



the issues related to the loss of monitoring locations as a result of progressive development of the East Quarry landfill liner systems. This plan shall be designed in consultation with the CLC and the City prior to submission to the Director.

57 Within 180 days of the issuance of this Certificate, the Company shall submit a report to the Director and the City with respect to the groundwater modelling performed for this Site. This report shall combine the items in the Gartner Lee Limited document dated August 1996, Item 21 of the attached Schedule "A", and the following:

- a) documentation of the West Quarry Landfill leachate recirculation assessment including clear definitions of discharge locations, volume removed and an assessment of the results to the actual volumes removed;
- b) sensitivity analysis of vertical conductance of the less fractured bedrock zones;
- c) calibration statistics to include observed and simulated hydraulic head values at target locations;
- d) documentation of desaturated layers and use of any re-wetting options;
- e) comparison of simulated flow rates to the constant hydraulic heads applied at well locations to observed or proposed flow rates; and
- f) identification of locations where hydraulic heads were specified and implications of specifications to the model and comparison to the actual results.

The documentation shall be in accordance with ASTM D5447-93.

58 Environmental Monitoring

58.1 The Company shall provide monitoring in accordance with the following:

- a) the performance of the engineered control systems of the Site as per Schedule "B";
- b) leachate production and quality as per Schedule "C";
- c) surface water flow and quality as per Schedule "D";
- d) levels of landfill gases as per Schedule "E";
- e) ground water as per Schedule "F";
- f) off-site dust levels and other air monitoring as per Schedule "G"; and
- g) noise levels as per the requirements set out in the monitoring report to be submitted as part of Condition 47.



- 59 The Company shall conduct air sampling by an approved MOEE method for a scan of VOC parameters during precipitation free, warm to hot weather conditions and during the months of June to August. The air sampling shall be conducted in simultaneous pairs at the property boundary, upwind and downwind of the working face, with the downwind sample being taken no more than 500 m from the working face. These paired air samples are to be taken coincident with the landfilling of petroleum contaminated wastes. For the first year of operation, up to 10 half hour sample pairs, one per day, are to be taken. After the first year of operation, the number of samples required will be determined in consultation with the MOEE. These monitoring results shall be submitted to the MOEE District Office as soon as practicable.
- 60 All monitoring data will be made available to the CLC and the City as soon as practicable.
- 61 Any changes to the monitoring programs shall be done in consultation with the CLC and the City prior to being submitted to the Regional Director for approval. Approval by the Regional Director is required prior to those changes being implemented.
- 62 If it is determined by the Regional Director that noise and/or dust levels from on-site operations or from transportation of waste to the Site must, in the opinion of the Director, be reduced or otherwise controlled to prevent adverse impacts to adjacent properties, the Company shall implement contingency measures in accordance with the requirements of the Director, following consultation with the CLC and the City, where practicable.
- 63 Predictive Monitoring
- 63.1 In the event that the results of the monitoring programs listed in Schedules D or F are such that an off-site exceedance of the PWQO, ODWO or the Reasonable Use Guideline is predicted to occur, the Company shall include in the annual monitoring report the following:
- a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
 - b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
 - c) a discussion of the modifications, if any, which should be made to the monitoring program; and
 - d) a discussion of other mitigation measures, if any, which may be necessary to prevent off-site impacts.



CONTINGENCY PLANS

- 64 Contingency plans relating to ground water impacts and the triggering of such contingency plans shall be as described in item Nos. 2, 3 and 15 of the attached Schedule "A".
- 65 Contingency plans relating to surface water impacts and the triggering of such contingency plans shall be as described in item No. 4 of the attached Schedule "A".
- 66 Contingency plans relating to landfill gas impacts and the triggering of such contingency plans shall be as described in item Nos. 2 and 16 of the attached Schedule "A".
- 67 Any changes to the specific trigger levels for the ground water and surface water monitoring programs shall be done in consultation with the CLC and the City prior to being submitted to the Regional Director for approval. Approval by the Regional Director is required prior to the implementation of these changes.
- 68 In the event that the results of the monitoring programs listed in Schedule D or F are such that an off-site exceedance of the PWQO, ODWO or the Reasonable Use Guideline has occurred as a result of the operation of the East Quarry landfill, the Company shall notify the Director, the CLC and the City as soon as possible and specify the following:
- a) Details of the off-site exceedance, including the confirmatory monitoring results and the potential off-site impacts to surface water and ground water users;
 - b) the extent and timing of the contingency measures to be implemented;
 - c) modifications, if any, which should be made to the monitoring program; and
 - d) other mitigation measures, if any, which may be necessary to reduce or prevent off-site impacts.

ENVIRONMENTAL INSPECTOR

- 69 The Company shall reimburse the Crown for costs incurred by the Crown to retain an Environmental Inspector. The terms of reference for the Environmental Inspector shall be determined by the Regional Director following consultation with the Company, the CLC and the City. A copy of the terms of reference shall be provided to the CLC and the City.



COMMUNITY LIAISON COMMITTEE

- 70 The Company in consultation with the City shall provide for the establishment of a Community Liaison Committee (CLC) within 120 days of the issuance of this Certificate for the purpose of providing community review of the development, operation, ongoing monitoring, closure and post closure care related to the landfill Site. The CLC shall act as a vehicle for communication between the Company and the Community and to provide the opportunity for the CLC to make recommendations to the Company and the Ministry or any other appropriate authority on matters of concern to people affected by the Company's operations.
- 71 The general mandate of the CLC shall be to:
- a) review and provide recommendations on annual operating and monitoring reports; and
 - b) review and provide recommendations on complaints and complaint handling protocols and any other matters of concern to the community.
- 72 Membership on the CLC shall be available on the following basis:
- a) two representatives of the Company;
 - b) one representative of the City of Stoney Creek;
 - c) one representative of the Regional Municipality of Hamilton-Wentworth;
 - d) one representative of the MOEE;
 - e) two community representatives from within 1,500 metres of the Site; and
 - f) two community representatives from within 500 metres of a designated haul route.
- The MOEE representative shall be non-voting.
- 73 The Company shall allow the CLC to prepare Terms of Reference for the CLC. The Company shall submit a copy of the Terms of Reference for establishing the CLC to the Regional Director. Any subsequent changes to the Terms of Reference for the CLC shall be forwarded to the Regional Director. A copy of the terms of reference for the CLC shall be publicly available.
- 74 The Company shall provide a maximum of \$10,000 annually for the reasonable administrative costs of establishing and operating the CLC, including the cost of meeting places, clerical services and consultants to be retained by the CLC for the purpose of reviewing reports provided by the Company. The amount of \$10,000 shall be reviewed at a minimum frequency of every five years.



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- 75 The Company shall provide the CLC and the City with access to non-proprietary documents including consultants reports relating to the Site in accordance with protocols agreed to between the Company and the City and the CLC. In addition, the Company shall provide the CLC and the City with copies of the annual reports required to be submitted to the Director. The Terms of Reference for the CLC shall include these protocols.
- 76 After notifying the Company and meeting all appropriate Health and Safety regulations, the Company shall allow the CLC and the City reasonable access to the Site, accompanied by a Company official.
- 77 The Company in conjunction with the CLC and the City shall establish a public complaints procedure that includes:
- 77.1 Circulating on a quarterly basis all complaints to members of the CLC, City and keeping a public record at the Company offices. Copies of complaint forms will be available at the Site office.
- 77.2 Establishing a 24-hour emergency telephone number to receive any complaints and to respond immediately. Written responses are to be provided by the Company within ten days of receipt of a complaint.
- 77.3 Recording the name and address of the complainant if given, and the date, time and nature of complaint.
- 77.4 Reviewing with the CLC and the City at least twice annually, all complaints about the operations of the Site and the Company's response/action. Complaints about exceedances are to be reviewed with the CLC and the City at each meeting of the CLC. Complaints that are not resolved within a period of ninety (90) days shall be referred to the CLC for review and resolution.
- 77.5 Summarizing all complaints and the Company's responses/ actions in the annual report.
- 78 The summary of the complaints procedure shall be forwarded to the Regional Director and all properties within 1,000 m of the Site property boundaries.



SITE CLOSURE

- 79 At least two years prior to the anticipated date of closure of the landfill Site, the Company shall submit a complete plan for closure, post-closure, long term maintenance, long term monitoring, and after-use of the Site, including all buffer and landfilled areas, to the Director for approval. The plan shall include the following:
- a) Final site contours and drainage plans;
 - b) Operation plans up to site closure;
 - c) Details on final grading, cover methods and source of cover materials;
 - d) Vegetative cover, landscaping plans and end-use of the Site;
 - e) Leachate and gas control systems in place or required;
 - f) Operation, maintenance and monitoring of leachate and gas control systems;
 - g) Long term ground water, surface water, and gas monitoring programs;
 - h) Proposed maintenance schedules;
 - i) Anticipated capital and operating costs of each closure plan activity or item;
 - j) Updated contingency plans for ground water, surface water and gas control problems; and
 - k) Post-closure ownership of the site.
- 80 The Closure Plan shall be designed in consultation with the CLC, the City and the Hamilton Region Conservation Authority prior to being submitted to the Director for approval.

FINANCIAL ASSURANCE

- 81 Financial assurance shall be provided to the Director by the Company in a form and manner acceptable to the Director and in an amount that is sufficient to pay for compliance with and performance of any action specified in this Certificate. The CLC and the City shall be consulted with regards to the financial assurance prior to submission to the Director.
- 82 Financial Assurance may be provided in one or more of the following forms: cash, irrevocable letter of credit, surety bonds, insurance policy or some other form, all satisfactory to the Director.
- 83 This Certificate No. A 181008 shall be included on any correspondence related to the financial assurance that is to be submitted to the Director.



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- 84 Financial Assurance for this Site shall be as outlined in Item Nos. 19 and 20 of the attached Schedule "A".
- 85 Within 60 days of the issuance of this Provisional Certificate of Approval, the Company shall provide to the Director financial assurance in the amount of eight million nine hundred and thirty thousand and five hundred and twelve dollars (\$8,930,512). The Company shall change the amount of financial assurance provided to the Director prior to the end of each year in accordance with the schedule outlined in the attached Schedule "H".
- 86 If financial assurance for this Site is provided in the form of an insurance policy, then the conditions outlined under Section 13.6 of Item 20 of the attached Schedule "A" must be met.
- 87 In the event that the financial assurance is scheduled to expire or notice is received that it will not be renewed and a replacement in a form satisfactory to the Director is not received at least 60 days before the expiry or the renewal date, the Company shall replace it with a cash deposit.
- 88 88.1 The Company shall submit an application regarding the review and amendment of the financial assurance to the Director for approval by March 1, 1999, and at intervals of not more than three (3) years thereafter. Supporting information for the application shall include:
- a) Updates of the discount, interest and inflation rates associated with the requirements for financial assurance in Conditions 84 and 85, including justifications and sources of the proposed rates; and
 - b) A report prepared by an Engineer which updates the cost estimates on which the amounts in Conditions 84 and 85 and Schedule "H" are based. The report shall take into consideration:
 - actual amount of leachate collection system completed;
 - actual amounts of waste landfilled;
 - the projected rate of fill;
 - progressive capping of completed fill areas;
 - leachate generation; and
 - any changes projected in the contingency measures, annual maintenance and monitoring costs or other mitigative measures.



In the event that any contingency measures have been carried out, the report shall describe the contingency measures remaining to be carried out and a certification by the Company to the Director as to the work which has been done and materials supplied by the Company relating to the contingency measures, the fair value, thereof, and the balance required to be retained as financial assurance to carry out remaining contingency measures.

- 88.2 A copy of the application and supporting documentation as described in Condition 88.1 for the review of the financial assurance shall also be provided to the CLC and the City.
- 89 The Company shall assess the need for pumping of the groundwater collection system in Year 10 and for each subsequent financial assurance review as per Condition 88.1. If the anticipated length of time required to remediate the West Quarry plume beneath the East Quarry Landfill Site liner system extends past the closure date of the East Quarry Landfill Site, the financial assurances shall be adjusted to account for the estimated time period required for groundwater extraction.



Ministry of
Environment
and Energy

Ministère de
l'Environnement
et de l'Énergie

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The reasons for the imposition of these conditions are as follows:

To ensure protection of the natural environment, to ensure that the operation of the site does not cause an adverse effect and to ensure that the design and operation of the Site is consistent with the approval granted under Section 14 of the Environmental Assessment Act, dated July 15, 1996, Order-in-Council Number 1422-96.



SCHEDULE "A"

This Schedule "A" forms part of the Provisional Certificate of Approval No. A 181008.

Information relied upon in the issuance of this Certificate:

1. The application for Approval of a Waste Disposal Site (Landfill) dated December 1, 1995 and supporting information.
2. The document entitled "Taro East Quarry Environmental Assessment, Design and Operations Report" by Gartner Lee Limited, dated January 1995.
3. The document entitled "Taro East Quarry Environmental Assessment, Hydrogeological Impact Assessment Final Report" by Gartner Lee Limited, dated January 1995.
4. The document entitled "Taro East Quarry Environmental Assessment, Surface Water Impact Assessment" by O'Neill Environmental in conjunction with Gartner Lee Limited, dated January 1995.
5. The document entitled "Taro East and West Quarries, Geologic, Hydrogeologic and Hydrologic Technical Appendix" by Gartner Lee Limited, dated August 1994.
6. The document entitled "Taro East Quarry Environmental Assessment, Waste Characterization Report" by Gartner Lee Limited, dated January 1995.
7. The document entitled "Taro Aggregates Ltd. East Quarry Environmental Assessment, Quarry Blasting Impact Assessment" by VME Associates Limited, dated January 1995.
8. The document entitled "Taro Aggregates Ltd. East Quarry Environmental Assessment, Noise Impact Assessment" by Vibration Assessment Limited, dated January 1995.
9. The document entitled "Taro Aggregates Ltd. East Quarry Environmental Assessment, Air Quality Impact Assessment" by CJB Air Quality Management, dated January 1995.



SCHEDULE "A" Cont'd.

10. The document entitled "Taro Aggregates Ltd. East Quarry Environmental Assessment, Visual Impact Assessment" by The Landplan Collaborative Limited, dated January 1995.
11. The document entitled "Tender Documents for East Quarry Landfill Site, Phase 1A Base Liner and Leachate Collection System, Stoney Creek, Ontario" dated July 25, 1996 by Gartner Lee Limited including Addendum Nos. 1 dated August 2, 1996, No. 2 dated August 13, 1996, and No. 3 dated August 14, 1996
12. The set of drawings, Drawings No. 1 to 12, entitled "Contract No.____, Taro Aggregates Ltd. Phase 1A - Base Liner and Leachate Collection System, East Quarry Landfill Site" dated July 1996 by Gartner Lee Limited.
13. The document entitled "East Quarry Landfill Site, Proposal for Construction and Testing of a Base Liner Test Pad" dated May 3, 1996 by Gartner Lee Limited.
14. The letter dated May 23, 1996 to Mr. John Kaasalainen of the Ministry of Environment and Energy, Approvals Branch, from Mark Sungaila of Gartner Lee Limited providing additional information regarding the construction of the base liner test pad.
15. The letter dated May 28, 1996 to Mr. Wayne Jackman of Taro Aggregates Limited from Mr. Steven Usher of Gartner Lee Limited providing the predictive monitoring trigger levels for the proposed East Quarry Landfill.
16. The memorandum dated June 26, 1996 to Mr. Wayne Jackman of Taro Aggregates Limited from Mr. Mark Sungaila of Gartner Lee Limited providing the trigger levels for combustible gas contingencies.
17. The letter dated August 2, 1996 to Mr. John Kaasalainen of the Ministry of Environment and Energy, Approvals Branch, from Mr. Edward San of Gartner Lee Limited providing additional information for the Phase 1A final detailed design.



SCHEDULE "A" Cont'd.

18. The letter dated August 14, 1996 to Mr. John Kaasalainen of the Ministry of Environment and Energy from Mr. Wayne Jackman of Taro Aggregates providing responses to the Ministry's review comments dated February 28, 1996.
19. The document entitled "Taro Aggregates Ltd. East Quarry Landfill Development, Financial Assurance Proposal - Revised August 28, 1996" dated August 28, 1996 by Taro Aggregates Limited.
20. The Ministry of the Environment and Energy document entitled "Financial Assurance (Part XII - Ontario Environmental Protection Act) A Guide" dated May 1996.
21. The document entitled "Response to Conditions 5.6 and 5.8, Simulation of Groundwater Flow at the Taro Aggregates Limited Properties, City of Stoney Creek, Ontario" dated August 1996 by Gartner Lee Limited.
22. The letter report to Mr. Wayne Jackman of Taro Aggregates Limited from Mr. Steven Usher of Gartner Lee Limited dated July 30, 1996 entitled "Taro East Quarry Landfill / EA Condition of Approval 5.9 / Long Term Impact of Dewatering".

SCHEDULE "B"

This Schedule "B" forms part of the Provisional Certificate of Approval No. A 181008.

Table B.1: Ground Water Perimeter Drain and Underdrain Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Daily	No active operational requirements; system operates by gravity flow and only when ground water pumping station is in operation (refer to Table B.2)	* No specific requirements.	* No specific daily requirements, maintenance as needed.
Monthly		* No specific monthly requirements.	* No specific monthly requirements, maintenance as needed.
Quarterly		* Probe cleanouts for sediment accumulation.	* No specific quarterly requirements, maintenance as needed.
Annually		* Video inspection of perimeter drain piping.	* Flush system piping as required based on inspection, other maintenance as needed.

Note: Ground water level and quality monitoring addressed in Schedule C.

Table B.2: Ground Water Pumping Station Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Daily	Ground water will be pumped from collection system as required. Once in operation, pumping station operates automatically with pumps activated by float controls. Once pumping cycle set at system start-up. No active operational requirements.	* If in operation, check pump operation.	* No specific daily requirements, maintenance as needed.
Monthly		* No specific monthly requirements.	* No specific monthly requirements, maintenance as needed.
Quarterly		* Inspect for sediment accumulation.	* No specific quarterly requirements, maintenance as needed. Vacuum sediment, <u>clean</u> switch contacts and pumps as needed.
Annually		* No specific annual requirements.	* No specific annual requirements, maintenance as needed.

Table B.3: Leachate Collection System Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Daily	No active operational requirements; system operates by gravity flow.	* Measure leachate quantity being collected.	* No specific daily requirements, maintenance as needed.
Monthly		* No specific monthly requirements.	* No specific monthly requirements, maintenance as needed.
Quarterly		* Probe cleanouts for sediment accumulation.	* No specific quarterly requirements, maintenance as needed.
Annually or Other		* Video inspection of all system piping upon completion of construction. Once constructed, video inspection of main pipes on annual basis, lateral pipes once every two years.	* Flush all collection system piping as required based on inspection, other maintenance as needed.

Note: Leachate quality, quantity and head monitoring addressed in schedule C.

Table B.4: Leachate Pumping Station and Gravity Sewer Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Daily	Pumping station	* Check pump for proper operation.	* No specific daily requirements, maintenance as needed.
Monthly	operates automatically with pumps activated by float controls.	* Inspect pumping station for sediment accumulation. * Inspect gravity sewer for sediment accumulation.	* Vacuum sediment as needed, maintenance as needed.
Quarterly	Once pumping cycle set at system start-up, no active operational requirements.	* Remove pumps and inspect for wear. * Inspect pump switches, electrical systems and alarms.	* No specific quarterly requirements, maintenance as needed.
Annually		* Video inspection of all gravity sewer piping after construction completion. * Once constructed, video inspection of gravity sewer piping once per two years.	* Flush gravity sewer as required based on inspection, other maintenance as needed.

Table B.5: Hydraulic Control Layer Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Daily	Operation of circulation system. (1)	* When circulation occurring, ensure proper circulation pump operation.	* <u>Monitoring system pressures to ensure adequate pressure, maintenance as needed.</u>
Monthly	No specific monthly requirements.	* No specific monthly requirements.	* No specific monthly requirements, maintenance as needed.
Quarterly	No specific quarterly requirements.	* No specific quarterly requirements.	* No specific quarterly requirements, maintenance as needed.
Annually	No specific annual requirements.	* No specific annual requirements.	* No specific annual requirements, maintenance as needed.

1. No active operational requirement until end of 20 year landfill operating period. Saturation of hydraulic control layer to begin starting in about year 20. Frequency of replacement of water within hydraulic control layer to be determined based on water quality within layer. Water quality and head monitoring addressed in Schedule C.

Table B.6: Gas Venting System Operation, Inspection, and Maintenance Requirements			
Frequency	Operation	Inspection	Maintenance
Monthly	System is passive and has not active operational requirements.	* Inspect venting pipes for obstruction.	* No specific monthly requirements, maintenance as needed.
Annually		* No specific annual requirements.	* No specific annual requirements, maintenance as needed.

Note: Combustible gas monitoring addressed in Schedule E.

Table B.7: Final Cover Inspection and Maintenance Requirements			
Frequency	Inspection	Maintenance	
Quarterly	* 'Walk-over' inspection for settlement occurrences, surface erosion and vegetation condition for 4 years following construction.	* No specific requirements, maintenance as needed based on inspection.	
Semi-Annually	* 'Walk-over' inspection for settlement occurrences, surface erosion, and vegetation condition (semi-annually for years 5 to 8 following construction).	* No specific requirements, maintenance as needed.	
Annually	* 'Walk-over' inspections year 9 following construction.	* No specific requirements, maintenance as needed.	

Table B.8: General Site Works Inspection and Maintenance Requirements			
Frequency	Inspection	Maintenance	
Weekly	Visual inspection of all fences, gates, visual screens, access roads, First Road West (for efficiency of sweeping) public warning signs, traffic signs.	* Maintenance / repair as needed.	
Monthly (May to October Only)	Visual inspection of sedimentation / retention ponds and perimeter ditches for vegetation condition and sediment accumulation (monthly for first year after construction).	* Maintenance as needed (sediment removal, revegetation, erosion repairs).	
Semi-Annually	Visual inspection of sedimentation / retention ponds and perimeter ditches for vegetation condition and sediment accumulation (semi-annually after first year following construction).	* Maintenance as needed.	



SCHEDULE "C"

This Schedule "C" forms part of the Provisional Certificate of Approval No. A 181008.

ENVIRONMENTAL MONITORING

This program will be implemented sequentially as the development of the site progresses. The Short Term category corresponds to the period during the operating life, prior to the hydraulic control layer being surcharged. The Long Term category corresponds to the post closure period, once the hydraulic control is surcharged.

The following schedule examines each layer individually in terms of water quantity (levels and flow) and water quality (chemistry).

		Frequency
Atmospheric Conditions		
<u>Short and Long Term</u>		
- Average temperature (min., mean, max.), precipitation, wind direction.		Daily
Waste		
- Records of scale-house receipts of waste types.		Continuous
Leachate Collection Layer		
<u>Short and Long Term</u>		
1	Levels - 6 internal locations (centred between underdrains), 16 of 44 cleanouts. - 2 diffusion test pad locations (Short Term only)	Monthly Monthly
2	Flow - Current Leachate Collection System discharge point.	Daily
3	Quality - Discharge point (List C + BOD)	Quarterly



Hydraulic Control Layer		
	<u>Short Term</u>	
1	Levels - visual observation at downhill perimeter ditch - 2 sampler tubes at diffusion test pads	Monthly
	<u>Long Term</u>	
	- 14 pump in/out locations around perimeter - 6 sampler tubes placed at internal locations (as above)	Monthly for 2 years after surcharge. Quarterly thereafter.
	<u>Short Term</u>	
2	Flow - visual observation, or pumpout volumes, at downhill perimeter ditch	Monthly or as needed
	<u>Long Term</u>	
	- at each of 14 pump in/out locations as part of flushing cycle	Annually or as determined by performance testing
	<u>Short Term</u>	
3	Quality - at downhill perimeter ditch (List A) - 2 sampler tubes at diffusion test pads (List B)	As needed when flowing
	<u>Long Term</u>	
	- 14 pump in/out locations (List A) - 6 sampler tubes placed at internal locations (as above) (List A)	4 per year
Ground Water Collection System / Vinemount Flow Zone		
	<u>Short and Long Term</u>	
1	Levels - 13 perimeter cleanout locations - 2 diffusion test pad locations (Short Term only) - Discharge, if pumping	Quarterly
2	Flow - Discharge, if pumping (Totalizer method)	Monthly
3	Quality - 9 of 13 perimeter cleanout locations - Discharge, if pumping - 2 diffusion test pad locations (Short Term only)	Quarterly (List B)
Primary and Secondary Liners		
	<u>Short and Long Term</u>	
1	Levels - Calculated from levels recorded in leachate collection system, hydraulic control layer, and ground water collection system (as above)	
2	Flow - Calculated from above information	
3	Quality Electrical Conductivity only at two diffusion test pads - 3 levels per liner - 2 probes per level to provide reproducibility (= 12 probes / location)	Quarterly

To avoid engineered perforations of the liner systems, which may become conduits for fluid movement and/or localized liner failure, ground water monitors in the VFZ, UFZ, MFZ, and LFZ will be restricted to the perimeter of the site. (That is, no ground water monitors will exist under the liner.)



SCHEDULE "C" Cont'd.

<u>List A :</u>	General: Major ions:	pH, Conductivity, Alkalinity, Phenols, TKN, NH ₃ -N, TOC Ca, Mg, Na, K, Cl, SO ₄ , F, NO ₂ -N, NO ₃ -N, Br, PO ₄
<u>List B :</u>	List A + Metals:	Al, BA, BE, B, Cd, Cr, Co, Cu, Pb, Fe, Mn, Mo, Ni, Si, Sr, Ti, V, Zn
<u>List C :</u>	List B + Organic Analysis:	Misa Groups 16,17,18,19,20, and 22.



SCHEDULE "D"

This Schedule "D" forms part of the Provisional Certificate of Approval No. A 181008.

Schedule D: Surface Water Monitoring Program (1 of 1)

Stations	April Dry	Feb-Apr Spring Freshet	Apr-May Spring Rain	June Dry	June-Sept Summer Rain	Aug Dry	Oct Dry	Oct-Dec Fall Rain
T-3	C	C+E	C	C+E	C	C	C	C
T-3A	C	C+E	C	C+E	C	C	C	C
T-11	C	C+E	C	C+E	C	C	C	C
T-12	C	C+E	C	C+E	C	C	C	C
T-21		D		D				
T-23		D		D				
T-28		D		D				
TS-1		B				B		B
TS-2		B				B		B

Note: List A (Field Parameters) is included with each B, C, D and E list.

List A: Field Measurements		List B: Evaluation of Sediment Ponds	
pH		total suspended sediment	
dissolved oxygen		total phosphorus	
water temperature		iron	
conductivity		copper (0.001) - see note below	
stream flow (or water level)		lead (0.001)	chromium (0.1)
		zinc (0.020)	nickel (0.025)
List C: Water Quality Evaluation (full)			
total suspended sediment	pH and alkalinity	BOD5	dissolved organic carbon
hardness	chloride	sulphate	nitrate
nitrite	total ammonia	calcium	magnesium
un-ionized ammonia (calculated)	total phosphorus (0.030)	sodium	manganese
copper (0.001)	boron	lead (0.001)	zinc (0.020)
cadmium (0.00045)	mercury (0.0002)	nickel (0.025)	silver (0.0001)
chromium (0.1)	iron (0.3)	selenium (0.1)	molybdenum (0.010)
filtered total aluminum (0.075)	arsenic (0.1)	cobalt (0.1)	beryllium
total phenols (4AAP) (0.001)			vanadium
List D: Water Quality Evaluation (Indicator Parameters)		List E: Trace Organic Compounds	
total suspended sediment	nickel (0.025)	Volatile organic scan	
pH and alkalinity	phenols	Base/neutral extractables	
total ammonia	conductivity	Acid extractables	
boron	chloride	Chlorophenols	
chromium (0.1)			

Note: Number in parenthesis is the minimum detection limit (in mg/L) which must be obtained in all cases. If it is not possible to achieve the stated detection limit then the lowest possible detection limit should be obtained.



SCHEDULE "E"

This Schedule "E" forms part of the Provisional Certificate of Approval No. A 181008.

Combustible Gas Monitoring

As each phase of the landfill is constructed, the gas monitors should be installed in the waste, plus progressively every 200 m around the landfill, into the water table in the Eramosa bedrock. Monitoring will include combustible gas concentrations in all monitors.

Table with 2 columns: Monitoring details (Winter, Summer, Sampling of Landfill Monitors) and Monitoring frequency (Weekly, Monthly, Once, Four samples each location).