BURLINGTON LANDFILL

1984 MONITORING REPORT

FOR

THE REGIONAL MUNICIPALITY OF HALTON

PROJECT NO: 85-22

APRIL, 1985

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Toronto-Buttonville Airport ■ Markham,Ontario ■ L3P 3J9 ■ 416-477-8400
Telex-06-986278

April 30, 1985

The Regional Municipality of Halton,
1151 Bronte Road,
Oakville, Ontario.
L6J 4Z3.

Attention: Mr. D.J. Corbett, P.Eng.

Dear Sirs:

Re: Burlington Landfill, 1984 Monitoring Report
GLAL 85-22

We are pleased to submit the Burlington Landfill 1984 Monitoring Report. The report contains ground and surface water quality data collected during 1984, and our interpretation of these data. The landfill appears to have caused some water quality impairment along drainage ditches to the south and southeast. Additional surface water stations and a temporary increase in surface water sampling frequency have been recommended to better assess this problem.

Thank you for the opportunity to be of service. Please contact our office if you have any questions.

Yours very truly
GARTNER LEE ASSOCIATES LIMITED

for R.E.J. Leech, B.Sc., M.Eng.Sc.,
Partner-in-Charge

R.C. Dickin, M.Sc.,
Project Manager.

RCD:dg

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1.0 CONCLUSIONS AND RECOMMENDATIONS:

1.1 CONCLUSIONS:

Based on our interpretation of the 1984 monitoring results and review of previous monitoring data we draw the following conclusions.

- As in previous years, some leachate seepages developed along the landfill slopes during wet weather in the spring of 1984. The Region mapped these seepages and, where possible, repaired them in April and May, 1984.

- Monitoring results indicate that the landfill impaired the quality of surface water runoff in drainage ditches to the south and the southeast of the landfill (stations SW10, SW11, SW12, SW13). These stations have only low intermittent flows and are generally dry during summer. Discharges from these stations join the main channel of Falcon Creek south of the landfill property and south of surface water station SW3. The impact of these discharges on the main channel of Falcon Creek to the south cannot be assessed using the existing surface water monitoring stations.

- No landfill impact was detectable on the main channel of Falcon Creek to the west and southwest of the landfill at stations SW2 and SW3.

- No landfill impact was detectable in 1984 on the Indian Creek tributaries (SW4-5 and SW6-7) to the east of the landfill. Only very low intermittent flows occur in these tributaries.

- As in previous monitoring, we have been unable to differentiate between poor natural ground water quality in the shale bedrock and leachate contaminated ground water. Leachate enters the shale bedrock below the southern part of the landfill, which does not have an underdrain system and where the refuse lies directly on top of fractured bedrock. The extent of leachate contamination of ground water downgradient to the south of the landfill cannot be accurately determined with the existing routine monitoring data. There are no ground water uses downgradient of the landfill.

- Shallow ground water quality at the north end of the landfill is of better natural quality due to different geologic conditions. Routine water quality analyses should be useful in future monitoring for detecting the presence of leachate from the expansion area at the north end of the landfill.

- Of the twenty-two monitoring nests which have been installed at this site only eight nests are suitable for continued monitoring of routine water quality parameters. The others have been destroyed by site construction, or have been sealed or will be sealed to permit landfill expansion. New monitors are required to replace sealed monitors and also for plume delineation studies involving trace organics.

- Burlington landfill leachate is chemically similar to other leachate produced at other southern Ontario landfills. The 1984 average concentrations of zinc, iron and BOD in Burlington leachate exceeded the sewer discharge limits set out in Regional By-Law 97-79. The volume of leachate collected in the toe-drain/underdrain collection system was not recorded in 1984 due to equipment breakdown.

1.2 RECOMMENDATIONS:

1. The Region should map leachate seepages monthly. Leachate seepages located inside the landfill toe-drain should be repaired as soon as possible. The established repair procedures of excavating and backfilling with permeable material to ensure hydraulic connection with the toe-drain should be used. Leachate seepages outside the toe-drain should be dealt with on an individual basis after assessing the significance of their impact on the environment.

2. In order to more fully assess the impact on Falcon Creek of leachate contaminated water in drainage ditches to the south of the landfill we recommend that a more intensive study be carried out in addition to continuation of the routine monitoring program. This additional study was also recommended in the "Terms of Reference" report (GLAL, April, 1985) and will provide information that will be used in conjunction with the contingency program. The main components of this study are:

a) Establishment of a new monitoring station on Falcon Creek south of Highway 403 (see proposed location SW14 on Figure 3).

b) The surface water sampling and flow measurement frequency at stations SW1, SW3, SW12, SW13 and SW14 should be increased to monthly (from quarterly) for a period of six months.

c) Establishment of two additional surface water stations, upstream and downstream of Highway 403, on another stream removed from potential landfill impacts. These stations will be used as control points to assess typical water quality impacts from the highway, so that these impacts can be distinguished from landfill impacts. Sampling and flow measurement at these stations would be carried out monthly for six months and then discontinued.

d) Remedial measures to prevent leachate discharges from the ditches south and southeast of the landfill (SW10, SW11, SW12, SW13) should continue to be investigated.

3. New ground water monitors should be installed at nine locations (see Figure 1). These monitors are required to replace monitors which have been destroyed or sealed and for the plume delineation program. These monitors will be constructed suitably for sampling and analysis of trace organics. The rationale and construction details for these monitors are summarized in Section 7.1 of this report.

4. The routine monitoring program of ground water, surface water and leachate should be continued as summarized in Section 7.2 of this report.

5. The proposed leachate plume delineation program using trace organic analyses of ground water should be carried out as summarized in Section 7.3 of this report.

6. The flow meter in the toe-drain should be repaired or replaced and continuous measurements of toedrain leachate discharge should be recorded.

7. Monitoring of the leachate with respect to the Regional Sewer Use By-Law 97-79 should continue with input from the sewage treatment plant operator. Special emphasis should be placed on zinc, iron and BOD levels to ensure that there are no adverse impacts on the sewage treatment plant.

2.0 INTRODUCTION:

Gartner Lee Associates Limited (GLAL) were retained on August 13, 1980 by the Regional Municpality of Halton to carry out a monitoring program at the Burlington Regional Landfill. The Region authorized the 1984 sampling program under Purchase Order No. 65444. This monitoring program was required by the Ministry of Environment (MOE) as part of the provisional certificate of approval No. A210102. This is the fifth annual monitoring report on data collected at this site. The monitoring program is on-going as per the recommendations in this report.

The ground water and surface water monitoring carried out in 1984 was generally similar in scope to 1983. A more intensive monitoring program involving trace organic analyses of ground water for leachate plume mapping has been proposed (GLAL, 1984a and GLAL 1985). This more intensive monitoring program will be carried out as soon as it is approved by the Ministry of the Environment (MOE) and the Region.

The ground water monitoring program was designed to assess the impact of the existing landfill on ground water quality. The purpose of the surface water monitoring program was to assess the impact, if any, of landfill site operations on the water quality of Falcon Creek and Indian Creek and to determine the effectiveness of the toe-drain collection system in preventing overland leachate flow.

Gas monitoring is not included in the present monitoring program because there is low potential for methane gas migration through the soils at this site. Methane is lighter than air and tends to move upward through cracks in the soil and vent to the atmosphere. In addition there are no buildings with basements immediately adjacent to the landfill. Basements are potentially hazardous gas concentration points.

A considerable amount of hydrogeological work has already been done at this site. Previous reports were reviewed and pertinent data and interpretions are included in this report. Previous GLAL reports on this site are referenced in Section 8.0.

3.0 BACKGROUND PHYSIOGRAPHY AND GEOLOGY:

Regionally the Burlington Landfill site is situated on the lower slopes of the Niagara Escarpment in an area heavily dissected by gullies and ravines. The lands comprising the site slope moderately towards the south and east, except as altered by the existing fills. A deep ravine, eroded into the shale bedrock, borders the western periphery of the site. In places, along the east slope of this ravine, erosional gullies occur. Remedial measures to stablize these slopes are being carried out by the Region of Halton. Falcon Creek flows intermittently to the south along the ravine bottom.

A less pronounced ravine borders the north-east side of the site. Intermittent drainage channels to the northeast of the property are part of the Indian Creek drainage basin.

The northern portion of the site is mantled by a relatively dense to very dense clayey silt till. This till is absent in the southern part of the site. A layer of weathered Queenston shale, varying in thickness, occurs beneath the till in the northern part of the subject area and at surface in the south. Unweathered Queenston shale forms the bedrock below the whole site.

4.0 LEACHATE:

4.1 LEACHATE COLLECTION SYSTEM:

Rainfall and snowmelt which infiltrates through the refuse will produce leachate. At the Burlington landfill site a toe-drain leachate collection system has been retrofitted along the west, south, and southeast sides. The toe-drain will be extended around the entire site as part of the "continued use" landfill expansion. The purpose of the toe-drain is to reduce leachate discharges from springs at the toe of the landfill into the surrounding environment.

The northern part of the landfill is underlain by a layer of clayey silt till and is equipped with an underdrain system for leachate collection (see Figure 1). The underdrain system will be extended into the expansion area to the northeast. The purpose of the underdrain system is to collect and thus prevent downward movement of leachate into the shale bedrock at depth.

The southern part of the landfill is older and is not equipped with an underdrain system. The layer of clayey silt till thins to the south and in places the refuse lies directly on shale bedrock. Leachate enters the ground water flow system in the shale bedrock in these areas.

All collected leachate from the toe-drain and underdrain is discharged to the Burlington sanitary sewer system. A flow meter to record leachate flow volumes was previously installed on the toe-drain in 1981. This meter has failed to provide reliable, continuous measurements of leachate

flows to date. No leachate flow measurements were made in 1984, because of continuous malfunction of the flow meter. A new flow metering system is currently being designed for installation later in 1985.

4.2 LEACHATE CHEMISTRY:

Leachate samples were collected by GLAL from toe-drain manhole 22A (see Figure 1) in April, July, August and November, 1984. Samples were collected each time using a new length of polyethylene tubing, a new 1 L sampling bottle (used as a vacuum vessel) and a hand suction pump. These leachate samples were analyzed by the MOE Rexdale Laboratory. Samples were collected and analyzed four times for routine water quality parameters, once for heavy metals and twice for volatile organic compounds. These results are presented in Appendix II.

The Region also collected leachate from the toe-drain manhole thirty-one times in 1984 and analyzed these samples at the Regional Laboratory. The samples were analyzed for selected routine water quality parameters and heavy metals. These results plus the Regional By-Law 97-79 concentration limits for sewer discharge are also presented in Appendix II.

The results of both MOE and Regional leachate analyses suggest that the Burlington Landfill leachate is generally typical of leachates produced from municipal landfills in southern Ontario. It has elevated concentrations of chloride, hardness, alkalinity, total Kjeldahl nitrogen, ammonia, iron, phenols, BOD and COD. The only volatile organics detected in 1984 were toluene, m and p-xylene,

ethylbenzene, benzene and 1, 2- dichlorobenzene. These compounds were only found at relatively low concentrations and none of them exceeded 1 mg/L in 1984 samples.

All heavy metal analyses are on unfiltered samples and represent total rather than dissolved concentrations. This type of analysis can be biased by suspended material in the water column. Review of the two MOE analyses show no unusually high heavy metal concentrations for landfill leachate.

The Regional heavy metal analyses have a higher detection limit than the MOE but are sufficiently accurate for comparison with the Regional sanitary sewer discharge By-Law 97-79. The 1984 average concentrations of copper, nickel, lead, cadmium, chromium as well as pH and suspended solids are less than the By-Law 97-79 limits. The average levels of zinc, iron and BOD exceed the By-Law 97-79 limits for sewage.

Average concentrations of 1984 MOE analyses for selected parameters in leachate are shown in Table 1. Typical concentrations in background surface water, shallow ground water in the till, and also for deep saline ground water in the shale are also presented in Table 1. Review of Table 1 shows that leachate can be distinguished from background surface water and shallow ground water in the till. However it is extremely difficult to detect the presence of diluted and attenuated leachate in the deep saline ground water in the shale bedrock.

TABLE 1: TYPICAL CONCENTRATIONS OF SELECTED PARAMETERS IN LEACHATE, GROUND WATER AND SURFACE WATER

SELECTED PARAMETERS	LEACHATE	SHALLOW GROUND WATER	DEEP GROUND WATER	SURFACE WATER
	Toe-drain manhole. Average of 1984 MOE data	22-III- upgradient monitor in till. Average of 1983-1984 MOE data	16-III - Downgradient monitor in shale Average of 1983-1984 MOE data	SW1 - upstream, Average of 1984 MOE data
Conductance (uS)	8348	1055	57,450	669
pH	6.8	7.3	7.4	8.1
Hardness (mg/L)	2817	585	16,962	331
Alkalinity (mg/L)	3254	634	20	267
Chloride (mg/L)	1061	7	25,785	34
Sulphate (mg/L)	50	127	1,470	73
Phosphorous Total (mg/L)	1.8	0.5	0.14	<.1
TKN (mg/L)	227	0.9	26.3	0.3
Ammonia (mg/L)	179	<.1	24.9	0.2
Iron Total (mg/L)	497	19.8	4.3	0.9
Phenols (ug/L)	1544	5	24	<1
BOD (mg/L)	4298	11	<1	<1
COD (mg/L)	5273	102	78	27

4.3 LEACHATE SEEPAGES:

The site was inspected for leachate seepages by GLAL staff during sampling visits in April, June, August and November, 1984. The Region supplied a plan of leachate seepages which were mapped and repaired by the Region in April-May, 1984.

In April 1984 a number of leachate seepages were observed discharging from the landfill slopes inside the perimeter toe-drain collection system at the southern end of the landfill. These seepages were related to water perched on top of layers of clayey silt daily cover material. They were repaired by excavating down through the daily cover layer and then backfilling with refuse and replacing the final cover material. This allows the perched leachate to move downward rather than discharging along the side slopes of the landfill.

On-site inspections in June, August and November by GLAL indicated that the repairs were effective. No flowing leachate springs were located during these site visits.

As previously reported in the 1983 monitoring report, leachate staining was observed at one location along the Falcon Creek ravine beyond the toe-drain. This seepage had no measurable flow and the leachate reinfiltrates into the ground downslope. The Falcon Creek channel was walked in April 1984, from SW3 to the northern end of the existing fill area. No leachate staining or direct discharge to the creek was observed.

A minor leachate spring beyond the toe-drain to the east of the landfill was also noted by the Region in the summer of 1984.

5.0 GROUND WATER:

5.1 GROUND WATER FLOW:

Ground water levels were measured in June, 1984, before well development and sampling. Additional ground water level measurements were made in early 1984 for the "Continued Use" study.

All ground water elevations measured to date are appended. Annual seasonal water level fluctuations of about 2 m± occur in the shallow monitors. Fluctuations are more subdued but generally show similar trends in the deeper monitors.

Figure 2 (map pocket at back) illustrates the water table configuration and shallow ground water flow direction as of February 3, 1984.

This same map was presented in the 1983 monitoring report. More monitoring points were available for water level measurements in February than in June 1984, therefore, the more detailed February water table map is presented.

The overall ground water flow system has not changed significantly from that presented in previous monitoring reports. Flow is generally to the southeast with locally radial components of flow towards adjacent streams and low wetland areas.

Water levels in monitors 18-I and 20-I rose 4 m between February and June 1984. The cause is not known. Additional water level monitoring is required to determine if these water level changes are actually occurring in the ground or if they are caused by some other problem such as failure of the annular seals in these monitors.

There is no recorded ground water use downgradient of the Burlington landfill site. The lands to the east are vacant and Highway 403 crosses south of the site. The property immediately south of Highway 403 is an undeveloped Canadian National Railway corridor. The industries located west of the landfill along the North Service Road are serviced with municipal water from Lake Ontario.

5.2 GROUND WATER QUALITY:

Ground water samples were collected in July, 1984, from designated monitors as presented in the 1983 monitoring report recommendations. Monitor locations are shown on Figure 1 (in map pocket at back of report). Monitors were developed two or three times by airlifting with compressed nitrogen gas (See Appendix I for details). Samples were collected using dedicated lengths of polyethylene tubing installed in each well, and a vacuum pump. For each monitor a new one litre glass sampling bottle with a two hole rubber stopper was used as the vacuum vessel. Thus the water sample only contacted the dedicated tubing and the sample bottle. This procedure was adopted to prevent cross-contamination by using sampling equipment in more than one well. All samples were submitted to the MOE Rexdale Laboratory for chemical analysis.

The existing ground water monitoring network at this site was installed between 1979 and 1983. It consists of PVC plastic monitoring wells constructed with solvent based glue installed in auger or tricone boreholes. Monitor construction details are appended in Appendix I. Borehole geologic logs were previously presented in the "Continued Use Hydrogeological Study" report (GLAL, 1984b).

Monitors at borehole locations 1, 7, 19 and 20 are within the "Continued Use" landfill expansion area and will be sealed during 1985 prior to landfilling. Monitors at borehole 8A, on top of the landfill were sealed in March 1985.

Monitors at borehole 2 could not be located during site visits in 1984 and probably have been destroyed during site construction or by recreational vehicles. Field observations, ground water levels and erratic water chemistry results suggest that the near surface annular seals of the four monitors at borehole 17 were damaged during construction of the landfill run-off settlement pond. The well head of the monitors may be submerged during wet periods and downward leakage of water from the settlement pond probably occurs. Monitors in boreholes 2 and 17 should be discontinued from further monitoring and should be sealed.

Monitors in borehole 21 were in good condition in July 1984 but have been damaged since by construction equipment or recreational vehicles. These monitors should be repaired and redeveloped if possible so they can continue to be used for monitoring.

All new monitors should be completed at surface with a concrete seal and protective steel casings with padlocked caps. Existing monitors should be protected by installing steel posts in appropriate locations around each monitor.

The 1984 analyses of ground water quality are presented in Appendix II. The 1983 analyses are also included for purposes of comparison. Previous monitoring results from 1979-1982 are presented in GLAL, 1984a and 1984b. Recent water quality results from damaged monitors at boreholes 1, 7 and 17 are considered unreliable and are not presented in this report.

Typical shallow ground water quality in the glacial till and in the shale bedrock, is presented in Table 1 (Section 4.2). Background water quality in the till is mineralized and tends to increase with depth. However, chloride concentrations are generally low (<20 mg/L) in the till, particularly at the north end of the site. Chloride should be a useful indicator of leachate contamination in till ground waters.

Water quality in the deep shale bedrock is extremely mineralized and saline. For example, chloride concentrations in the shale have been measured up to twenty-five times as high as in leachate. Due to this naturally poor ground water quality, it is not possible to detect the presence of leachate in the shale using routine water quality parameters.

As in previous monitoring, relatively poor water quality was found in 1984 in downgradient monitors screeened in the shale at boreholes 12, 13, 14, 15 and 16. Due to the poor natural water quality in the shale it is not possible to confidently conclude whether water quality in these particular monitors is degraded by leachate or is just naturally poor. The area south of the landfill is also used as a snow removal dump. The presence of road salt from snow dumping further complicates water quality data interpetation in this area.

To the north, better water quality was found in shallow monitors 18-III, 21-II and 22-III. Chloride levels were less than 10 mg/L and conductivity values were about 1,000 umhos/cm. If in the future leachate reaches any of these three wells, it should be detectable using routine water quality parameters like chloride.

Conductivity levels in deep monitors 16-II, 18-I and 22-I increased substantially in 1984 over 1983. It appears that these monitors may still be responding to the well development process. Similarly BOD concentrations in monitors 18-I and 18-II dropped from >30 mg/L in 1983 to <5 mg/L in 1984, which suggest these monitors are also still responding. Additional well development and sampling is required to confirm background water quality in the recently installed monitors (18, 21, 22). Our present understanding of the ground water flow system plus the monitoring data collected to date suggest there is no leachate impact at this time in the northern monitors at boreholes locations 18, 21 and 22.

6.0 SURFACE WATER:

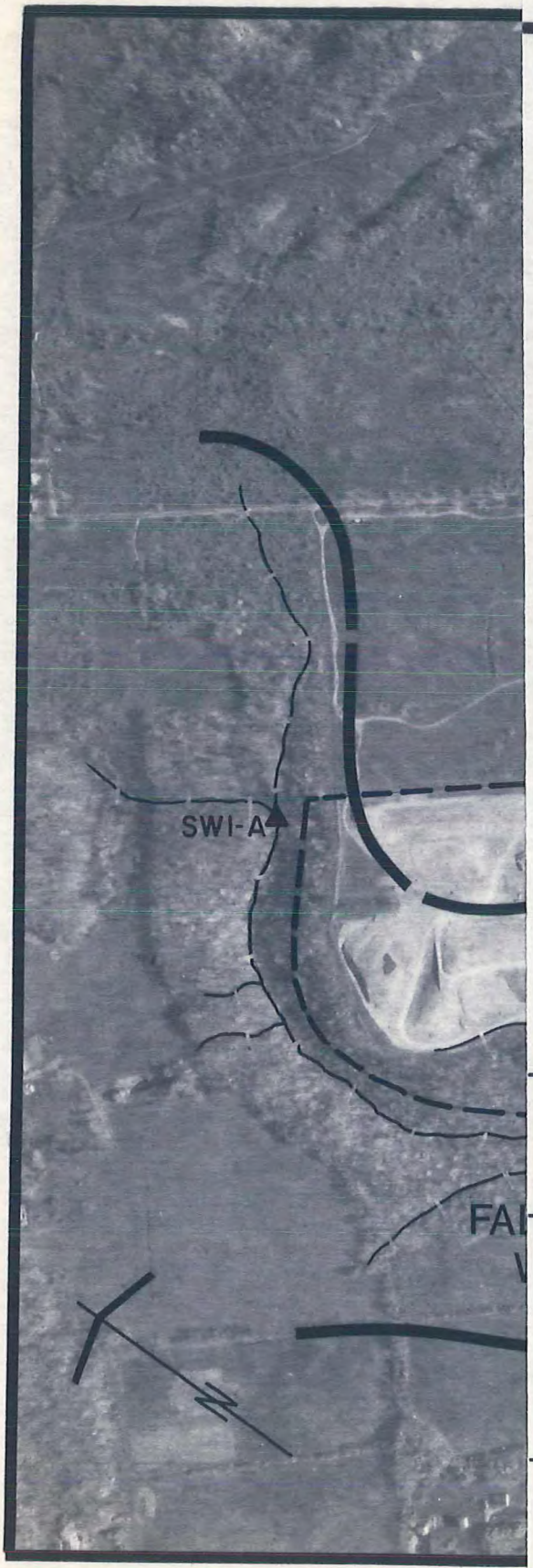
6.1 SURFACE WATER FLOW:

The existing landfill is located within two watersheds; Falcon Creek and Indian Creek. Surface water monitoring stations are located in both watersheds and are shown in Figure 3.

Visual estimates of flow are made at monitoring stations during quarterly sampling visits. These results are presented in Table 2. Review of Table 2 shows that the highest flows occur in the main channel of Falcon Creek (SW1, SW2, SW3) during the spring and fall. Falcon Creek in the vicinity of the landfill stops flowing during dry weather in the summer months.

The other sampling stations (SW4 through SW13) flow only during wet weather as a result of surface runoff. Tributaries SW6-7 and SW10-11 have poorly defined drainage channels which connect low wetland areas on the east side of the landfill to the north service road ditch. The Indian Creek tributary SW4-5 has a better defined channel in the bottom of a ravine, particularly at the northern end. It does not flow as consistently as Falcon Creek.

A V-notch weir was installed on Falcon creek at station SW-3 in 1982 (see Figure 3). The details of the weir are in Appendix I. In 1984 Regional staff read the staff gauge two or three times per week, except in the winter when the stream was frozen. These readings and calculated flow rates are in Appendix I and are plotted in Figure 4. Data is



Legend

▲SW14 Surface Water Monitoring Station

Drainage Course (Intermittent)

Surface Watershed Divide

Property Boundary

SURFACE WATER STATIONS

3

Halton Region

BURLINGTON LANDFILL SITE

Project 85-22, 84-101
Scale 1:8,000 (approx)

Gartner Lee Associates Limited

Project 85-22

TABLE 2: BURLINGTON LANDFILL STREAM FLOW ESTIMATES L/s

STATION	April 9 1984	June 25 1984	August 21 1984	November 14 1984
SW1	45	12	<0.1	1.8
SW2	49	20	<0.1	3.6
SW3	43.1 (0.25)	4.4 (0.1)	NF	1.2 (0.06)
SW4	5	<0.1	NF	<0.1
SW5	1.2	<0.1	NF	<0.1
SW6	<0.1	NF	NF	NF
SW7	<0.1	NF	NF	NF
SW10	0.2	NF	NF	NF
SW11	0.2	NF	NF	NF
SW12	<0.1	NF	NF	<0.1
SW13	-	-	-	<0.1

NF = No Flow

(.1) = Staff gauge reading at V-notch weir in metres

missing for parts of February to May because the records have been misplaced. Data from August to mid-October was not collected because the weir was silted up.

Figure 4 illustrates the intermittent nature of flow in Falcon Creek based on limited data. During the spring flows of 20 L/s or more generally occur which are related to rain or snow melt events. Flows decrease in early summer and eventually dries up in July and August. In the fall flows occur that are related to rain fall events. During winter it is not always possible to collect measurements due to frozen conditions at the weir.

6.2 SURFACE WATER QUALITY:

Surface water samples were collected in April, June, August and November 1984 as part of the routine monitoring program. Surface water sampling stations are shown on Figure 3 (Section 6.1). These samples were submitted to the MOE Rexdale Laboratory for analysis. All chemical and bacteriological analysis results are presented in Appendix II.

The results are summarized in Table 3 which presents the 1984 average concentrations of selected parameters at the various monitoring stations. Station SW1 represents background water quality in Falcon Creek. Stations SW2, SW3, SW4, SW5, SW6, and SW7 have water quality which is similar to background water quality. Stations SW10, SW11, S12 and SW13 have poorer water quality and are probably affected by runoff which has contacted the refuse.

TABLE 3: 1984 AVERAGE CONCENTRATIONS OF SELECTED PARAMETERS IN SURFACE WATERS

SAMPLING STATION	CONDUCTIVITY (umhos/cm)	CHLORIDE (mg/L)	TKN (mg/L)	BOD (mg/L)	COD (mg/L)	NUMBER OF ANALYSES IN AVERAGE
SW-1	669	34	0.3	<2	27	4
SW-2	660	34	0.3	<2	11	4
SW-3	659	31	0.4	<2	57	3
SW-4	833	12	0.6	<2	30	3
SW-5	796	17	0.3	<2	14	2
SW-6	745	25	0.5	<2	8	1
SW-7	733	25	0.5	<2	<4	1
SW-10	1460	80	1.0	<2	18	1
SW-11	1293	76	0.9	<2	24	1
SW-12	2080	281	19.5	520	644	2
SW-13	2790	412	0.7	<2	30	1

Figure 5 shows the 1984 average concentrations of selected parameters plotted versus sampling location on Falcon Creek. Concentrations of most parameters remain constant within the natural variation as the stream flows past the landfill. Levels of total coliforms and COD increase between SW2 and SW3 but because these fluctations are not associated with increases of chloride or conductance they are likely caused by sampling biases rather than leachate. There does not appear to have been any detectable leachate impact of the main channel of Falcon Creek between SW1 and SW3 in 1984.

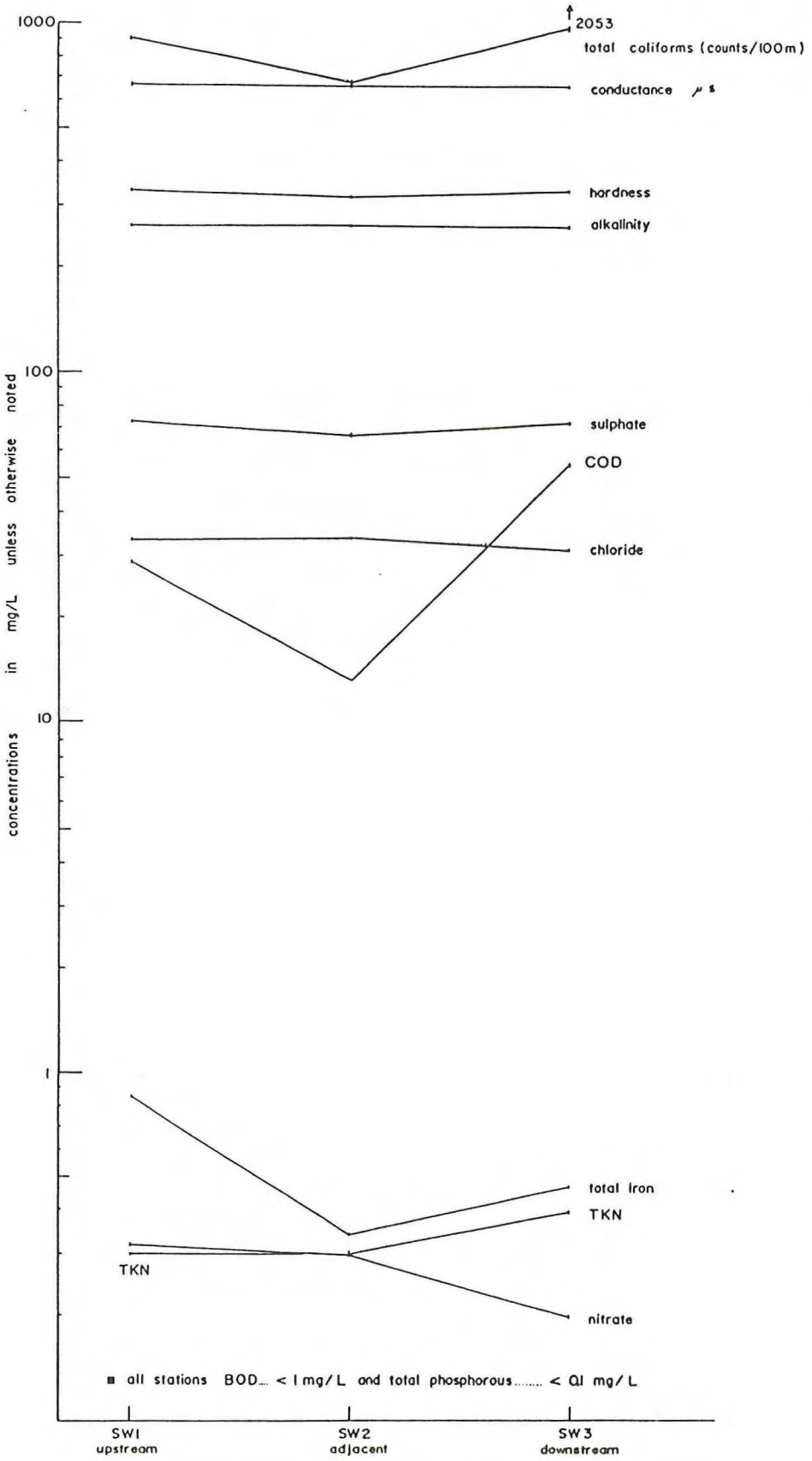
Figure 6 illustrates the 1984 seasonal fluctuations in conductivity and chloride in the main channel of Falcon Creek. Concentrations were generally lowest in the spring and tended to be somewhat higher the rest of the year. Background chloride concentrations slightly exceeded downstream concentrations in April and November, but not in June and August.

There does not appear to have been any leachate impact on Indian Creek tributarires SW4-5 and SW6-7 based on the limited 1984 data base The limitation in the data base is due to zero flow in these tributaries at three of the four sampling occasions. Some parameters such as total coliforms were occasionally high but these are likely due to the almost stagnent flow conditions in these streams. The 1983 monitoring results suggested there might be a minor landfill impact on tributary SW6-7, but the 1984 results did not confirm this.

FALCON CREEK WATER QUALITY – 1984 MEAN VALUES

FIGURE 5

Project 85-22



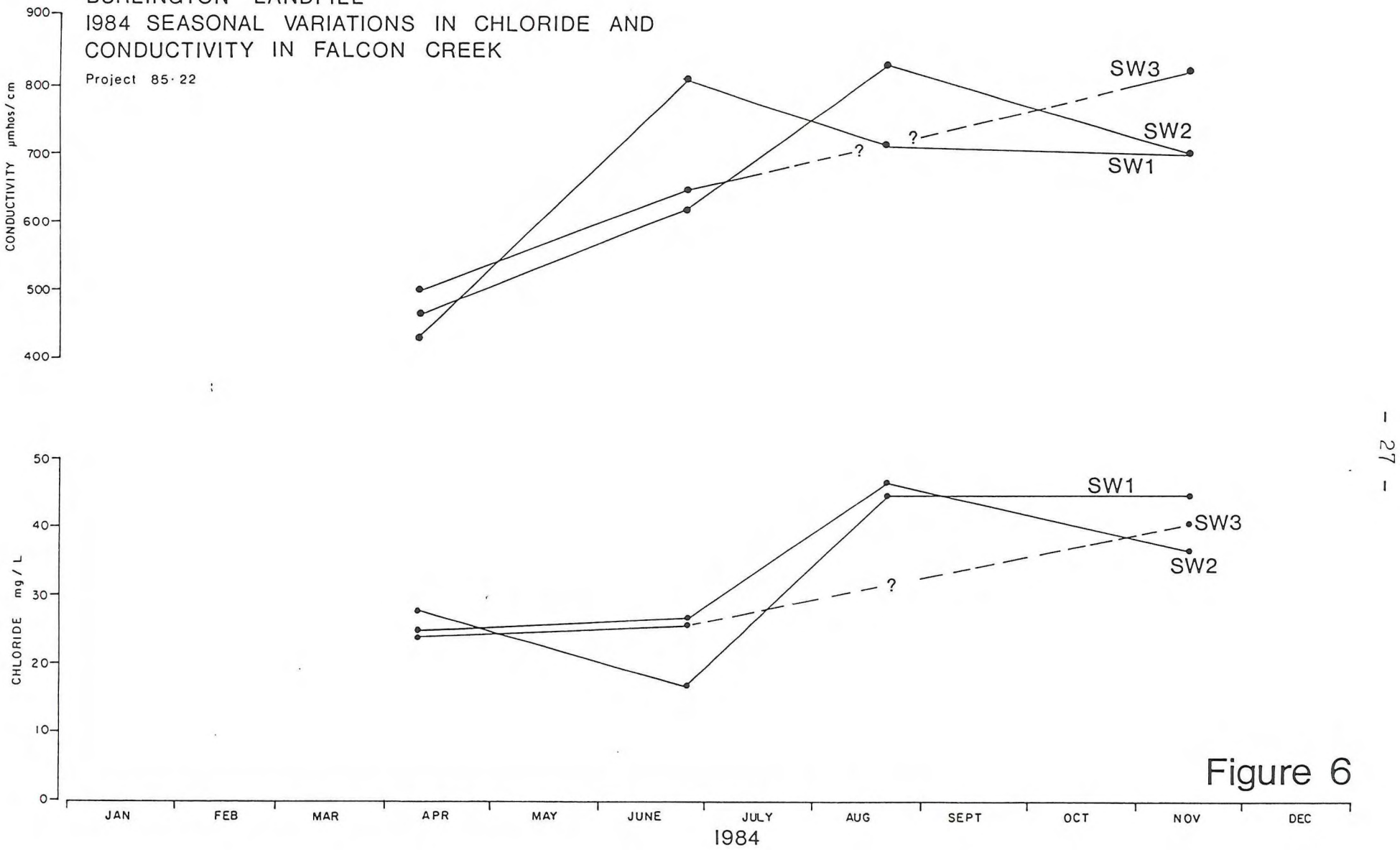

BURLINGTON LANDFILL
1984 SEASONAL VARIATIONS IN CHLORIDE AND CONDUCTIVITY IN FALCON CREEK
Project 85-22
CONDUCTIVITY µmhos/cm
900
800
700
600
500
400
SW3
SW2
SW1
?
?
CHLORIDE mg/L
50
40
30
20
10
0
SW1
SW3
SW2
?
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
1984

Figure 6

Landfill impact was detected on Falcon Creek tributary SW10-11 southeast of the landfill on the National Sewer Pipe property which receives discharge from the landfill east perimeter ditch. Water in this runoff channel eventually flows westward along the North Service Road ditch to a culvert at SW13, which runs southward under Highway 403. The ditches along the site entrance road and a natural drainage swale south of the landfill also contribute small amounts of intermittent flow to SW13. The water quality in the SW10-11-13 drainage course has elevated concentrations of inorganic constituents such as conductivity, chlorides, hardness etc. However, biodegradable components such as BOD and phenol were below detection in 1984.

Surface water station SW12 is the outlet for the sedimentation pond which receives all discharges from the landfill west perimeter ditch. Any runoff from uncovered refuse in the existing filling area would likely reach SW12. Therefore it is not surprising that the water quality at SW12 appears to be affected by landfill leachate. Elevated concentrations of electrical conductance, chloride and hardness occurred in both the April and November samples. The April sample also had high levels of BOD, COD, phenol, TKN and ammonia. The improved water quality in November may be due to the repair of leachate seepages by the Region in late April and May, 1984, however further monitoring is required to confirm this. Flow rates from SW12 are low and the stream channel was not flowing during June and August sampling visits. The intermittent discharges from SW12 flow westward along the north servce road ditch and meets the main channel of Falcon Creek at a large culvert which runs southward under highway 403.

There are no existing surface water stations on the main channel of Falcon Creek downstream from where it receives the discharges from SW12 and SW13. The establishment of a new station on Falcon Creek downstream of highway 403 has been recommended to assess the impact of those discharges. The establishment of two background control stations on another stream removed from the landfill, is also recommended. These will be used to assess typical water qualty impacts from the highway so they can be distinguished from landfill impacts.

One additional surface water sample was collected on December 4, 1984 by Regional Staff from Falcon Creek just north of the Bell cable (between SW2 and SW3). This was done at the request of local residents who had noted an oil-like sheen on the water. This sample is not part of the routine monitoring program. The sample was submitted to the MOE laboratory for analysis and these results are included in Appendix II.

The sample was collected from standing water and upstream background samples were not collected at the same time. The results show what appears to be elevated levels of conductivity, hardness, alkalinity and chloride for Falcon Creek. Nitrogen, phosphorous, BOD, COD and iron concentrations are generally low and within the range of background water quality. Phenol concentrations were below detection which suggests that the oil-like sheen was probably not caused by petroleum products. A thin layer of iron oxides on the surface of the water may have caused

the oil-like sheen. No volatile trace organics were detected in the sample. We cannot confidently draw any conclusions concerning landfill impact on this sample because the water was not flowing and no background samples were collected.

7.0 PROPOSED MONITORING PROGRAM:

The details of the 1985 monitoring program are outlined in the "Monitoring Program Terms of Reference" (GLAL, 1985). this program is summarized in the following three subsections.

7.1 PROPOSED NEW GROUND WATER MONITORS:

Additional monitors are required to replace damaged or sealed monitors, for the plume delineation study and for monitoring of leachate levels in the underdrain area of the landfill. The proposed new monitors are listed in Table 4 and their locations are shown on Figure 1.

Monitors at boreholes 23, 24, 26 and 27 will be used as initial sampling locations for the plume delineation study. They will also be included in the routine monitoring program.

Monitors at boreholes 28, 29, 30 and 31 will be used to replace monitors which have been lost from the routine monitoring network. These monitors will be used for follow-up sampling in the plume delineation study, if required.

The monitor at borehole 25 in the refuse will be used to monitor leachate levels only.

BURLINGTON LANDFILL: 84-101

TABLE 4: PROPOSED NEW GROUND WATER MONITORS

BOREHOLE LOCATION NO.	MONITOR NO.	GEOLOGY ADJACENT SCREEN	SCREEN & SAND PACK DEPTH m	PELTONITE SEAL DEPTH m	GROUT SEAL DEPTH m	PURPOSE
23	I	Shale	17-18	16-17	0-16	Plume Delineation - Background - Upper Shale
	II	Till	11-12	10-11	0-10	Plume Delineation - Background - Deep Till
	III	Till	1-6	0.5-1	0-0.5	Plume Delineation - Background - Upper Till
24	I	Shale	17-18	16-17	0-16	Plume Delineation - Probable Leachate Impact - Deep Shale
	II	Shale	11-12	10-11	0-16	Plume Delineation - Probable Leachate Impact - Intermediate Depth Shale
	III	Shale	1-6	0.5-1	0-0.5	Plume Delineation - Probable Leachate Impact - Shallow Shale
25	I	Refuse	1-16	0.5-1	0-0.5	Leachate Level in Underdrained Area
26	I	Shale	17-18	16-17	0-16	Plume Delineation - Background Deep Shale
	II	Shale	11-12	10-11	0-10	Plume Delineation - Background Intermediate Depth Shale
	III	Shale	1-6	0.5-1	0-0.5	Plume Delineation - Background Upper Shale
27	I	Shale	17-18	16-17	0-16	Plume Delineation and Routine Monitoring - Replaces BH17
	II	Shale	11-12	10-11	0-10	Plume Delineation and Routine Monitoring - Replaces BH17
	III	Shale	1-6	0.5-1	0-0.5	Plume Delineation and Routine Monitoring - Replaces BH17
28	I	Shale	1-8	0.5-1	0-0.5	Routine Monitoring - East Side - Replaces BH10
29	I	Till	1-8	0.5-1	0-0.5	Routine Monitoring - West of Underdrain Area - Replaces BH6
30	I	Till-Shale	1-8	0.5-1	0-0.5	Routine Monitoring - East Side - Replaces BH2
31	I	Till-Shale	1-8	0.5-1	0-0.5	Routine Monitoring - East Side - Replaces BH19

Note: All depths are approximate. Actual depths will be determined by conditions encountered during drilling

Gartner Lee Associates Limited

7.2 ROUTINE MONITORING PROGRAM:

Ground water monitoring for routine water quality parameters will be carried out once per year at the thirty-one wells listed on Table 5. This includes fifteen existing monitors and the sixteen new specially constructed monitors.

The new monitors in boreholes 23 and 26 will be used to assess background water quality. Monitors in boreholes 21 and 22 will be used to determine if leachate is migrating northwesterly to Falcon Creek from the new landfill areas. Selected monitors in boreholes 12, 13, 14, 15, 16, 18 and proposed boreholes 24, 27, 28, 29, 30 and 31 are located in "potential impact" areas downgradient of existing or new landfill areas.

Of the existing wells, only the shallower monitors which contain fresher water quality have been selected for routine water quality monitoring. The deeper monitors which have saline water quality (>2,000 mg/L chloride) will not be sampled for routine water quality parameters because of the difficulty in detecting leachate contamination.

All proposed new monitors (except borehole 25) will be included in the routine monitoring program initially to characterize their water quality. New monitors which yield saline water may be dropped from the routine monitoring program at some time in the future.

All wells will be purged by removing at least one well bore volume prior to sampling.

TABLE 5 BURLINGTON LANDFILL ROUTINE MONITORING PROGRAM

	SAMPLING LOCATIONS	TASK	FREQUENCY PER ANNUM	ANALYTICAL PARAMETERS
Groundwater	Monitors 12-II, 13-II, 14-I, 14-II, 15-I, 15-II, 16-IV, 18-II, 18-III, 21-I, 21-II, 21-III, 22-I, 22-II, 22-III, 23-I, 23-II, 23-III, 24-I, 24-II, 24-III, 26-I, 26-II, 26-III, 27-I, 27-II, 27-III, 28-I, 29-I, 30-I, 31-I	Develop, sample and deliver samples to laboratories.	1	Conductivity, chloride, hardness, alkalinity, nitrogen (TKN, NH_3), BOD, COD.
	All existing ground water monitors.	Measure water levels.	1	
Surface Water	SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW10, SW11, SW12, SW13, SW14. (See Figure 2).	- Sample - Measure flows at time of sampling - deliver samples to laboratory.	4	Conductivity, pH, chloride, hardness, alkalinity, nitrogen (TKN, NH_3, NO_2, NO_3) BOD, COD, phosphorous, phenol, iron, suspended solids.
	Falcon Creek Indian Creek	Inspect stream bank and valley walls for springs and sample if sufficient flow.	4	Same as for surface water samples above.
	SW3	Read staff gauge (Regional staff)	2 per week	
Leachate	Toe-drain, 2nd manhole south of junction (See Figure 1)	Sample and deliver samples to laboratory.	4	Conductivity, pH, chloride, hardness, alkalinity, nitrogen, (TKN, NH_3, NO_2, NO_3), BOD, COD, phosphorous, phenol, iron, suspended solids, heavy metal scan.
		Monitor leachate flow rate. (Regional staff).	Continuously	
	Entire Site	Map leachate springs and document repair work (Regional staff).	As required, minimum frequency 12.	
		Review Regional leachate spring maps and confirm mapping in the field (Monitoring Consultant).	4	

Eight proposed routine ground water monitoring parameters are listed on Table 5. These leachate indicator parameters were selected after a review of the existing monitoring data.

Phenols are not included as they can leach from the PVC glue and pipe in the existing monitors. As well iron was not included as the ground water samples all contain suspended reddish iron-rich silt. This iron is naturally occurring and its source is the Queenston shale.

Surface water monitoring will be carried out four times annually at eleven stations. Sampling station locations are shown on Figure 3. Table 5 lists the sampling station locations, sampling frequencies and analytical parameters. Eight of the listed sampling stations are on Falcon Creek and its tributaries. The other four stations are on tributaries of Indian Creek.

In order to permit meaningful interpretation of surface water quality results it is necessary to measure flows at the time of sampling. In addition, the staff gauge at SW3 on Falcon Creek should be read twice weekly by Regional staff. This will provide important information on surface water flow rates which can be used for water budget and loading calculations. All streams and drainage channels included in this monitoring program are ephemeral. Some of the smaller channels flow only after periods of considerable precipitation. Stagnant water samples do not provide representative data and therefore will not be collected.

During surface water monitoring activities the main stream channels will be walked. The stream bottoms, banks and valley walls will be inspected for ground water discharges. Springs on the valley walls will be sampled if sufficient discharge is available.

Leachate sampling from the toe-drain collection system will be carried out quarterly. Samples will be collected from the second manhole south of the junction between the east and west limbs. Samples will be analyzed for the detailed list of parameters presented on Table 5.

The need to collect further leachate samples will be assessed after one year. These four samples combined with the existing data should adequately characterize the existing leachate chemistry. Recommendations of continued leachate sampling will be made in the 1985 monitoring report.

The Region of Halton should carry out leachate spring mapping at least once a month, and more frequently during wet weather. Perched springs inside the perimeter toe-drain should be promptly excavated to ensure hydraulic connection to either the toe-drain or underlying refuse. The spring area should then be regraded. Leachate spring locations and any repairs undertaken should be documented and the locations shown on the site plan which will be kept in the scale house. The monitoring consultant should review this map and confirm the mapping during the four annual site visits for surface water sampling.

Once a year all routine monitoring data will be reviewed and analyzed by an experienced hydrogeologist. The analysis will include an assessment of:

a) the site impact on adjacent surface streams,
b) the site impact on ground water,
c) leachate chemistry and flow data.

This analysis plus all monitoring data will be included in an annual monitoring report. This report will be submitted to the Region in March and will include all data collected during the previous calendar year. The report will contain conclusions and recommendations for continued monitoring and remedial measures if required. The report should be submitted to the Ministry of the Environment for review, by March 31st as specified in the certificate of approval.

7.3 PLUME DELINEATION PROGRAM:

As discussed above, difficulty has been experienced in delineating the leachate plume emanating from this site. This is due to the naturally poor quality of the local ground water. Researchers at the nearby Bayview Landfill have suggested the use of organic compounds at trace concentrations to detect leachate in areas of poor background water quality. We propose to carry out a similar program at the Burlington Landfill.

Initially the program will involve sampling of twelve of the new specially constructed monitors, and the toe-drain. All monitors will be purged by removing at least one well-

bore volume prior to sampling. The selected monitors are listed on Table 6. Additional step-out monitors may be added in the future if the initial progam is successful in identifying an organic parameter or group of paramters which can be used to detect the leachate plume.

Table 7 lists the proposed analytical parameters for the plume delineation program. It has not been determined whether the MOE laboratory or a private laboratory will carry out the analyses. Some revision of Table 7 may be required depending upon the laboratory used.

We propose to collect plume delineation samples three times during 1985 after the new monitoring wells have been installed and developed. After these three sets of data have been collected, the feasibility of delineating the plume using organics will be assessed. The analytical results and our assessment will be presented in a report.

If the initial program is successful then additional steps to map the leachate plume will be recommended.

The proposed work schedule would be as follows.

1. Contract finalization and project initiation
   (1 month)

2. Drilling and installation of new monitors
   (1 month)

TABLE 6: PLUME DELINEATION STUDY INITIAL SAMPLING LOCATIONS
(See Figure 1 for locations)

SAMPLING LOCATION	PURPOSE
Toe-drain Manhole	- leachate chemistry characterization
23-I	- Background - upper shale
23-II	- Background - deep till
23-III	- Background - shallow till
26-I	- Background - deep shale
26-II	- Background - intermediate depth shale
26-III	- Background - upper shale
24-I	- Probable leachate impact - deep shale
24-II	- Probable leachate impact - intermediate depth shale
24-III	- Probable leachate impact - upper shale
27-I	- South property boundary - deep shale
27-II	- South property boundary - intermediate depth shale
27-III	- South property boundary - upper shale
Control Sample	- blank, spike or duplicate sample

TABLE 7: PLUME DELINEATION STUDY - ANALYTICAL PARAMETERS

PARAMETER	COMMENTS
trace organics on EPA Hazardous Substance List	- may be changed to standard MOE organic scan if MOE laboratory completes analyses
total phenols	
pH	
conductivity	
chloride	
hardness	
alkalinity	
nitrogen (TKN, NH)	
dissolved organic carbon (DOC)	
chemical oxygen demand (COD)	
calcium	
sodium	
magnesium	
potassium	
sulphate	
iron	

3. Development of new monitors (3 months may be required to allow for possible slow response in low permeability materials).

4. Collect three sets of ground water samples (3 months - slow responding monitors may only be sampled once or twice)

5. Laboratory analysis (2 months)

6. Reporting (1 month - required to issue draft report after receipt of final analytical results).

It is recognized that time is of the essence and the above schedule will be compressed if at all possible. Time may be saved in items 3 and 5 above. The above program should be completed in order that its results can be included in the 1985 monitoring report and that recomendations from the study be included in the 1986 monitoring program.

8.0 REFERENCES:

Previous Gartner Lee Associates Limited Reports on this site are listed below for reference:

1985: Burlington Regional Landfill Site, Monitoring Program Terms of Reference, GLAL 84-101.

1984a Burlington Landfill - 1983 Monitoring Report. GLAL 84-2.

1984b: Hydrogeological Study, Burlington Landfill Continued Use. GLAL 83-66.

1983 Burlington Landfill - 1982 Monitoring Report. GLAL 82-71.

1982 Burlington Landfill - 1981 Monitoring Program. GLAL 80-96.

1981 Burlington Landfill Site, (1980) Monitoring Program - Interim Report. GLAL 80-96.

1980 Monitoring Program Report. Burlington Regional Landfill Site. GLAL 80-39.

1979 Burlington Landfill Site, Hydrogeological Study. GLAL 78-92.

APPENDIX I

GROUND WATER MONITOR DETAILS

GROUND WATER ELEVATIONS

FLOW DATA FOR FALCON CREEK SW3 WEIR

SW3 WEIR SPECIFICATIONS AND EQUATIONS

DEVELOPING OF MONITORS PRIOR TO SAMPLING, JUNE 1984

GROUND WATER MONITOR DETAILS

PROJECT 85-22

TABLE ____ SHEET 1

GROUND WATER MONITOR DETAILS

BOREHOLE NO.	*MONITOR				LOCATION OF TIP		LOCATION OF SEAL	
	No.	Diameter mm	Type	Elev.	Depth	Elev.	Depth	Elev.
1	I	32	● trow	183.7	18.6	165.1	18.0	165.7
	II	32	●	183.6	14.0	170.0	14.0, 13.4	170.0, 170.6
	III	19	▲	183.5	6.1	177.6	3.1, 0.9	180.6, 182.8
2	I	19	●	171.7	11.2	160.5	10.6	161.1
	II	19	▲	171.7	7.0	164.4	4.8, 0.9	166.6, 170.5
7	I	32	●	182.1	15.4	166.1	14.8	166.7
	II	32	●	181.3	10.9	170.9	10.8, 10.3	171.0, 171.5
	III	19	▲	182.1	6.1	175.3	6.1, 3.1, 0.9	175.3, 178.3 180.5
8A	I	31	●	156.45	22.89	133.56	21.37	135.08
	II	31	▲	157.00	17.07	139.93	17.07	139.93
							1.83	155.17
11A	I	31	●	135.33	13.11	122.22	12.04	123.29
	II	31	▲	135.00	6.10	128.9	6.10	128.90
							1.37	133.63
12	I	32	● trow	127.9	12.7	115.2	12.0	115.9
	II	32	●	127.7	7.3	120.4	7.3, 7.0	120.4, 120.7
	III	19	▲	127.9	2.5	125.4	1.1	126.8
13	I	19	●	122.6	9.8	112.8	9.1	113.5
	II	19	▲	122.6	6.1	116.5	3.0, 1.2	119.6, 121.4

* All elevations and measurements taken from the top of each monitor.

● - Piezometer ▲ - Standpipe

GROUND WATER MONITOR DETAILS

BOREHOLE NO.	MONITOR				LOCATION OF TIP		LOCATION OF SEAL	
	No.	Diameter	Type	Elev.	Depth	Elev.	Depth	Elev.
14	I	31	●	125.73	10.97	114.76	9.91	115.82
	II	31	▲	125.74	6.10	119.64	6.10	119.64
							1.07	124.67
15	I	31	●	121.39	10.94	110.45	9.88	111.51
	II	31	▲	121.81	6.10	115.71	6.10	115.71
							1.43	120.38
16	I	31	●	123.61	28.86	94.75	27.04	96.57
	II	31	●	124.03	17.74	106.29	17.74	106.29
							16.22	107.81
	III	31	●	123.92	9.91	114.01	8.84	115.08
	IIII	31	▲	123.91	6.10	117.81	6.10,1.52	117.81,122.39
17	I	31	●	115.47	29.93	85.54	28.56	86.91
	II	31	●	115.74	17.62	98.12	17.62	98.12
							16.40	99.34
	III	31	●	115.70	9.20	106.50	7.99	107.71
	IIII	31	▲	115.67	6.10	109.57	6.10	109.57
							1.28	114.39
18	I	31	●	157.75	16.72	141.03	15.81	141.94
	II	31	●	157.75	11.24	146.51	6.67	151.08
	III	31	▲	157.75	6.67	151.08	0.87	156.88
19	I	31	●	173.79	11.59	162.20	6.72	167.07
	II	31	▲	173.78	6.55	167.23	0.91	172.87
20	I	31	●	179.95	17.30	162.65	16.84	163.11
	II	31	●	179.72	11.19	168.53	12.71	167.01 ,169.75
	III	31	▲	179.72	6.92	172.80	0.82	178.90
21	I	31	●	184.68	18.52	166.16	17.60	167.08
	II	31	●	184.92	14.79	170.13	0.76	184.16
	III	31	▲	184.91	9.59	175.32	0.75	184.16
22	I	31	●	182.76	16.67	166.09	15.76	167.00
	II	31	●	182.76	11.80	170.96	0.82	181.94
	III	31	▲	182.47	7.24	175.23	0.53	181.94

* All elevations and measurements taken from the top of each monitor.

● - Piezometer ▲ - Standpipe

GROUND WATER ELEVATIONS

PROJECT 85-22 TABLE ___ SHEET 1

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Nov.7 1979	Dec.6 1979	Jan.17 1980	Feb.6 1980	Mar.7 1980	Apr.18 1980	Oct.30 1980	Dec.9 1980	Feb.25 1981	Apr. 8 1981	May 25 1981
1	I	●	173.25	172,97	173.00	173.50	173.45	174.13	173.51	172.82	172.80	173.20	173.87
	II	●	179.00	178.97	179.90	181.06	180.94	181.23	179.13	178.80	180.14	181.07	181.39
	III	▲	181.27	181.11	181.66	182.62	182.51	183.10	181.56	181.45	182.68	183.00	182.74
2	I	●	166.57	166.82	166.89	168.30	167.81	168.35	166.56	166.49	166.95	168.10	168.20
	II	▲	168.63	169.42	170.29	171.37	170.08	171.37	168.95	168.54	170.02	170.82	170.81
3	I	●	161.04	160.55	160.60	162.30	161.95	162.06	161.28	160.84	160.58	161.94	Destroyed
	II	▲	161.77	162.02	162.86	163.52	163.00	164.50	-	-	162.35	163.08	Destroyed
4	I	●	166.30	166.21	166.28	166.05	166.33	166.37	166.25	165.97	165.53	165.60	Destroyed
	II	▲	167.38	168.07	169.73	172.00	171.00	173.37	167.57	167.40	172.77	173.87	Destroyed
5	I	●	154.53	154.70	154.69	154.80	154.91	155.23	Destroyed	-	-	-	-
	II	●	Destroyed	-	-	-	-	-	-	-	-	-	-
	III	▲	161.90	162.16	162.97	164.25	164.25	164.68	162.35	162.82	Destroyed	-	-
6	I	●	160.39	160.45	160.69	160.10	160.30	160.45	160.55	160.47	160.15	160.25	Broken
	II	▲	166.30	167.07	168.17	169.90	168.63	171.25	166.48	166.41	169.24	170.58	Bent
7	I	●	175.26	174.98	175.20	175.00	176.67	176.85	175.28	174.72	175.23	176.28	176.34
	II	●	175.62	177.69	177.80	179.10	178.60	179.50	175.78	176.12	179.35	179.52	179.52
	III	▲	176.05	178.69	179.25	180.13	179.72	180.61	176.28	176.36	180.93	180.71	180.52
8	I	●	139.50	136.55	138.96	Destroyed or Burried	-	-	-	-	-	-	-
	II	▲	147.30	142.99	144.60		-	-	-	-	-	-	-
9	I	●	Destroyed	-	-	-	-	-	-	-	-	-	-
	II	●	Destroyed	-	-	-	-	-	-	-	-	-	-
	III	▲	Destroyed	-	-	-	-	-	-	-	-	-	-

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Nov.7 1979	Dec.6 1979	Jan.17 1980	Feb.11 1980	Mar.7 1980	Apr.18 1980	Oct.30 1980	Dec.9 1980	Feb.25 1981	Apr. 8 1981	May 25 1981
10	I	●	127.73	128.36	128.50	128.50	128.07	128.86	127.60	127.85	Blocked	128.16	128.49
	II	●	132.27	132.38	132.23	132.25	131.90	132.39	131.72	131.83	131.97	132.2	132.13
	III	▲	133.12	133.50	133.42	133.42	133.08	133.59	133.25	Destroyed	-	133.06	133.33
11	I	●	128.25	125.70	126.37	126.75	-	-	-	-	-	-	-
	II	▲	130.55	130.18	130.13	130.00	Destroyed	-	-	-	-	-	-
12	I	●	121.41	121.41	121.67	121.75	121.50	121.87	120.91	121.01	121.05	121.35	121.58
	II	●	123.99	124.74	125.25	124.78	124.35	125.85	123.55	124.16	124.16	124.62	124.98
	III	▲	127.15	125.92	127.05	126.37	125.99	127.07	126.53	127.04	127.25	126.53	126.56
13	I	●	118.66	119.25	119.80	119.50	119.11	120.20	118.66	118.87	119.02	119.40	119.57
	II	▲	119.40	120.62	121.00	120.22	119.80	121.40	119.26	119.47	119.70	120.12	120.30

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Oct.30 1980	Dec.9 1980	Feb.25 1981	Apr.8 1981	May 25 1981	Oct.20 1981	Nov.25 1981	June 9 1982	July 6 1982	Aug.17 1982	Oct.28 1982
8A	1	●	136.79	135.75	136.15	137.43	136.43	136.19	136.33	136.18	135.79	135.75	135.80
	II	▲	140.50	140.90	Blocked Ice	140.95	-	140.96	140.92	145.26	145.29	145.05	145.15
11A	I	●	125.68	128.11	126.35	126.19	127.98	126.28	126.93	128.08	128.26	128.33	127.93
	II	▲	Dry	130.43	129.95	129.05	129.13	dry	130.75	129.00	129.00	130.50	130.25
14	I	●	124.18	124.31	124.47	124.34	124.38	124.34	124.39	124.26	124.05	124.12	124.23
	II	▲	124.53	124.88	124.97	124.85	124.78	124.87	124.90	124.71	124.57	124.34	124.74
15	I	●	119.92	120.23	120.46	120.16	120.16	120.20	120.29	120.41	120.32	119.89	120.06
	II	▲	120.34	120.71	121.10	120.83	120.7	120.71	121.08	121.10	120.61	120.18	120.61
16	I	●	115.37	115.28	115.34	115.11	114.98	114.85	115.06	115.39	-	115.01	115.06
	II	●	115.71	115.71	115.70	115.81	116.14	115.95	116.19	116.11	115.53	115.97	115.57
	III	●	117.17	118.75	118.73	118.94	119.19	118.94	119.32	119.27	118.52	118.89	120.92
	IIII	▲	121.01	121.23	121.33	121.40	121.65	121.36	121.93	121.91	122.61	120.93	121.42
17	I	●	113.89	114.09	114.06	114.01	114.06	113.72	113.93	114.04	114.01	113.11	113.55
	II	●	113.84	114.04	114.01	114.07	114.13	113.94	114.15	114.26	114.08	113.45	113.86
	III	●	114.56	114.88	Blck.Ice	114.88	114.90	114.82	115.09	115.24	114.86	114.10	114.74
	IIII	▲	114.64	114.95	114.97	114.92	114.92	114.88	115.13	115.15	114.87	114.12	114.72

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Oct.20 1981	Nov.23 1981	June 9 1982	July 6 1982	Aug.17 1982	Oct.28 1982					
1	1	●	173.82	173.71	174.38	174.43	174.33	173.55					
	11	●	180.28	180.6	176.20	176.21	180.40	180.50					
	111	▲	181.45	183.2	183.20	182.48	181.80	181.97					
2	1	●	167.17	167.62	167.39	167.37	166.82	166.60					
	11	▲	169.71	170.62	170.34	170.07	169.28	168.65					
6	1	●	bent	bent	destroyed	-	-	-					
	11	▲	160.58	bent	destroyed	-	-	-					
7	1	●	176.30	not	174.57	177.25	175.76	176.34					
	11	●	178.89	located	177.28	179.09	177.79	178.42					
	111	▲	180.77		180.88	180.50	179.11	179.77					
10	1	●	128.02	128.20	destroyed	-	-	-					
	11	●	132.01	132.34	destroyed	-	-	-					
	111	▲	132.53	133.19	destroyed	-	-	-					
12	1	●	121.33	121.74	121.48	121.53	121.00	121.50					
	11	●	124.47	125.5	124.92	124.56	123.83	124.30					
	111	▲	126.39	127.3	127.00	125.90	Dry	125.63					
13	1	●	119.20	121.15	119.60	-	118.91	119.16					
	11	▲	119.60	121.12	120.90	118.02	119.37	119.55					

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Dec.1 1982	Sept.9 1983	Nov. 8 1983	Nov. 22 1983	Jan. 5 1984	Jan. 24 1984	Feb. 3 1984	June 25 1984			
1	I	●	173.61	- - - NO READINGS - - -	173.62	173.61	173.55	173.57	172.59	174.35			
	II	●	181.07		179.70	179.79	180.85	180.72	180.67	181.38			
	III	▲	183.19		180.45	181.12	181.51	182.11	182.49	--			
2	I	●	167.27		166.49	N/A	167.03	167.01	168.36	unable			
	II	▲	169.84		N/A	N/A	170.63	168.97	170.68	to locate			
7	I	●	176.58		175.83	173.55	176.78	177.00	177.10	177.16			
	II	●	179.81		176.22	177.98	179.15	178.78	178.95	destroyed			
	III	▲	181.03		176.73	180.80	180.10	179.78	180.20	blocked			
8A	I	●	136.23		137.52	136.82	138.00	137.84	139.62	137.51			
	II	▲	145.26		141.18	142.71	141.00	N/A	141.12	141.08			
11A	I	●	128.01		N/A	N/A	127.02	126.71	126.75	--			
	II	▲	129.46		N/A	N/A	130.92	130.79	131.42	--			
12	I	●	121.90		120.79	120.92	121.63	121.17	121.55	121.68			
	II	●	125.70		123.60	124.34	125.12	124.68	124.65	125.24			
	III	▲	127.34		Dry	126.28	126.68	126.00	125.96	126.47			
13	I	●	120.29		118.51	119.02	118.85	118.60	118.88	119.04			
	II	▲	121.15		119.08	120.07	120.27	119.81	120.05	120.21			
14	I	●	124.43		124.07	124.17	124.24	124.23	124.25	124.46			
	II	▲	124.94		124.46	124.76	124.85	124.80	124.96	124.84			
15	I	●	120.39		119.95	120.10	120.34	120.22	120.29	120.43			
	II	▲	121.11		120.32	120.54	121.15 (frozen)	N/A	(frozen)	120.94			

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

GROUND WATER ELEVATIONS

BOREHOLE NUMBER	MONITOR No.	MONITOR Type	Dec.1 1982	Sept. 9 1983	Nov. 8 1983	Nov. 22 1983	Jan. 5 1984	Jan.24 1984	Feb. 3 1984	June 25 1984			
16	I	●	115.51	--no readings--	115.00	113.82	114.02	113.97	114.01	114.11			
	II	●	116.03		115.61	114.55	114.74	114.71	114.68	114.73			
	III	●	119.38		118.51	118.64	119.08	118.94	118.58	119.31			
	IIII	▲	122.01		121.17	121.40	121.77	121.54	121.57	121.93			
17	I	●	113.97		113.39	113.24	113.58	113.54	113.47	114.06			
	II	●	114.13		113.62	113.80	114.05	114.01	114.03	114.17			
	III	●	115.15		114.33	114.69	115.04fr.	N/A	115.04fr.	115.03			
	IIII	▲	115.17		114.37	114.71	115.04fr.	N/A	115.04fr.	115.06			
18	I	●	--- Installed August-Sept. 1983 ---	N/A	147.01	145.15	144.73	145.05	145.37	149.31			
	II	●		N/A	153.35	154.51	155.03	154.09	154.16	155.23			
	III	▲		N/A	153.58	154.18	154.75	154.62	154.86	155.3			
19	I	●		165.71	165.02	164.46	165.07	164.90	165.11	165.62			
	II	▲		167.43	Dry	Dry	Dry	Dry	Dry	dry			
20	I	●		162.90	167.27	166.76	168.63	167.38	167.75	171.69			
	II	●		175.69	176.18	176.59	175.93	175.79	175.87	176.27			
	III	▲		175.11	176.26	177.70	176.10	175.79	175.87	176.54			
21	I	●		170.90	N/A	175.51	178.03	176.24	177.18	177.99			
	II	●		174.49	N/A	177.32	180.92	181.28	178.02	180.55			
	III	▲		179.75	N/A	183.45	182.95	183.24	183.31	183.44			
22	I	●		166.44	169.82	169.58	171.28	169.97	170.34	170.34			
	II	●		178.38	177.90	178.81	180.61	180.23	180.26	181.08			
	III	▲		178.39	177.91	178.81	180.61	180.21	180.23	181.08			

NOTE: fr. = frozen
N/A = not available

● – Piezometer ▲ – Standpipe

Gartner Lee Associates Limited

FLOW DATA FOR FALCON CREEK SW3 WEIR

TABLE FALCON CK STREAMFLOW DATA. BURLINGTON L.F. 11/83 - 12/84

DATE	H	Q (L/S)	COMMENT
NOV, 83			
3	0.05	0.8	
7	0.04	0.4	
9	0.04	0.4	
11	0.101	4.5	
14	0.07	1.8	
16	0.108	5.3	
18	0.108	5.3	
21	0.092	3.5	
23	0.08	2.5	
25	0.072	1.9	
28	0.148	11.6	RAIN
30	0.08	2.5	
DEC 83			
2	0.082	2.7	FROZEN
5	0.118	6.6	
7	0.232	35.8	RAIN
9	0.1	4.4	FROZEN
12	0.35	103.2	RAIN
14	0.222	32.0	
16	0.188	21.1	FROZEN
19	0.188	21.1	FROZEN
21		0.0	FROZEN
23		0.0	FROZEN
26		0.0	FROZEN
28		0.0	FROZEN
30		0.0	FROZEN
JAN 84		0.0	FROZEN
FEB 84			
2	0.23	35.0	
MAR 84			
27	0.33	84.5	
APRIL 84			RECORDS MISSING
MAY 84			RECORDS MISSING

TABLE FALCON CK STREAMFLOW DATA. BURLINGTON L.F. 11/83 - 12/84

DATE	H	Q (L/S)	COMMENT
JUNE 84			
1	0.162	14.6	
4	0.16	14.1	
6	0.13	8.4	
8	0.102	4.6	
11	0.1	4.4	
13	0.09	3.4	
15	0.086	3.0	
18	0.382		RAIN
20	0.168	16.0	
22	0.12	6.9	
25	0.1	4.4	
27	0.12	6.9	
29	0	0.0	
JULY 84			
2 - 30	0	0.0	
AUG 84			
4	0	0.0	
6	0.175	17.7	
9			NO READING
21		0	WEIR SILTED TO ABOVE THE STAFF GAUGE
OCT 84			
17	0	0.0	WEIR CLEANED OUT
19	0.02	0.1	
22	0	0.0	
24	0	0.0	
26	0	0.0	
29	0	0.0	
31	0	0.0	
NOV 84			
2	0	0.0	
5	0.09	3.4	
7	0.04	0.4	
9	0.02	0.1	
12	0.08	2.5	FLURRIES
14	0.06	1.2	
16	0.07	1.8	FLURRIES
19	0.06	1.2	
21	0.05	0.8	
23	0.05	0.8	
26	0.06	1.2	
28	0.06	1.2	
30	0.06	1.2	

TABLE FALCON CK STREAMFLOW DATA BURLINGTON L.F. 11/83 - 12/84

DATE	H	Q (L/S)	COMMENT
DEC 84			
3	0.1	4.4	RAIN
5	0.06	1.2	
7			FROZEN
10	0.08	2.5	
12	0.1	4.4	
14	0.1	4.4	
17	0.1	4.4	
19	0.09	3.4	
21			FROZEN
24	0.17	16.4	
28	0.16	14.1	FREEZING RAIN
31	0.21	27.9	

SW3 WEIR SPECIFICATIONS AND EQUATIONS

Weir 90 , V-notch weir

for $H \leq 0.305$ m, $Q = 1.38^{2.5}$

for $H > 0.305$ m,

$Q = 0.071 + 1.836 \{1.83-0.2(H-0.305)\}(H-0.305)^{1.5}$

H = depth of water measured from notch of V in metres, in both cases.

Q = discharge in m^3/s.

GLAL 85-22 DEVELOPING OF MONITORS PRIOR TO SAMPLING

BURLINGTON LF. JUNE, 1984

Monitor #	Calculated Volume of Water (3 Bore Vol. (L))	(1 Bore Vol.)	Volume Removed Prior to Sampling (L)	
1-I	8.9	3.0	9.0	
II	6.9	2.3	18.0	
7-I	8.5	2.8	12.0	
III	1.6	0.5	3.0	
12-I	5.4	1.8	7.0	
II	4.3	1.4	6.0	
III	0.54	0.2	0.0	insufficient water
13-I	2.12	0.7	4.0	
II	1.3	0.4	2.0	
14-I	7.8	2.6	11.0	
II	2.5	2.8	9.0	
15-I	7.9	2.6	12.0	
II	4.3	1.4	7.0	
16-I	16.7	5.6	32.5	
II	7.8	2.6	10.5	
III	4.3	1.4	7.0	
IV	3.4	1.1	10.0	
17-I	22.9	7.6	51.0	
II	12.9	4.3	31.0	
III	7.0	2.3	21.0	
IV	4.5	1.5	15.0	
18-I	4.4	1.5	5.0	
II	7.7	1.6	10.0	
III	3.8	1.3	6.2	
21-I	9.4	3.1	9.5	
II	6.4	2.1	8.0	
III	6.4	2.1	44.0	
22-I	3.4	1.1	4.5	
II	7.5	2.5	22.0	
III	4.0	1.3	8.0	

APPENDIX II

MOE LEACHATE ANALYSES - ROUTINE

MOE LEACHATE ANALYSES - VOLATILE ORGANICS

MOE LEACHATE ANALYSES - HEAVY METALS

LEACHATE ANALYSES - HALTON REGIONAL LABORATORY

GROUND WATER QUALITY ANALYSES

SURFACE WATER QUALITY ANALYSES

SURFACE WATER BACTERIOLOGICAL ANALYSES

ANALYSIS OF SAMPLE COLLECTED BY HALTON REGION FROM FALCON CREEK - NORTH OF BELL CABLE

MOE LEACHATE ANALYSES - ROUTINE

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 Toe-Drain Leachate Analysis Results

STATION	DATE	CONDUCTIVITY (u mhos/cm)	pH	HARDNESS CaCO3 (mg/L)	ALKALINITY CaCO3 (mg/L)	CHLORIDE Cl (mg/L)	SULPHATES SO4 (mg/L)	PHOSPHOROUS TOTAL P (mg/L)	PHOSPHOROUS SOLUBLE P (mg/L)	NITROGEN TOTAL KJELD N (mg/L)	NITROGEN AMMONIA N (mg/L)	NITROGEN NITRITE N (mg/L)	NITROGEN NITRATE N (mg/L)	POTASSIUM K (mg/L)	MAGNESIUM Mg (mg/L)	CALCIUM Ca (mg/L)	SODIUM Na (mg/L)	IRON Fe (mg/L)	PHENOLS (ug/L)	BOD5 O (mg/L)	COD O (mg/L)
LEACHATE	9 APR 84	6360	6.8	1737	1992	637	40	1.60	--	150.0	112.00	0.10	0.10	305.0	52.0	610	440	795.00	1220.0	3615.0	3898
	JUL 84	9880	6.6	3792	4176	1240	71	3.00	--	310.0	292.50	0.09	0.20	285.0	460.0	760	850	198.00	2440.0	8680.0	7694
	21 AUG 84	9720	6.8	3420	3990	1402	40	--	0.39	--	118.00	0.07	0.20	480.0	--	--	860	--	1760.0	3280.0	6100
	15 NOV 84	7430	7.0	2320	2856	966	47	0.80	<0.04	220.0	195.00	0.04	<0.10	312.0	315.0	410	560	--	755.0	1615.0	3400

MOE LEACHATE ANALYSES - VOLATILE ORGANICS

Burlington Landfill Volatile Organic Concentrations in Leachate Samples Collected from the Toe-Drain. Results in ug/L. Analyses by the MOE Using Method OP15-0038

PARAMETER	APRIL 9 1984	AUGUST 21 1984
1, 1-Dichloroethylene		
Dichloromethane		
TRS-1, 2-Dichloroethylene		
Dichloroethane		
Chloroform		
1, 1, 1-Trichloroethane		
1, 2-Dichloroethane		
Carbontetrachloride		
Benzene		20
1, 2-Dichloropropane		
Trichloroethylene		
Dichlorobromomethane		
Toluene	100	900
1, 1, 2-trichloroethane		
chlorodibromomethane		
Tetrachloroethylene		
Chlorobenzene		
Trifluorochlorotoluene		
Ethylbenzene		80

PARAMETER	APRIL 9 1984	AUGUST 21 1984
P-Xylene		
M-Xylene		250
Bromoform		
O-Xylene		80
1, 1, 2, 2-Tetrachloroethane		
1, 4-Dichlorobenzene		
1, 3-Dichlorobenzene		
1, 2-Dichlorobenzene		20

MOE LEACHATE ANALYSES - HEAVY METALS

PROJECT 85-22 MOE LEACHATE ANALYSES - HEAVY METALS TABLE____ SHEET____

WATER ANALYSIS RESULTS

SAMPLING LOCATION Leachate Manhole TESTED BY MOE

	Nov.22 1983	Nov.15 1984									
Iron	33	26.0									
Manganese	-	3.6									
Aluminum	-	1.7									
Barium	-	0.67									
Cadmium	<0.01	<0.005									
Cobalt	-	0.037									
Chromium	0.075	0.027									
Copper	<0.009	<.006									
Molybdenum	-	0.03									
Nickel	0.081	<0.03									
Lead	<0.06	0.01									
Vanadium	-	<0.008									
Zinc	1.1	0.4									
Arsenic	0.001	-									
Mercury	0.0003	-									
Selenium	<0.001	-									

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited

LEACHATE ANALYSES - HALTON REGIONAL LABORATORY

LEACHATE ANALYSES - HALTON REGIONAL LABORATORY

	Dec.9/83	Dec.13/83	Dec.22/83	Jan.5/84	Jan.20/84	Jan.25/84	Feb.2/84	Feb.9/84	Feb.16/84	Feb.23/84	Mar.1/84	Mar.15/84	Mar.22/84	Mar.29/84
pH	6.7	6.7	7.1	6.8	7.4	7.4	7.0	7.4	6.8	6.6	7.4	7.1	6.7	7.1
Zn	0.6	0.5	1.0		2.5	12.9		0.8	0.7	0.9	0.6	0.6	0.7	1.7
Cu	<.3	<.3	<.3	<.3	<.3	<.3		<.3	<.3	<.3	<.3	<.3	<.3	<.3
Ni	<.6	<.6	<.6	<.6	<.6	<.6		<.6	<.6	<.6	<.6	<.6	<.6	<.6
Pb	<1	<1	<1	<1	2.2	< 1		<1	1.4	<1	1.7	<1	1.8	<1
Cd	<.1	<.1	<.1	<.1	<.1	<.1		<.1	<.1	<.1	<.1	0.2	<.1	<.1
Cr	0.7	<,6	0.8	<.6	<.6	<.6		<.6	0.9	<.6	<.6	1.2	<.6	<.6
Co	<.5	<.5	<.5	<.5	<.5	<.5		<.5	<.5	<.5	<.5	<.5	<.5	<.5
Fe	7.3	60.7	90	86.2	60.7	82.4		61.4	96.5	37.6	59.7	68.0	22.9	95.1
BOD	115	1120	1365	384	1210	726	853	1092	1132	660	921	1002	195	870
SS	244	142	348	312	354	330	189	254	166	150	286	216	123	294
Total P	1.8	6.9	1.7	0.8	0.51	0.63		0.99	0.93	0.24	0.74	4.4	1.03	0.85
NH_3					224	129	322	112	72.8	56	100.8	140	33.6	78.4
TKN					274	252	798	240.8	145.6	190	252	224	89.6	134.4

No Metal Analysis - Sample Thrown Out

All results in mg/L unless otherwise noted

LEACHATE ANALYSES - HALTON REGIONAL LABORATORY

	Apr.12/84	Ap4.19/84	May 3/84	May 10/84	May 17/84	May 24/84	May 31/84	June 5/84	June 21/84	June 28/84	July 12/84	July 19/84	July 26/84	Aug.2/84
pH	6.7	6.8	6.7	6.7	6.6	6.4	6.4	6.5	6.4	6.6	6.6	6.9	6.5	6.8
Zn	2.6	4.2	-	3.3	6.3	4.5	5.8	6.1	3.2	5.6	3.1	3.3	2.7	3.2
Cu	<.3	<.3	-	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3
Ni	<.6	<.6	-	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Pb	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cd	<.1	<.1	-	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Cr	<.6	<.6	-	0.8	1.6	<.6	<.6	<.6	<.6	0.7	<.6	<.6	<.6	0.9
Co	<.5	<.5	-	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Fe	89.7	99.6	-	<.4	114.3	88.5	39.5	104	70.4	87.1	100.2	150.5	82.7	88.5
BOD	780	1428	2160	888	4140	3540	3990	4020	2250	NA	3240	2750	2970	2130
SS	177	368	200	191	292	122	175	331	91	122	248	101	104	137
Total P	1.5	<.1	0.80	0.55	9.1	5.5	1.6	2.5	6.8	11.8	2.5	4.8	4.4	4.0
NH_3	168	274.4	-	168	179.2	78.4	352.8	162.4	89.6	252	196	202	179	230
TKN	299.6	302.4	-	274.4	296.8	224	168	392	274.4	358	308	342	319	297

LEACHATE ANALYSES - HALTON REGIONAL LABORATORY

	Aug.8/84	Aug.17/84	Aug.24/84	Sept.19/84	Oct.17/84	Nov.14/84	1984 Mean	By-Law 97-79
pH	6.8	6.6	6.9	6.6	6.7	6.8	6.8	6.0-10.5
Zn	3.0	4.9	3.5	2.5	2.0	1.1	3.3	3.0
Cu	<.3	<.3	<.3	<.3	<.3	<.4	<.3	3.0
Ni	<.6	<.6	<.6	<.6	<.6	<.6	<.6	3.0
Pb	<1	<1	<1	<1	<1	<1	<1	3.0
Cd	<.1	<.1	<.1	<.1	<.1	<.1	<.1	2.0
Cr	<.6	<.6	2.5	<.6	<.6	<.6	<.8	3.0
Co	<.5	<.5	<.5	<.5	<.5	<.5	<.5	-
Fe	95.1	82.6	81.4	75.8	69.1	76.7	80.4	50
BOD	2640	2730	220	1760	1920	156	1792	300
SS	363	101	164	146	-	164	209	350
Total P	6.0	4.0	0.09	2.1	14.5	0.62	3.1	-
NH_3	224	386.4	308	235.2	207.2	212	185	-
TKN	325	308	347.2	742	358.4	229.6	302	-

GROUND WATER QUALITY ANALYSIS

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 GROUND WATER ANALYSIS RESULTS

MONITOR	DATE	CONDUCTIVITY	pH	HARDNESS	ALKALINITY	CHLORIDE	SULPHATES	PHOSPHOROUS		NITROGEN				POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	IRON	PHENOLS	BOD5	COD
								TOTAL	SOLUBLE	TOTAL KJELD	AMMONIA	NITRITE	NITRATE								
		(u mhos/cm)		CaCO3 (mg/L)	CaCO3 (mg/L)	Cl (mg/L)	SO4 (mg/L)	P (mg/L)	P (mg/L)	N (mg/L)	N (mg/L)	N (mg/L)	N (mg/L)	K (mg/L)	Mg (mg/L)	Ca (mg/L)	Na (mg/L)	Fe (mg/L)	(ug/L)	(mg/L)	(mg/L)
12-I	NOV 83	9800	7.4	2412	114	2547	1160	0.25	--	--	4.80	5.50	--	65	183	665	1230	7.90	6.6	16.0	238
	JUL 84	8860	7.3	2402	149	2484	1480	0.31	--	1.0	7.40	0.02	<0.05	69	177	670	1175	13.00	3.0	5.3	96
12-II	NOV 83	4410	7.1	1917	700	370	1640	0.20	--	2.5	1.20	0.02	<0.10	42	138	540	364	6.50	1.2	0.7	114
	JUL 84	4020	6.9	2208	711	328	1460	0.15	--	1.6	1.25	<0.01	<0.05	46	130	545	360	16.00	1.0	<1.3	38
13-I	NOV 83	17500	6.6	4821	36	5564	1600	0.34	--	1.5	0.50	9.00	--	82	385	1300	2060	13.30	5.0	<0.9	208
	JUL 84	16100	7.2	4658	53	5604	1650	0.15	--	9.0	9.20	<0.01	<0.05	78	355	1280	2175	10.80	11.0	<1.2	232
13-II	NOV 83	1620	7.6	646	--	174	309	1.10	--	2.0	<0.10	0.03	0.20	13	66	150	108	29.50	1.2	6.5	1410
	JUL 84	1860	7.3	735	523	264	235	0.60	--	1.4	0.20	0.07	0.15	14	73	174	152	23.00	7.0	6.9	54
14-I	NOV 83	7200	7.4	1936	126	1597	1630	0.15	--	4.5	4.50	0.17	0.20	60	128	565	850	4.15	5.0	<5.3	88
	JUL 84	6810	7.2	2154	117	1604	1650	<0.04	--	4.8	4.85	0.02	<0.05	58	132	645	870	4.00	2.2	6.9	70
14-II	NOV 83	2980	7.2	1142	1140	229	880	10.50	--	8.5	<0.10	0.02	<0.10	20	127	248	252	385.00	<0.6	5.6	2820
	JUL 84	2840	7.0	1172	558	233	940	0.68	--	0.6	<0.05	<0.01	<0.05	24	127	260	248	31.00	<-1.0	<1.5	36
15-I	NOV 83	4560	7.2	1198	254	1216	370	0.30	--	3.0	2.70	0.31	0.30	41	109	300	420	4.60	4.0	8.2	80
	JUL 84	4360	7.1	1299	250	1182	335	<0.05	--	1.1	4.00	0.02	<0.05	46	113	335	449	5.20	0.8	5.5	42
15-II	NOV 83	2470	7.2	789	511	417	395	2.40	--	3.5	0.30	0.02	0.20	22	85	176	236	70.00	<0.2	6.1	112
	JUL 84	1890	7.1	888	876	207	400	9.90	--	10.0	0.40	0.02	<0.05	28	115	166	164	310.00	<-0.8	<2.5	162
16-I	NOV 83	34600	7.0	5789	41	12560	2240	0.16	--	--	17.50	0.02	0.40	130	460	1560	6050	4.55	2.2	<0.8	390
	JUL 84	35200	7.0	7528	36	14070	2175	<0.06	--	21.3	18.30	<0.01	0.15	132	555	2100	6450	5.50	13.8	<0.4	--
16-II	NOV 83	28200	7.4	4487	46	9804	2400	0.10	--	--	14.90	<0.01	0.30	110	350	1220	5000	2.00	6.8	<0.6	310
	JUL 84	48100	6.9	12007	33	21010	1800	<0.06	--	25.0	22.70	<0.01	<0.10	167	915	3300	8425	5.80	30.8	<1.0	--
16-III	NOV 83	61000	7.3	16732	27	25750	1480	0.14	--	--	26.00	0.02	0.30	300	1350	4475	9000	5.10	12.4	<5.0	78
	JUL 84	53900	7.4	17191	20	25820	1460	<0.07	--	26.3	23.80	<0.01	<0.05	256	1325	4700	8650	3.15	34.6	<1.2	--
16-IV	NOV 83	2310	7.4	745	650	196	580	1.75	--	2.5	<0.10	0.02	0.20	28	90	150	250	77.50	<0.2	<5.0	582
	JUL 84	2690	7.1	851	505	250	700	0.27	--	0.5	<0.05	<0.01	<0.05	30	85	184	290	11.00	1.0	<1.0	34

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 GROUND WATER ANALYSIS RESULTS

MONITOR	DATE	CONDUCTIVITY (u mhos/cm)	pH	HARDNESS CaCO3 (mg/L)	ALKALINITY CaCO3 (mg/L)	CHLORIDE Cl (mg/L)	SULPHATES SO4 (mg/L)	PHOSPHOROUS TOTAL P (mg/L)	PHOSPHOROUS SOLUBLE P (mg/L)	NITROGEN TOTAL KJELD N (mg/L)	NITROGEN AMMONIA N (mg/L)	NITROGEN NITRITE N (mg/L)	NITROGEN NITRATE N (mg/L)	POTASSIUM K (mg/L)	MAGNESIUM Mg (mg/L)	CALCIUM Ca (mg/L)	SODIUM Na (mg/L)	IRON Fe (mg/L)	PHENOLS (ug/L)	BOD5 (mg/L)	COD (mg/L)
18-I	NOV 83	9800	8.2	2160	91	1918	2900	0.30	--	6.0	3.80	0.02	0.10	103	185	560	1490	2.85	6.0	31.0	484
	JUL 84	12410	7.8	2712	73	3396	2700	0.08	--	0.7	6.85	<0.01	<0.05	100	225	715	2175	5.80	8.8	4.6	196
18-II	NOV 83	5400	7.2	1751	1628	687	2120	15.60	--	12.0	2.90	<0.01	<0.10	65	125	495	670	1030.00	0.8	37.0	190
	JUL 84	4500	7.2	1465	523	672	1500	3.50	--	5.5	2.80	<0.01	<0.05	56	89	440	545	210.00	<0.6	3.2	120
18-III	NOV 83	910	7.4	526	398	8	185	0.60	--	2.0	<0.10	0.02	0.80	11	61	111	29	17.80	2.6	<3.8	22
	JUL 84	980	7.1	550	796	7	154	1.45	--	1.5	<0.05	<0.01	<0.10	10	68	109	30	65.00	<-0.6	<4.7	60
21-I	NOV 83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	JUL 84	4040	7.8	2197	85	10	2775	<0.02	--	2.8	2.60	<0.01	<0.05	52	285	410	315	1.90	32.4	<1.6	20
21-II	NOV 83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	JUL 84	1780	7.8	772	940	9	700	3.65	--	3.0	0.75	<0.01	<0.05	29	133	90	124	160.00	65.0	7.2	126
21-III	NOV 83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	JUL 84	946	7.6	503	770	2	130	1.85	--	1.0	<0.05	0.02	0.20	8	81	68	43	80.00	2.8	<3.7	40
22-I	NOV 83	1640	8.0	579	600	19	412	0.80	--	3.5	0.50	0.02	<0.10	42	100	67	151	40.00	6.0	41.0	382
	JUL 84	2640	7.9	884	545	17	1080	<0.06	--	2.7	2.15	<0.01	<0.05	42	154	100	326	3.55	23.0	<2.4	66
22-II	NOV 83	1360	7.7	758	646	4	225	0.25	--	1.5	<0.10	0.02	<0.10	19	138	77	36	8.20	2.0	<2.3	12
	JUL 84	908	7.4	546	475	5	102	0.08	--	<0.3	<0.05	0.02	<0.05	9	81	86	18	5.10	13.0	<1.8	12
22-III	NOV 83	1250	7.4	676	632	6	155	0.20	--	1.0	<0.10	0.02	<0.10	12	115	81	35	5.40	5.0	10.6	182
	JUL 84	860	7.3	494	635	8	98	0.88	--	0.7	<0.05	0.02	<0.10	6	52	112	19	34.20	5.0	<2.7	22
Burlington Tap Water	NOV 83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	JUL 84	322	7.9	132	94	27	29	<0.01	--	<0.1	<0.05	<0.01	0.40	2	8	39	12	1.45	0.8	<0.5	20

SURFACE WATER QUALITY ANALYSES

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 Surface Water ANALYSIS RESULTS

STATION	DATE	CONDUCTIVITY (u mhos/cm)	pH	HARDNESS CaCO3 (mg/L)	ALKALINITY CaCO3 (mg/L)	CHLORIDE Cl (mg/L)	SULPHATES SO4 (mg/L)	PHOSPHOROUS TOTAL P (mg/L)	PHOSPHOROUS SOLUBLE P (mg/L)	NITROGEN TOTAL KJELD N (mg/L)	NITROGEN AMMONIA N (mg/L)	NITROGEN NITRITE N (mg/L)	NITROGEN NITRATE N (mg/L)	POTASSIUM K (mg/L)	SODIUM Na (mg/L)	IRON Fe (mg/L)	PHENOLS (ug/L)	BOD5 O (mg/L)	COD O (mg/L)
SW-1	9 APR 84	431	8.3	193	149	28	33	0.10	<0.02	0.3	<0.10	<0.10	0.20	2.1	16	0.44	<-0.4	<0.5	<-6
	25 JUN 84	813	8.2	442	348	17	125	0.12	<0.01	0.5	<0.05	0.02	<0.05	6.3	30	2.40	<-0.2	<1.5	78
	21 AUG 84	718	7.9	348	301	45	67	0.05	0.06	0.2	0.35	<0.01	0.25	1.7	30	0.51	<-0.2	<1.0	10
	15 NOV 84	712	8.0	340	270	45	68	<0.06	<0.02	<0.3	<0.10	<0.01	0.50	3.7	27	0.10	<0.2	<0.4	18
SW-2	9 APR 84	469	8.3	223	169	25	39	<0.04	<0.02	0.3	<0.10	<0.01	0.30	2.4	15	0.66	<-0.8	<0.6	<-6
	25 JUN 84	620	8.2	296	267	27	49	0.09	<0.01	0.4	<0.05	<0.01	<0.05	3.5	18	0.35	<0.2	<0.4	16
	21 AUG 84	836	7.9	412	346	47	98	0.05	<0.04	0.2	<0.10	<0.01	<0.10	4.8	34	0.19	<-0.8	<0.4	14
	15 NOV 84	713	8.1	342	274	37	78	<0.07	0.06	<0.3	<0.05	<0.01	<0.05	4.5	24	0.15	<0.2	<0.7	10
SW-3	9 APR 84	502	8.2	247	181	24	46	0.05	<0.02	0.3	<0.10	<0.10	0.20	2.6	16	0.73	<-0.8	<0.8	<-2
	25 JUN 84	650	8.3	340	280	26	60	0.10	<0.01	0.4	<0.05	0.02	<0.05	3.9	21	0.35	<-0.4	<0.4	160
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	824	8.1	401	313	41	110	<0.06	<0.04	<0.3	<0.05	<0.01	<0.05	4.5	31	0.32	<0.2	<0.1	10
SW-4	9 APR 84	577	8.1	316	251	6	65	0.31	<0.02	0.7	<0.10	<0.10	0.10	4.1	12	10.90	<-0.8	<1.2	<-6
	25 JUN 84	828	7.9	468	405	12	96	0.10	<0.01	0.4	<0.05	0.03	<0.05	5.2	23	1.85	<-0.4	<1.1	70
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	1095	7.7	616	464	16	210	<0.05	<0.02	0.6	<0.10	<0.01	<0.05	4.7	32	0.68	<-0.6	<1.0	18
SW-5	9 APR 84	666	8.3	351	249	10	102	0.04	<0.02	0.3	<0.10	<0.01	<0.10	4.4	19	0.78	<-0.8	<0.9	18
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	926	7.9	498	334	23	195	<0.03	<0.02	<0.3	<0.05	<0.01	<0.05	4.6	28	0.68	<0.2	<-0.1	10
SW-6	9 APR 84	745	8.0	364	212	25	160	<0.04	<0.02	0.5	<0.10	<0.01	<0.10	3.7	27	0.19	<-0.6	<0.8	8
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-7	9 APR 84	733	8.3	348	229	25	134	<0.06	<0.02	0.5	<0.10	<0.01	<0.10	4.1	31	2.02	<-0.8	<1.0	<4
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 Surface Water ANALYSIS RESULTS

STATION	DATE	CONDUCTIVITY	pH	HARDNESS	ALKALINITY	CHLORIDE	SULPHATES	PHOSPHOROUS		NITROGEN				POTASSIUM	SODIUM	IRON	PHENOLS	BOD5	COD
								TOTAL	SOLUBLE	TOTAL KJELD	AMMONIA	NITRITE	NITRATE						
		(u mhos/cm)		CaCO3 (mg/L)	CaCO3 (mg/L)	Cl (mg/L)	SO4 (mg/L)	P (mg/L)	P (mg/L)	N (mg/L)	N (mg/L)	N (mg/L)	N (mg/L)	K (mg/L)	Na (mg/L)	Fe (mg/L)	(ug/L)	O (mg/L)	O (mg/L)
SW-10	9 APR 84	1460	8.0	614	343	80	360	<0.06	<0.02	1.0	<0.10	0.35	0.80	24.0	78	0.68	<-0.8	<1.8	18
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-11	9 APR 84	1293	8.1	553	309	76	300	<0.07	<0.02	0.9	0.20	0.02	0.30	21.0	67	1.25	<-0.8	<1.9	24
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-12	9 APR 84	2770	7.7	870	682	326	158	0.15	0.02	38.3	29.00	<0.01	<0.10	84.4	160	4.25	290.0	1038.0	1258
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	1390	7.7	560	150	235	240	0.09	<0.02	0.7	<0.05	0.05	2.30	23.2	47	2.66	1.6	<0.7	30
SW-13	9 APR 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	25 JUN 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	21 AUG 84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15 NOV 84	2790	7.3	994	398	412	660	<0.03	<0.02	0.7	<0.05	<0.01	<0.05	8.8	256	2.45	<0.2	<0.1	30

SURFACE WATER BACTERIOLOGICAL ANALYSES

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 Surface Water ANALYSIS RESULTS

STATION	DATE	TOTAL COLIFORM (count/100ml)	FECAL COLIFORM (count/100ml)	FECAL STREPTOCOCCUS (count/100ml)	PSEDU. AERUGINOSA (count/100ml)	COMMENTS
SW-1	9 APR 84	<160	<20	<40	<10	
	25 JUN 84	12000	680	1140	--	
	21 AUG 84	820	100	150	--	
	15 NOV 84	460	<70	130	--	
SW-2	9 APR 84	<140	<20	<20	<10	
	25 JUN 84	4200	440	800	--	
	21 AUG 84	1300	100	140	--	
	15 NOV 84	280	<70	<50	--	
SW-3	9 APR 84	<120	<20	<60	<10	
	25 JUN 84	6800	500	960	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	10600	780	290	--	
SW-4	9 APR 84	560	<20	<20	<20	
	25 JUN 84	8200	620	960	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	1300	<40	<160	--	
SW-5	9 APR 84	520	<20	<20	<10	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	720	<20	440	--	
SW-6	9 APR 84	1500	<20	<100	<10	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	--	--	--	--	
SW-7	9 APR 84	2200	<20	<40	<10	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	--	--	--	--	

1984 BURLINGTON LANDFILL MONITORING

GLAL 85-22 Surface Water ANALYSIS RESULTS

STATION	DATE	TOTAL COLIFORM (count/100ml)	FECAL COLIFORM (count/100ml)	FECAL STREPTOCOCCUS (count/100ml)	PSEDU. AERUGINOSA (count/100ml)	COMMENTS
SW-10	9 APR 84	1200	<20	<80	<10	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	--	--	--	--	
SW-11	9 APR 84	2300	<20	<140	<10	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	--	--	--	--	
SW-12	9 APR 84	420	<160	820	<20	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	980	<20	360	--	
SW-13	9 APR 84	--	--	--	--	
	25 JUN 84	--	--	--	--	
	21 AUG 84	--	--	--	--	
	15 NOV 84	3000	<20	460	--	

ANALYSIS OF SAMPLE COLLECTED BY HALTON REGION
FROM FALCON CREEK -
NORTH OF BELL CABLE

Environment Ontario
FINAL REPORT

Page 001
Printed 15/02/85

RECEIVED
1985
HALTON REGION
PUBLIC WORKS

Municipality/Project: B U R L I N G T O N L A N D F I L L

Submission: C E 2 7 6 3

Sampling Date(s): D E C 0 4, 1 9 8 4

Program..... 0400231 LANDFILL CE REGN -MUNICIPAL
Agency..... 0101030101 TORONTO

Sampled by: MUCCIARELLI, S. Date Submitted: 05/12/84, Date Received: 06/12/84

..... Mail this copy to ..... WOODBURN,G
REGION OF HALTON
1151 BRONTE ROAD PO BOX 7000
OAKVILLE ONTARIO
L6J 6E8

Final reports to WOODBURN,G REGION OF HALTON Telephone: 416-827-2151
HENDRY, GEORGE TRACE ORGANICS SECT. Telephone: 416-248-3031

Field Sample	Sampling Location	Sampling Location Description	Sampling Date	Time	Zone
1	BURLINGTON LANDFILL		04/12/84		5

Sample Description	Lab Sample#	Remarks	Lab Sample#	Remarks
FALCON CREEK-NORTH OF BELL CABLE	W49-0280 MS49-5213		OP49-0094	

TESTS REQUESTED: G+WCLFRC G+OPOPUP
G+MBSI +PHNOL
-FEUT +FEUT@WFEMN

Sample Class: Results

WATER (GRND/DOMESTIC) WQ

Inquiries at: STUART BARNES
Telephone: 416-248-3512

Field Sample	Sampling Location	Sample Description	Lab Sample#	Remarks	Sampling Date	Time	Zone
1	BURLINGTON LANDFILL	FALCON CREEK-NORTH OF BELL CABLE	W49-0280		04/12/84		5

Field Sample Number... 1

Test Description Code, Units of Measure	Method	W49-0280
CONDUCTIVITY 25C COND25,UMHO/CM AT 25 C	002AI2	1590.00
HARDNESS, TOTAL HARDT ,MG/L AS CACO3	CALC01	788.5
ALKALINITY,TOTAL ALKT ,MG/L AS CACO3	003CT3	538.4
PH (-LOG(H+(CONCN))) PH ,DIMENSIONLESS	001AI1	8.00
CHLORIDE, UNF,REACTIVE CLIDUR,MG/L AS Cl	002BT3	69.6
RESIDUE,TOTAL RST ,MG/L	001AI5	1130.0
RESIDUE,FILTRATE RSF ,MG/L	101AI5	1090.0
RESIDUE, PARTICULATE RSP ,MG/L	201AI5	37.3
IRON, UNF,TOTAL FEUT ,MG/L AS Fe	504BC2	.82
PHOSPHORUS, UNF,TOTAL PPUT ,MG/L AS P	504BC2	.050<T
PHOSPHATES, FRAC,REACT. PPO4FR,MG/L AS P	103BC2	.02<T

Sample Class: Results

WATER (GRND/DOMESTIC) WQ

Inquiries at: STUART BARNES
Telephone: 416-248-3512

Test Description / Code, Units of Measure	Method	Field Sample Number... 1 W49-0280
NITR'N,TOTAL KJELD,UNF.R NNTKUR,MG/L AS N	004BC2	.60
AMMONIUM,TOTL, FRAC.REAC NNHTFR,MG/L AS N	103AC2	.05<W
NITRATES,TOTL, FRAC.REAC NNOTFR,MG/L AS N	102CC2	.05<W
NITRITE, FRAC.REACT. NNO2FR,MG/L AS N	102CC2	.005<W
PHENOLICS (UNF.REACTIVE) PHNOL ,UG/L PHENOL	002BC2	-.8<T
BOD, 5DAY ,TOTAL DEMAND BOD5 ,MG/L AS O	001AI2	.5<T
CHEMICAL OXYGEN DEMAND COD ,MG/L AS O	002AC0	26.
DISSOLVED ORGANIC CARBON DOC ,MG/L AS C	102AC2	7.2
DISSOLVED INORGAN,CARBON DIC ,MG/L AS C	102AC2	2.6

Sample Class: Results

SEWAGE MICROBIOLOGY

Inquiries at: JIM CLARK
Telephone: 416-248-3008

Field Sample	Sampling Location	Sample Description	Lab Sample#	Remarks	Sampling Date	Time	Zone
1	BURLINGTON LANDFILL	FALCON CREEK-NORTH OF BELL CABLE	MS49-5213		04/12/84		5

Field Sample Number... 1

Test Description Code, Units of Measure	Method	MS49-5213					
TOTAL COLIFORM MF TCMF ,COUNT /100ML	LG 22	640.					
TOTAL COLIFORM MF BKGD TCMFBK,COUNT /100ML	LG 22	4800.					
FECAL COLIFORM MF FCMF ,COUNT /100ML	TGI 20	10.<					
FECAL STREPTOCOCCUS MF FSMF ,COUNT /100ML	EG 48	20.<=>					

Sample Class: Results

PRIORITY ORGANICS

Inquiries at: DAVID HALL
Telephone: 416-248-3939

Field Sample	Sampling Location	Sample Description	Lab Sample#	Remarks	Sampling Date	Time	Zone
1	BURLINGTON LANDFILL	FALCON CREEK-NORTH OF BELL CABLE	OP49-0094		04/12/84		5

Test Description Code, Units of Measure / Method	Field Sample Number... 1 OP49-0094					
1,1-DICHLOROETHYLENE X1001P,UG/L P0C0D0	0.<W					1
DICHLOROMETHANE X1002P,UG/L P0C0D0	0.<W					86
TRS-1,2-DICHLOROETHYLENE X1003P,UG/L P0C0D0	0.<W					1
DICHLOROETHANE X1004P,UG/L P0C0D0	0.<W					
CHLOROFORM X1005P,UG/L P0C0D0	0.<W					
1,1,1-TRICHLOROETHANE X1006P,UG/L P0C0D0	0.<W					
1,2-DICHLOROETHANE X1007P,UG/L P0C0D0	0.<W					
CARBONTETRACHLORIDE X1008P,UG/L P0C0D0	0.<W					
BENZENE B2001P,UG/L P0C0D0	0.<W					
1,2-DICHLOROPROPANE X1009P,UG/L P0C0D0	0.<W					
TRICHLOROETHYLENE X1010P,UG/L P0C0D0	0.<W					

Sample Class: Results

PRIORITY ORGANICS

Inquiries at: DAVID HALL
Telephone: 416-248-3939

Field Sample Number...	1
Test Description Code, Units of Measure / Method	OP49-0094
DICHLOROBROMOMETHANE X1011P,UG/L P0C0D0	0,<W
TOLUENE B2002P,UG/L P0C0D0	0,<W
1,1,2-TRICHLOROETHANE X1012P,UG/L P0C0D0	0,<W
CHLORODIBROMOMETHANE X1013P,UG/L P0C0D0	0,<W
TETRACHLOROETHYLENE X1014P,UG/L P0C0D0	0,<W
CHLOROBENZENE X2001P,UG/L P0C0D0	0,<W
TRIFLUOROCHLOROTOLUENE X2013P,UG/L P0C0D0	0,<W
ETHYLBENZENE B2003P,UG/L P0C0D0	0,<W
P-XYLENE B2004P,UG/L P0C0D0	0,<W
M-XYLENE B2005P,UG/L P0C0D0	0,<W
BROMOFORM X1015P,UG/L P0C0D0	0,<W
O-XYLENE B2006P,UG/L P0C0D0	0,<W
1,1,2,2TETRACHLOROETHANE X1016P,UG/L P0C0D0	0,<W
1,4-DICHLOROBENZENE X2002P,UG/L P0C0D0	0,<W
1,3-DICHLOROBENZENE X2003P,UG/L P0C0D0	0,<W

Sample Class: Results

PRIORITY ORGANICS

Inquiries at: DAVID HALL
Telephone: 416-248-3939

Field Sample Number...	1					
Test Description Code, Units of Measure Method	OP49-0094					
1,2-DICHLOROBENZENE X2004P,UG/L P0C0D0	0.<W					

REMARK CODE EXPLANATIONS

RMK	DESCRIPTION
<	ACTUAL RESULT IS LESS THAN THE REPORTED VALUE
<=>	APPROXIMATE RESULT
<T	THIS LOW MEASUREMENT IS TENTATIVE, FOR INFO ONLY
<W	"ZERO", VALUE REPORTED IS MIN. MEASURABLE AMOUNT

*** END OF REPORT ***