design, and construction details of blower and flare station (if applicable).
79. The Licencee shall construct or modify the Landfill Gas Collection and Flaring System in accordance with the design plans submitted pursuant to Clause 78 of this Licence, and any terms and conditions set by the Director at the time of approval.

Operation – Landfill Gas Collection and Flaring System

80. The Licencee shall, in the event of an environmental, mechanical, electrical or human condition which causes a shutdown or malfunction of a component of the

Landfill Gas Collection and Flaring System, lasting greater than 72 hours; report the condition to an Environment Officer within the next 24 hours. The report shall include the nature of the shutdown or malfunction, the time and estimated duration of the event, the cause for the event and the proposed actions for return to operation.

81. The Licencee shall not combust landfill gas at any location other than the landfill gas flare or other combustion equipment as approved by the Director.
82. The Licencee shall combust only landfill gas or propane for startup in the landfill gas flare.
83. The Licencee shall not emit particulate matter from the Development such that:
 - a) particulate matter:
 - i) exceeds 0.23 grams per dry standard cubic metre calculated at 25 degrees Celsius and 760 millimetres of mercury, corrected to 12 percent carbon dioxide for processes involving combustion, from any point source of the Development;
 - ii) exhibits a visible plume with an opacity of greater than 5 percent at any point beyond the property line of the Development; or
 - iii) results in the deposition of visible particulate residue at any time beyond the property line of the Development; or
 - b) opacity from any point source of the Development equals or exceeds:
 - i) 20 percent as the average of any 24 consecutive opacity observations taken at 15 second intervals;
 - ii) 20 percent for more than 16 individual opacity observations within any 1 hour period; or
 - iii) 40 percent for any individual opacity observation.
84. The Licencee shall remove and collect condensate from the landfill gas collection system, and shall dispose of the condensate as landfill leachate.

Monitoring and Reporting – Landfill Gas Collection and Flaring System

85. The Licencee shall carry out the monitoring plan submitted by Integrated Gas Recovery Services Inc. on November 1, 2010, and approved by the Director on November 8, 2010, or any future amendment approved by the Director.
86. The Licencee shall include a report of the Landfill Gas Collection and Flaring System annual operations, in the annual report required by Clause 104, including, at a minimum, the following items:
 - a) the results of the monitoring program approved by Clause 85 of this Licence;
 - b) an evaluation of the landfill gas collection system's impact on greenhouse gas emissions at the Development;
 - c) records of maintenance and shutdown periods of the landfill gas collection and flaring system; and

- d) a description of any significant maintenance or operational problems encountered.
- 87. The Licencee shall have the Landfill Gas Collection and Flaring component of the report required by Clause 86 of this Licence verified by an independent third party that is acceptable to the Director.
- 88. The Licencee shall retain the records required by Clauses 85 and 86 of this Licence for a period of not less than 10 years.

SITE DRAINAGE, PONDS AND LEACHATE

Operation – Site Drainage, Ponds and Leachate

- 89. Unless otherwise approved by the Director, the Licencee shall direct and treat leachate collected in the sump manholes or any other run off or water handling component of the Development at the City of Brandon Wastewater Treatment Facility.
- 90. The Licencee shall not recirculate leachate or contaminated water collected at the Development through the landfill cells unless approved by the Director.

Monitoring and Reporting – Leachate

- 91. The Licencee shall report an occurrence of leachate breakout which leaves the Development to an Environment Officer within 24 hours.

GROUNDWATER

Monitoring and Reporting – Groundwater

- 92. The Licencee shall develop a groundwater monitoring, sampling and analysis plan and submit it for approval within six (6) months of the date of issuance of this Licence. The plan shall propose the location, type and number of locations to be monitored and sampled, the parameters and the frequency of sampling. The monitoring shall include both vertical and horizontal components of groundwater flow. The Licencee shall maintain records of the results of all such analyses.
- 93. As a result of the operation of the Development, the Licencee shall not cause the concentration values of the parameters listed in Appendix 'B', attached to this Licence, to exceed background levels in groundwater at the compliance boundary.
- 94. The Licencee shall, for the parameters listed in Appendix 'B' attached to this Licence, sample and submit a report which compares the analytical results obtained

for the sampling with the results from previous sampling events, at the frequency approved in Clause 92.

SURFACE WATER MANAGEMENT

Surface Water Management

95. The Licencee shall manage surface water, both impacted and non-impacted, at the Development to prevent uncontrolled release from the Development.
96. In the event of a release of surface water impacted by any contaminant that could potentially affect downstream users of drinking water, the Licencee shall notify the Office of Drinking Water and the City of Portage la Prairie.

Construction – Surface Water Management System

97. The Licencee shall obtain a Water Rights Licence from the Water Resources Branch, Conservation and Water Stewardship, if required, for drainage works that cause water to leave the Development. The Licencee shall provide to the Director, a copy of the Water Rights Licence at minimum ten (10) days prior to any construction identified within that Licence.

Operation – Surface Water Management System

98. The Licencee shall operate and maintain all surface water courses to minimize odour and pest problems, sedimentation within the waterways, and to maximize nutrient reduction.

Monitoring and Reporting – Surface Water Management System

99. The Licencee shall, for the parameters listed in Appendix 'C', attached to this Licence, sample and submit a report which compares the analytical results obtained for the sampling with the results from previous sampling events, at the frequency approved in Clause 41.

CONTINGENCY ACTION PLAN

100. The Licencee shall submit to the Director for approval, within six (6) months of the date of issuance of this Licence, a plan that includes a Contingency Action Plan to be implemented in the event that the monitoring program identifies any parameter in surface or groundwater at the property boundary, as a result of the operation of the Development, in excess of background levels. The Contingency Plan shall assess the significance of the exceedance in relation to applicable groundwater and surface water criteria, and action to be taken to mitigate the contamination, if required.

101. The Licencee shall notify an Environment Officer of all incidents requiring Contingency Action Plan implementation regarding groundwater or surface water pollution within seven (7) days of identification of an incident; notification shall include the nature of the incident, the area affected (when determined), immediate actions taken and follow up action proposed to be taken.

RECORDS AND ANNUAL REPORT

Operation and Monitoring Records

102. The Licencee shall have available for inspection by an Environment Officer or the Director upon request, records of all operational activities, monitoring and analytical results, reports, certifications and documents identified in this Licence.
103. The Licencee shall keep for inspection, operating and monitoring records at the Development site office including:
- a) as-built drawings showing the location and development of excavation, fill area, final grades and structural components;
 - b) records of annual waste tonnage received at the site;
 - c) records of handling of any wastes (including special wastes) accepted at the landfill including the amounts accepted and the disposal locations within the landfill;
 - d) all Certifications and permits for acceptance of regulated materials (SRM (if applicable), weigh scale certification);
 - e) an initial topographic survey and plans showing the areas where waste has been disposed in the current and previous years;
 - f) an annual update survey of active areas, or areas receiving cover;
 - g) monitoring results; and
 - h) complaints received and actions taken.

Annual Report

104. The Licencee shall, unless otherwise approved by the Director, on or before the 15th day of April of each year and beginning in 2016, prepare an annual report with respect to all activities at the Development conducted pursuant to this Licence during the previous calendar year. The format of the report shall be approved by the Director and contain at minimum:
- a) a summary of any construction activities which occurred at the Development;
 - b) the mass of each type of waste received (solid waste to tipping face, compost feedstock, petroleum contaminated soils, special wastes, etc.);
 - c) the mass of each type of material that was removed from the Development (recyclables, treated soils, compost, etc.);
 - d) a summary of the monitoring report results from air, groundwater, and surface water as per Clauses 86, 94 and 99 respectively;

- e) the volume of leachate which was removed from the Development for treatment;
 - f) summary reports and details of all incidents that required implementation of the contingency plan;
 - g) summary report of noise or odour complaints received; and
 - h) summary report of any fires within the development requiring notification as per Clause 11.
105. The Licencee shall compare the results included with the report pursuant to Clause 104 of this Licence with annual reports submitted in previous years to show trends and variances. The reports shall identify, at minimum, any significant variations, the cause of the variations and any actions taken.
106. The Licencee shall create an Executive Summary from the previous year's annual report, pursuant to Clause 104 of this Licence; the Executive summary is to be submitted to the Director, and made available to the public:
- a) by posting on the City of Brandon's website;
 - b) by deposit at the City of Brandon Public Library; and
 - c) at the Development site office.

EMERGENCY RESPONSE PLAN

107. The Licencee shall maintain an Emergency Response Plan, in accordance with the Canadian Centre for Occupational Health and Safety emergency planning guidelines or other document acceptable to the Director, outlining procedures to be used in the event of leak, spill, fire, flood or other hazardous condition at the Development, or if waste management functions are disrupted.
108. The Licencee shall have available for inspection by an Environment Officer, upon request, records of the details of all incidents requiring the implementation of the Emergency Response Plan at the Development site office.

SITE SAFETY PLAN

109. The Licencee shall maintain a Site Safety Plan in the Operating Procedures in accordance with Provincial and City requirements.

CLOSURE AND POST CLOSURE

110. The Licencee shall review and update the approved Waste Disposal Closure Plan submitted by AECOM dated June 2010 for the Development, at minimum every ten (10) years with respect to determining capacity and closure and post closure costs. The plan shall address the closure of the existing and maintenance of closed waste

disposal cells and provide a preliminary plan for the closure of the new waste disposal cells, including but not limited to:

- a) final cover design and maintenance;
- b) maintenance of leachate detection, collection and treatment;
- c) groundwater monitoring;
- d) landfill gas monitoring; and
- e) financial assurance required to implement the Plan.

111. The Licencee shall submit to the Director, not less than one (1) year prior to closure of the Development, an updated engineering design for the closure of the Development and the proposed post closure monitoring plan.
112. The Licencee shall, where an increase in the slope of the final cover due to settlement, or erosion of the final cover occurs during the post closure period, take remedial action to correct the situation and maintain the design.
113. The Licencee shall implement and maintain the approved Waste Disposal Closure Plan for the Development pursuant to Clause 110 or 111 of this Licence and any terms and conditions set by the Director at the time of approval.

FINANCIAL ASSURANCE/INSURANCE

114. The Licencee shall provide to the Director confirmation of financial insurance coverage in the form of: Environmental Impairment Liability insurance providing coverage subject to a minimum limit of \$1.0 million per occurrence or claim, including coverage for gradual, and sudden and accidental pollution. Coverage to include on-site and off-site clean up costs, and be placed with insurers satisfactory to the Province of Manitoba. The Province of Manitoba shall be added as an Additional Insured on the policy. The policy shall contain a clause stating that the Insurer will give Manitoba 60 days prior written notice in case of significant reduction in coverage or policy cancellation.
115. During the term of the Licence, the City of Brandon, as Licencee, may self insure for environmental impairment liability. Such self-insurance shall satisfy Manitoba's requirement for Environmental Impairment Liability insurance as set out in Clause 114 of this Licence.

RECORD DRAWINGS

116. The Licencee shall:
 - a) prepare "record drawings" for the Development and label the drawings "record drawings"; and

- b) provide to the Director, within six (6) months, or as otherwise approved by the Director, after completion of construction of each component of the Development, two paper copies and one electronic copy of the “record drawings” of the component of the Development.

REVIEW AND REVOCATION

- A. This Licence replaces Licence No. 2932 issued to The City of Brandon, which is hereby rescinded.
- B. This Licence replaces Operating Permit No. 3011.17 issued to The City of Brandon, which is hereby rescinded.
- C. 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.
- D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of *The Environment Act*.

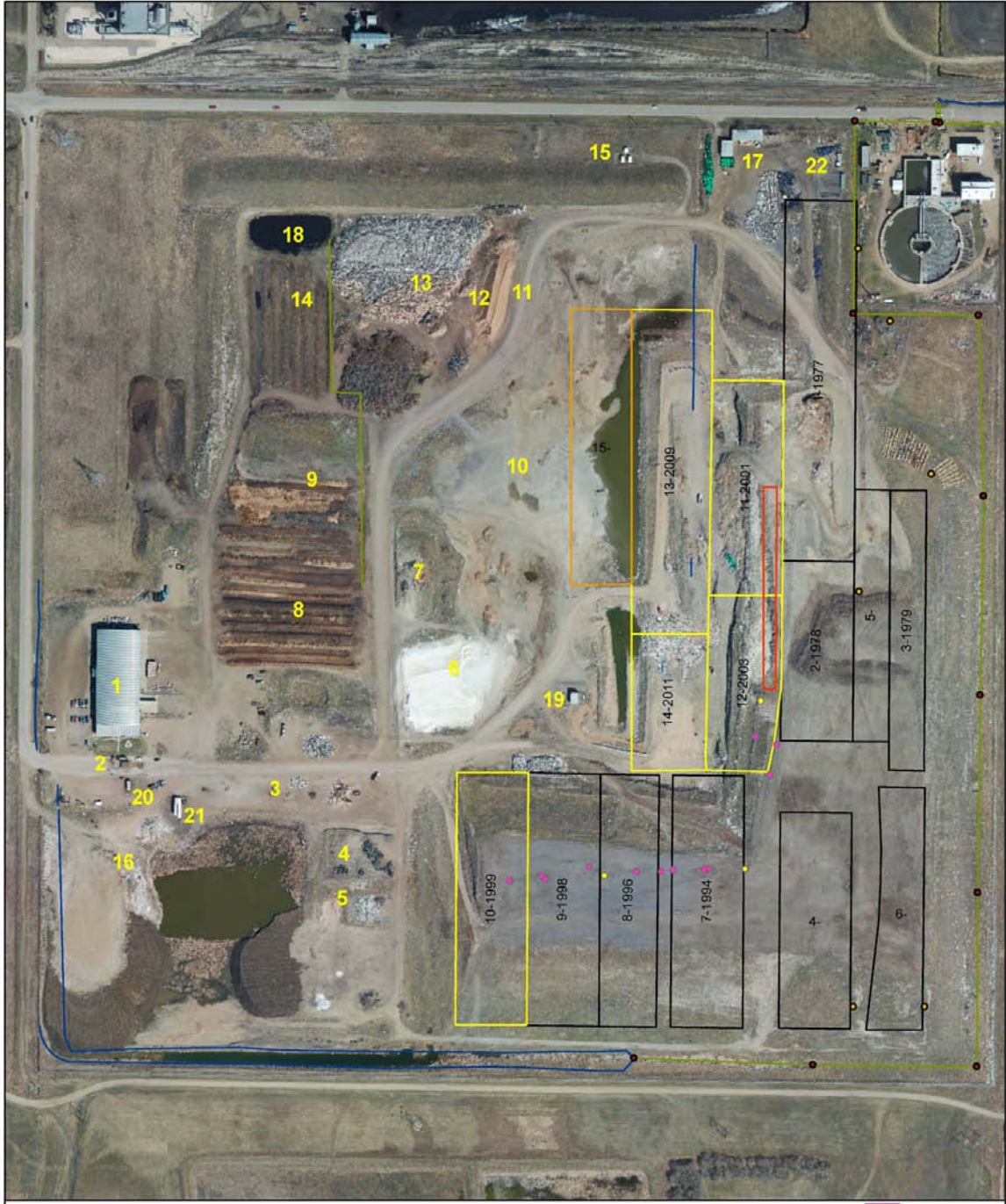
“original signed by”

Tracey Braun, M.Sc.
Director
Environment Act

File No.: 5597.00

APPENDIX 'A'
TO ENVIRONMENT ACT LICENCE NO. 3149

CITY OF BRANDONEASTVIEW LANDFILL SITE
PLAN



APPENDIX 'B'
TO ENVIRONMENT ACT LICENCE NO. 3149 Clauses 93 and 94

**COMPREHENSIVE WATER QUALITY CHEMICAL
AND MICROBIOLOGICAL PARAMETERS**

Parameter	Notes
Alkalinity-bicarbonate	Dissolved
Alkalinity-carbonate	Dissolved
Alkalinity-hydroxide	Dissolved
Alkalinity-total	Dissolved
Hardness- as CaCO ₃	Dissolved
pH-units	Dissolved
Specific Conductivity	Dissolved
Turbidity-NTU	
Residue-filterable	
Residue-non filterable	
Residue-total	
Chloride	Dissolved
Sulphate	Dissolved
Cyanide-total	Dissolved
Ammonia	Dissolved
Nitrate-Nitrite-Nitrogen	Dissolved
Total Kjeldhal Nitrogen	
Phosphorus	Dissolved
Arsenic	Dissolved
Barium	Dissolved
Beryllium	Dissolved
Cadmium	Dissolved
Calcium	Dissolved
Chromium	Dissolved
Copper	Dissolved
Iron	Dissolved
Lead	Dissolved

APPENDIX 'B' (cont'd.)
TO ENVIRONMENT ACT LICENCE NO. 3149, Clauses 93 and 94
COMPREHENSIVE WATER QUALITY CHEMICAL
AND MICROBIOLOGICAL PARAMETERS

Parameter	Notes
Magnesium	Dissolved
Manganese	Dissolved
Mercury	Total
Nickel	Dissolved
Potassium	Dissolved
Selenium	Dissolved
Silver	Dissolved
Sodium	Dissolved
Zinc	Dissolved
Naphthalene	
Benzo a pyrene	
Anthracene	
CCME Petroleum Hydrocarbon Fraction 1	
CCME Petroleum Hydrocarbon Fraction 2	
CCME Petroleum Hydrocarbon Fraction 3	
CCME Petroleum Hydrocarbon Fraction 4	
Leachable Lead	
Benzene	
Ethylbenzene	
Toluene	
Xylene	
Vinyl Chloride	
Diazinon	
2, 4-D	
Coliforms	Fecal & Total
<i>E.Coli</i>	

APPENDIX 'C'
TO ENVIRONMENT ACT LICENCE NO. 3149 Clause 99

**SURFACE WATER QUALITY CHEMICAL
AND MICROBIOLOGICAL PARAMETERS**

Parameter	Notes
Alkalinity-bicarbonate	Dissolved
Alkalinity-carbonate	Dissolved
Alkalinity-hydroxide	Dissolved
Alkalinity-total	Dissolved
Hardness as CaCO ₃	Dissolved
pH-units	Dissolved
Specific Conductivity	Dissolved
Turbidity-NTU	
Residue-filterable	
Residue-non filterable	
Residue-total	
Chloride	Dissolved
Sulphate	Dissolved
Cyanide-total	Dissolved
Ammonia	Dissolved
Nitrate-Nitrite-Nitrogen	Dissolved
Total Kjeldhal Nitrogen	
Phosphorus	Dissolved
Arsenic	Dissolved
Barium	Dissolved
Beryllium	Dissolved
Cadmium	Dissolved
Calcium	Dissolved
Chromium	Dissolved
Copper	Dissolved
Iron	Dissolved
Lead	Dissolved
Magnesium	Dissolved
Manganese	Dissolved
Mercury	Dissolved
Nickel	Dissolved
Potassium	Dissolved
Selenium	Extractable
Sodium	Dissolved
Zinc	Dissolved
Coliforms	Fecal & Total
COD & BOD	
<i>E.Coli</i>	

APPENDIX 'D'
TO ENVIRONMENT ACT LICENCE NO. 3149 Clause 30

SOIL SAMPLING

1. The Licencee shall provide a drilling rig, acceptable to the designated Environment Officer, to extract soil samples from the specified liner of the structure. This includes all liners constructed with clay. The drill rig shall have the capacity to drill to the maximum depth of the clay liner 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 liners placed or found at the surface of the 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.

APPENDIX 'D' (cont'd.)
TO ENVIRONMENT ACT LICENCE NO. 3149, Clause 30

SOIL TESTING METHODS

1. Triaxial Test Method
 - a) The soil samples shall be tested for hydraulic conductivity using ASTM D 5084 (Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter).
 - b) Soil specimens shall have a minimum diameter of 70 mm (2.75 inches) and a minimum height of 70 mm (2.75 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The hydraulic gradient shall not exceed 30 during sample preparation and testing. Swelling of the soil specimen should be controlled to adjust for: the amount of compaction measured during sample collection and extraction from the tube and the depth or elevation of the sample. The effective stress used during saturation or consolidation of the sample shall not exceed 40 kPa (5.7 psi) or the specific stress level, that is expected in the field location were the sample was taken, which ever is greater.
 - c) The complete laboratory report, as outlined in ASTM D 5084, shall be supplied for each soil sample collected in the field.

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