



Environmental
Assessment
Board

(416) 965-2531

1 St. Clair Avenue West
Toronto, Ontario
M4V 1K7

ENVIRONMENTAL ASSESSMENT BOARD

REPORT

ON THE

PUBLIC HEARING ON THE APPLICATION BY THE REGIONAL
MUNICIPALITY OF HALTON FOR APPROVAL OF A PROPOSED
EXTENSION (PHASE II) OF THE EXISTING BURLINGTON
LANDFILL SITE

June 19, 1980

TABLE OF CONTENTS

	<u>Page</u>
<u>INTRODUCTION</u>	2
<u>EXAMINATION IN CHIEF OF MR. G. ANDERSON BY MR. PERLIN</u>	5
Investigation of Proposed Expansion	6
Hydrogeological Setting	6
Conclusions	9
Recommendations	10
<u>CROSS-EXAMINATION OF MR. G. ANDERSON:</u>	11
By Mr. D. C. Brown	11
By Mr. R. O. Elstone	13
By Mr. C. W. Johnson	14
By Mrs. Betty Barhydt	15
<u>EXAMINATION IN CHIEF OF MR. DENIS GORDON STEVENS BY MR. PERLIN</u>	16
Environmentally Sensitive Area	16
Existing Site Conditions	17
Site Drainage	18
Vegetation	19
Fish and Wildlife	21
Conclusions	21
Recommendations	23
<u>CROSS-EXAMINATION OF MR. STEVENS:</u>	24
By Mr. D. C. Brown	24
By Mr. R. O. Elstone	25
By Mr. C. W. Johnson	25
<u>RE-EXAMINATION OF MR. STEVENS BY MR. PERLIN</u>	26

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
<u>EXAMINATION IN CHIEF OF MR. W. F. WELLS BY MR. PERLIN</u>	26
Alternatives	27
Proposed Site Expansion	30
Existing Site	30
Burlington Landfill Site - Design and Operations Report	31
Waste Quantities and Characteristics	31
Traffic Projections	33
Site Design	34
Final Contour Design	35
Base Contour Design	36
Surface Drainage	37
Leachate Collection and Disposal System	38
Access Roads	40
Access Control	40
Public Container	40
Site Operation	41
Monitoring	44
Conclusions	45
 <u>CROSS-EXAMINATION OF MR. WELLS:</u>	 45
By Mr. D. C. Brown	45
By Mr. R. O. Elstone	47
By Mr. C. W. Johnson	50
 <u>RE-EXAMINATION OF MR. WELLS BY MR. PERLIN</u>	 51
 <u>EVIDENCE OF MR. R. O. ELSTONE</u>	 51
 <u>CROSS-EXAMINATION OF MR. ELSTONE BY MR. BROWN</u>	 53
 <u>CROSS-EXAMINATION OF MR. ELSTONE BY MR. PERLIN</u>	 54

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
<u>EVIDENCE OF MR. C. W. JOHNSON</u>	55
<u>CROSS-EXAMINATION OF MR. JOHNSON BY MR. BROWN</u>	56
<u>ARGUMENT BY MR. BROWN</u>	56
<u>ARGUMENT BY MR. PERLIN</u>	57
<u>MINISTRY OF THE ENVIRONMENT</u>	60
<u>INSPECTION OF THE SITE</u>	60
<u>CONCLUSIONS</u>	60
<u>RECOMMENDATIONS</u>	63

APPENDICES

- A. Application for the Certificate of Approval
- B. List of Exhibits

REPORT ON THE PUBLIC HEARING ON THE APPLICATION BY THE
REGIONAL MUNICIPALITY OF HALTON FOR APPROVAL OF A PROPOSED
EXTENSION (PHASE II) OF THE EXISTING BURLINGTON LANDFILL SITE

BEFORE:

Mr. D. M. Coolican,
Board Member and
Hearing Chairman

- and -

Mr. S. Montgomery,
Board Member.

A public hearing was held in the Council Chambers, Civic Administration Building, Burlington, Ontario, on April 22nd, 23rd and 24th, 1980 under Sections 33a(1) and 33d(1) of The Environmental Protection Act concerning the application by the Regional Municipality of Halton for a Certificate of Approval for an extension (Phase II) to the existing Burlington landfill site located within Part 1 of Reference Plan R-1067 (Instrument No. 415301) on part of Lots 3 and 4, Concession II- Township of East Flamborough (now the City of Burlington) immediately northwest of the existing landfill site.

A description and the location of the proposed site are set out in Appendix A attached hereto.

Mr. Coolican and Mr. Montgomery were assisted at the hearing by Mr. H. Browne, Environmental and Engineering Advisor to the Board. It was ascertained by the Board that

the necessary notices had been given as required by the Act. All persons who appeared were given full opportunity to be heard, to make representation by counsel or agent and to raise questions regarding the subject matter of the hearing. Transcripts of the proceedings of the hearing have been made.

This report summarizes the information presented and the views expressed at the hearing. The Board's recommendation with respect to the subject matter of the hearing, together with its reasons therefor, are given.

INTRODUCTION

Mr. Dennis Y. Perlin, Regional Solicitor for the Regional Municipality of Halton, provided background information regarding the application and he introduced three witnesses to explain the proposal. These witnesses for the Region were: Mr. Grant Anderson, P.Eng., Consulting Hydrogeologist, Associate, Gartner Lee Associates Limited; Mr. Denis G. Stevens, Senior Ecologist, M. M. Dillon Limited; and Mr. Wallace Fredric Wells, P.Eng., Manager, Waste Management Engineering, M. M. Dillon Limited.

Mr. Perlin introduced a number of exhibits (Exhibits 1-30) including resolutions, letters and reports which provided background information regarding the proposal. A list of these exhibits is provided at the back of this report.

Mr. Perlin noted that the Regional Municipality of Halton, which consists of the City of Burlington, the Town of Oakville, the Town of Halton Hills (commonly known as Georgetown - Acton) and the Town of Milton, was given complete jurisdiction

over waste disposal, such as landfill sites, when it was formed in 1974. The area municipalities collect the waste and the Region must dispose of it.

When the Region commenced in 1974 it took over five landfill sites, three of which have since been closed. The two remaining sites are in Oakville and Burlington. It was anticipated that the Oakville site capacity would be reached by the end of May 1980. At the Burlington site it was anticipated that the site would be filled by July 1980, but an expansion referred to as Phase I Expansion would allow the site to continue until the spring of 1981 by way of modifications to the land form and contours at that site. Mr. Perlin explained that the matter before the Board at this hearing was a proposed small expansion to the existing Burlington site referred to as the Phase II Expansion.

He noted that the Region has so far been unsuccessful in obtaining approvals for long term waste capacity and therefore the Region was trying to obtain small capacity expansions to the existing Oakville and Burlington landfill sites. Thus he emphasized the immediate need for the proposed expansion to provide a short term solution so that the long term solution can be resolved. He explained that depending on the outcome of the proposed Burlington expansion and other applications that will be made in the near future, only one to four years of landfilling capacity would be available in the Region.

The existing Burlington site is 111 acres but only 72 acres are landfilled. It is proposed that 17 acres of an

expanded area of 58 acres to the north of the existing site would be landfilled. If approved, the total size of the site would be 169 acres, of which only 72 acres would be landfilled. Thus the application before the Board was an extension of 17 acres of landfilling.

The Burlington site was commenced in 1972 by the Town of Burlington and the operation was assumed by the Region in 1974. Actually the Region has contracted the operation to the private firm of Environmental Handling Services Limited of St. Catharines. This firm also operates the Oakville site.

Approximately 308 tons of wastes from the Burlington and Milton areas are deposited at the Burlington site daily, while the Oakville site serves the Oakville and Halton Hills areas. If the expanded Burlington site becomes the waste disposal site for the whole Region, then approximately 739 tons per day would be deposited by 1983.

The present site operates six days a week, Monday through Saturday, except for Christmas Day and New Year's Day. Its hours of operation are Monday to Friday, 8:00 a.m. to 5:30 p.m. and Saturday, 8:00 a.m. to 4:00 p.m. If the expansion is approved, then the hours from Monday to Friday would be from 7:30 a.m. to 6:00 p.m.

Mr. Perlin concluded his introductory remarks by filing a number of exhibits (1-30) to document the development of the proposal before introducing his three witnesses, Mr. Grant Anderson, Mr. Denis Stevens, and Mr. Wallace Wells, to explain the details of the project.

EXAMINATION IN CHIEF OF MR. G. ANDERSON BY MR. PERLIN

As his first witness Mr. Perlin introduced Mr. G. Anderson, a Consulting Hydrogeologist with Gartner Lee Associates Limited, to explain the hydrogeological information regarding the site as outlined in his firm's report (Exhibit 19) entitled "Burlington Landfill Site, Hydrogeological Study" dated September 1979. Mr. Anderson also referred to his firm's monitoring program report dated April 1980 for the Burlington site which was submitted as Exhibit 11. He also submitted as Exhibit 27 a summary of his evidence.

Mr. Anderson outlined his extensive background experience relating to landfilling. He noted that his firm was retained by M. M. Dillon Limited for the Region as sub-consultants in September 1978 to study Phase II Expansion of the Burlington Landfill Site. However, as early as 1975 his firm was involved as consultants to the Region for their overall waste management program. In January 1979, the comprehensive field investigation with regard to the suitability of the small expansion to the existing operations of the Burlington site was undertaken.

The Consulting Hydrogeologist employed a chart to outline in general terms the hydrogeological concerns of placing landfill and its effect on the natural environment. There are two primary concerns. The first relates to the movement of leachate and its potential impact on the ground water and surface water resources adjacent to the site. The other involves the movement of gas and its potential impact on development adjacent to the site.

201.1
P. 129
130
leachate
not follow
report
leach
migration

Mr. Anderson explained how leachate was formed and how it migrated to the water table through various types of soil at different rates. Through sands and gravels it can travel at rates of 100 to 300 feet per year. Similarly methane gas can travel long distances through sand and gravel creating potential hazards to adjacent development. He noted that the hazards to adjacent development. He noted that the hydrogeological problems were minimized when landfill was placed in clay soil since the leachate would move at less than a foot per year. Also in clay the gases can be naturally vented through the refuse so that gas migration off the site is minimized.

Investigation of Proposed Expansion

A detailed investigation was carried out to evaluate the general feasibility of the proposed expansion. This involved drilling holes for samples of soil and rock for visual and laboratory identification and installation of piezometers and standpipes to measure vertical and lateral ground water flow components. In addition to the above study of the proposed expansion area, the existing active site was also evaluated. The ground water and surface water flows and chemistry were monitored in an attempt to predict future impacts resulting from the expansion and also to document existing site conditions.

Hydrogeological Setting

As a result of his field investigation, Mr. Anderson made conclusions with respect to the hydrogeological setting of the existing and proposed expansion of the Burlington site.

The proposed expanded area is situated on the lower slopes of the Niagara Escarpment and is composed of an average of about 7.8 meters (25 feet) of glacial till soils over Queenston Shale bedrock. There is a minimum of 1.5 meters of till in the south and a maximum of 10.7 meters in the north. The shale bedrock reportedly is over 250 feet deep at this location. The Falcon Creek valley, eroded into the shale bedrock, borders the north and west limits of the proposed site. Most of the existing site is sitting directly on the Queenston Shale bedrock.

soils
p. 146 Vol. 1
to
p. 151

The ground water table is a subtle reflection of the surface topography sloping predominantly to the southeast with components towards the Falcon Creek valley (see Exhibit 33A). The surface of the water table within the proposed expanded area is in the glacial till and varies in depth from near the ground surface in the uplands to about 3.5 meters near the top of the valley wall. The valley tends to draw the water table down. Within the refuse on the existing site the water table is well below the ground surface. In some cases only the lower one to two meters of refuse are below the water table. At some locations all the refuse is above the water table.

groundwater
p. 149

The site is within a ground water recharge zone, that is, the gradients are downward. Thus ground water flows downward through the glacial till to the shale bedrock. Since the gradients are very steep, he reported that it is a strong recharge zone. In Exhibit 33B the ground water regime in the bedrock is outlined. Within the expansion area ground water flow in the bedrock is toward the Falcon Creek valley, while

recharge
zone

33B
Groundwater
Regime in
the bedrock
p. 181
N 3

flow under the existing site is predominantly southeast. The

leachate
movement Falcon Creek valley is a ground water discharge zone.

bedrock
to give
sided
to the
receiver
of leachate
Mr. Anderson reported that the bedrock regime would be the important receiver of the leachate. The leachate would migrate to the rock and move through the shale. At the existing site this movement through the shale would be generally southerly away from the site with some minor components moving towards Falcon Creek, whereas in the northerly part of the expanded area the movement would be towards Falcon Creek, with some minor flow from the southern portion going southeasterly underneath the lands that have already been landfilled.

at of
low-glacial till
fractured
to
fractures
glacial till
no
The velocity of flow through the fractures of the glacial till would be about 50 feet per year. This movement would be essentially vertically downward. If there were no fractures in the till the velocity would only be a tenth of a foot per year. The consultant estimated that the velocity of flow laterally through the shale would be 70 feet per year.

water
quality
163
166
169
In regard to ground water quality it was reported that the quality of water in the shale was relatively poor and does not comply with drinking water guidelines since excessively high concentrations of sulphates, hardness sodium and iron are present. There is no recorded ground water use in the immediate vicinity of the existing or proposed facility.

surface
drainage
divide
A surface drainage divide bisects the proposed expansion area between the Indian Creek and Falcon Creek watersheds.

160- The existing site is located in the Falcon Creek basin, south
174 and down-gradient from the proposed expansion area. Leachate

produced at the existing site infiltrates into the underlying shale and migrates downward and southeasterly with minor flow towards the west and east. A small portion of the leachate egresses as springs and enters the surface waters. Design measures have been undertaken to collect the surface leachate springs. These leachate collection systems will be discussed later by Mr. Wells.

Leachate
collection
systems
165-74

Mr. Anderson referred to the monitoring program (Exhibit 11) which outlines the investigative program required to further document the leachate movement in the rock around the existing landfill. A monitoring program is also suggested for the expansion lands if they are approved.

Monitoring
program
175

Conclusions

Mr. Anderson made the following conclusions as the result of his study:

The proposed expansion area may be developed for solid waste disposal provided the facility is properly engineered and operated to minimize the impact of leachate on the ground and surface waters.

?
Expansion
may be
developed
for solid
waste disposal
if facility is
properly
engineered

To collect leachate an underdrain system is necessary and a toe drain system along the west side of the Phase I expansion area. There should be a contingency plan for an interceptor drain on the east side of the Falcon Creek valley so that leachate could be intercepted before it reaches the creek if the underdrain system failed.

underdrain
system is
necessary
? toe drain
system west
Phase I

Any contaminant migration from the proposed site would be principally towards the Falcon Creek valley, although seasonal migration may be under the existing site.

Contaminant
migration

There are no significant operational constraints from a hydrogeological viewpoint on the proposed facility.

?

1

3

and leachate movement to adjacent properties to the west. He did not believe that adjacent properties to the east would be affected by methane gas or leachate. The underdrains would convey the leachate to the west. In any case, a gas venting system would be installed if monitoring indicated the need for it.

Mr. Anderson believed that the proposed expansion would not have any adverse impact on surface and ground water to the south of the site. It would not create a worse impact than what is already there. In fact, he thought that it would enhance the situation.

CROSS-EXAMINATION OF MR. G. ANDERSON:

By Mr. D. C. Brown

Mr. Brown, Solicitor for the City of Burlington, questioned Mr. Anderson about Bayview Park, a closed landfill park, located east of the site and immediately east of the National Sewer Pipe property and southeast of the Papeland Ridgeback property. Reportedly there are leachate springs around the Bayview Park site which discharge to surface water. Mr. Brown wondered if it would be possible to link up a drainage system for this old site to the one proposed for the Phase I or Phase II site. Mr. Anderson replied that more study would be required at that site to determine the quantity and quality of the leachate.

Bayview
leachate
springs
possible to
link drainage
system

more work
required
on Bayview
leachate

Bayview Park is used for a riding stable with quarter horses. The site did not have any underdrains or toe drains. Mr. Brown wanted assurances that similar conditions of leachate discharge would not result at the proposed site. Mr. Anderson noted that the underdrain and toe drain system would be quite effective. In addition, the monitoring program

?
what is
wanted

would enable the designers to determine if the contingency collection system should be constructed. This would be a toe drain type of design along the floodplain of Falcon Creek, at the toe of the embankment along the south side of the proposed Phase II expansion. This contingency drain could be installed relatively quickly since the design would have been approved along with the proposed Phase II expansion.

2
could
would
go into
could

In response to Mr. Brown's concerns, Mr. Anderson advised him that the natural barrier provided by Falcon Creek would prevent the migration of leachate or gas to adjacent lands west of the Creek. Also, as a condition of the Certificate of Approval for the Phase I expansion, the Ministry of the Environment had requested that a monitoring program be developed to further investigate the movement of the leachate and its impact to the south from the existing site. If this leachate impacts the ground water or surface water then the Ministry would advise the Region to take corrective action. However, he noted that this matter was still being studied and the results of the study are not known. The leachate could be drained to a sanitary sewer on the North Service Road. This would be a gravity flow system.

2
not
no
study
and
on the
sur
Hill

Due to the explosive potential of the mixture of air with 5 to 15 per cent methane, Mr. Anderson explained that the ultimate end use of the rehabilitated site should be open space or recreational of some nature. Buildings could not be constructed directly on top of the site. There is no risk involved when the methane is vented or diluted naturally at the ground surface.

By Mr. R. O. Elstone

Mr. Elstone, the owner of adjoining property to the east, expressed concern about assurances that the consultant's recommendations and the monitoring program would be carried out. Mr. Anderson reported that the Ministry of the Environment has requested that the monitoring programs be reviewed by an independent agency. However, he noted that the Ministry would be responsible for assuring that the proper monitoring program was carried out.

?
Has this
been done

Mr. Elstone questioned the consultant about the existing erosion of the eastern bank of Falcon Creek just south of the proposed expansion where he claimed that trees were dying. Mr. Anderson reported that the construction of a drainage swale along the north edge of the Phase I fill area discharged over the edge of the valley into Falcon Creek. Since no engineering measures were taken to channel the water down the creek wall, severe erosion took place at that location. Mr. Anderson claimed that the recommended engineered drainage system in this proposal would solve the problem by diverting the surface water away from the valley wall into the ten meter set back. This drainage buffer set back would preclude any surface water going over the valley wall towards Falcon Creek. The details of the drainage system would be discussed by Mr. Wells.

2

Mr. Elstone complained that nothing was done in the past to protect the environment. Mr. Anderson disagreed by indicating that investigations of the problems, such as leachate, were undertaken over the past few years and as a result a leachate collection system was installed a year ago at the existing site.

Mr. Elstone wondered if the Region would be more responsible in the operation of the expanded site than they were with the existing site. Mr. Anderson noted that the Ministry is policing the sites better now. Also the landfills have only been designed over the past 7 to 8 years, before that, they were not designed and were really just dumps. The requirements for landfills were getting more comprehensive each year. Any legitimate concerns could be incorporated into conditions of approval.

Mr. Elstone was also concerned that the construction of the drain would destroy some of the beautiful trees along the east bank of Falcon Creek. Mr. Anderson agreed that some trees would be destroyed but he explained that a biologist was involved in the design of the sewer so that the damage to environmentally sensitive areas would be minimized. Also, he noted that the sewer in question was part of the contingency plan and it would only be constructed if the monitoring results indicted its need. Also, all the works would be within their own property limits.

By Mr. C. W. Johnson

Mr. Johnson, a neighbouring property owner to the northwest of the site, expressed concern about the possibility of methane gas drifting from the site onto neighbouring property. Mr. Anderson again referred to the natural barrier of Falcon Creek. He explained that the gas would be naturally vented on the property owned by the Region. It would be diluted with air so that it would not be detectable. Since methane gas can affect vegetation, he suggested that it be monitored once a year in the winter between the landfill in the 10 meter

reflare
gas
Falcon
Creek
natural
barrier

buffer zone. When the ground is frozen methane would be migrating at its worst condition. Since methane is lighter than air, it readily dissipates into the atmosphere.

In regard to Mr. Johnson's concern that leachate would be detrimental to vegetation and trees in the valley, Mr. Anderson did not believe that leachate would be a problem along the valley wall since it has not appeared to have affected it over the existing site. He noted that the Region is collecting the leachate which comes out of the toe of the existing landfill and they are aware that some gets to the ground water. The latter problem is the subject of further investigation as outlined in Exhibit 11, the monitoring program. The leachate from the springs that are around the toe of the existing site would be conveyed for treatment to the sewage plant and not the flow of Falcon Creek as Mr. Johnson thought.

Mr. Anderson explained that the drain would be continued along the western edge of the existing operation to the expanded site. The underdrain system would be installed before the garbage is placed at the expanded site. The entire drainage works would be a gravity system.

By Mrs. Betty Barhydt

Mrs. Barhydt asked the consultant if monitoring once a year would be often enough. Mr. Anderson explained that once a year monitoring referred to gas only. There is no development encroaching in the area where the gas would be dissipated. However the frequency of ground water monitoring would be greater and he explained the program which he recommended to the Region and the Ministry, as outlined in Exhibit 11. Background water quality would be established

and then testing would be carried out every three months at least for the first year. At the end of the year the program would be re-evaluated and adjusted accordingly. Probably his firm would be carrying out the monitoring program.

EXAMINATION IN CHIEF OF MR. DENIS GORDON STEVENS BY MR. PERLIN

Mr. Perlin's second witness was Mr. Stevens, Biologist, Head of Environmental Assessment with M. M. Dillon Limited. He explained his environmental analysis of the Burlington Landfill site expansion as outlined in Appendix A of the report dated January 1980 by M. M. Dillon Limited entitled "Burlington Landfill Site Design and Operations Report" which was submitted as Exhibit 16.

His section became involved in the summer of 1978. Exhibit 37, an aerial photo of the site, was also submitted by Mr. Stevens. This photo showed the existing conditions along with the environmentally sensitive areas. There were three stages in his study. The first involved the review of existing material and consultation with relevant agencies. Field investigation was the second stage of the study. The third stage involved identifying the environmental effects of landfilling and recommending measures to minimize the potential effects.

Environmentally Sensitive Area

Falcon Creek ravine with its Sassafras Woods immediately west of the existing site and its proposed expansion is designated as an Environmentally Sensitive Area (ESA) in the Official Plan of the Regional Municipality of Halton. An ESA is defined as "a land or water area containing natural

features or ecological functions of such significance as to warrant their protection in the best long-term interests of the people and environment of Halton Region". The policy of the Official Plan requires that an Environmental Impact Assessment (EIA) is conducted to assess the impact of the landfill operations adjacent to the Sassafras Woods.

The Region's Environmental and Ecological Advisory Committee expressed concern about the impact of the landfilling on three areas:

1. The Sassafras Woods;
2. The eroded slope along the west boundary of the existing site;
3. The water quality of Falcon Creek.

Thus Mr. Stevens stated that his report was prepared to satisfy the requirements of the Environmentally Sensitive Areas Policy of the Official Plan of the Region and also to reflect the concerns of the Halton Region's Environmental and Ecological Advisory Committee. In addition, the objectives of his study were to:

1. survey existing environmental conditions of the site extension;
2. assess the environmental effects of existing and proposed landfill operations;
3. recommend measures to minimize adverse environmental effects.

Existing Site Conditions

The site is located on a flat plateau between two ravine systems and slopes irregularly to the south. The two ravine systems form site boundaries: the Falcon Creek ravine

extending along the western and northern edge, identified as high hazard land slopes by the Ontario Land Inventory and the Indian Creek ravine extending along the eastern edge, identified as high hazard lands because of soil erosion.

The western and eastern ravines are overlain with deep red clay. Shale occurs close to the surface on the western and eastern slopes where ground cover has been removed and the surficial materials have been eroded. Soil on the proposed site extension is composed of loam over clay till. The agricultural capability of the site is rated as 60% class 1 and 40% class 3 by the Soil Capability for Agriculture in the Canada Land Inventory.

Highway 403 and the North Service Road parallel the southern boundary of the site.

Site Drainage

As indicated previously the proposed site is located in two drainage basins. Most of the site drains to Falcon Creek while a small portion in the eastern part of the site drains into a small intermittent watercourse, Indian Creek.

Surface runoff from the completed landfill area is collected in drainage ditches along the eastern and northern site boundaries. The runoff is then directed over the steep red shale slopes of the western ravine to Falcon Creek, and to swales entering Indian Creek southeast of the site. This has resulted in erosion of the ravine slopes and also runoff from the site over the western slope has removed vegetation and formed many deep gullies.

Mr. Stevens reported that the surface water quality of these creeks is not particularly high. They are typical of

streams in an urban or suburban area. Although his testing did not indicate a significant impact on water quality from the existing landfill operations, leachate is seeping from the springs along the toe of the landfill and seasonally enters Falcon Creek by overland flow. The water quality of Falcon Creek is outlined on page 8 of his report.

Ground water discharge does not appear to be a major source of leachate contamination from the existing site to Falcon Creek since the ground water flows to depth and moves in a southerly direction off the site.

Vegetation

The Biologist described the vegetation for the ravine forest edge, the hedgerows, the eroded western shale clay slope, the fields and the stream banks.

The ravine forest (Sassafras Woods) bordering the west and north limits of the proposed site expansion meets two of the nine criteria for establishing an Environmentally Sensitive Area:

1. the area is a habitat with limited representation in the Region, Ontario, or Canada, or a small remnant of particular habitats which have virtually disappeared within the Region:
2. the area provides habitat for rare or endangered species that are endangered regionally, provincially or nationally.

The Sassafras Woods is distinguished for:

1. the provision of habitat for Carolinian species at the northern limit of their range in Ontario;

2. the presence of nationally, provincially and regionally rare tree and ground flora species; and
3. the size, location and linkage value of the woods in the context of the remaining escarpment forest.

Mr. Stevens explained that the Carolinian plant species found in the Sassafras Woods are normally found in the Carolinian zone of North America. This species is most prevalent in the northern part of the Appalachians in Kentucky. The Sassafras Woods, which is not normally found in Canada, is approximately 100 hectares (247 acres) in size. The dominant tree species are sugar maple, shagbark hickory, hawthorn, witch hazel, white ash, ironwood, large-tooth aspen and red oak. In table 2 of his report a more detailed outline of the species of trees, shrubs and herbaceous plants is listed.

Hedgerows form the southern and eastern boundaries of the site extension. Along the southern boundary the hedgerow comprises largely of hawthorn and honeysuckle shrubs with some shagbark hickory, red oak, white ash, American elm, and black maple. Along the eastern site boundary the hedgerow comprises of hawthorn and honeysuckle, with mature white oak, red oak, shagbark hickory, sugar maple, white ash and nannyberry.

The area proposed for the site expansion is a typical farm field which has not been cultivated for some time and now is composed of timothy grass, asters, goldenrod, red clover, etc.

Two provincially and regionally rare herbaceous plants were noted in the Falcon Creek stream valley: large-bracted

tick trefoil and three-leaved false solomon's seal. He predicted that these plants would not be affected by the site expansion.

Fish and Wildlife

Mr. Stevens reported that it is a fairly good area for wildlife, such as white-tailed deer. Several birds were observed: ruffed grouse, red-tailed hawk, turkey vulture, herring gull, killdeer, catbird, song sparrow, bobolink, and red-winged blackbird.

He reported that the Ministry of Natural Resources has described the potential of Falcon and Indian Creeks to support their fish as limited due to low flows and high water temperatures. These intermittent creeks were assumed to contain minnows and perhaps suckers.

Conclusions

Mr. Stevens made the following conclusions in his report:

The proposed drainage scheme for the site extension will direct runoff from the eastern portion of the site in the existing ditches to Indian Creek. Most of the surface runoff will be directed along the western site boundary to outlet into Falcon Creek near Highway 403. The creek valley is gently sloping and shallow at this location. The new drainage scheme is designed to ensure that runoff will not be directed over the eroded clay-shale slopes. Remedial measures for slope rehabilitation along the western slope abutting the existing site should be undertaken.

No impairment of surface water quality, as a result of leachate is anticipated. Erosion and sedimentation measures

should reduce sediment loading and turbidity in Indian and Falcon Creeks.

Little impact on Sassafras Woods is anticipated. No vegetation will be removed and perimeter fences will protect plants from damage during initial site preparation and site operation. Only the hedgerow along the southern site boundary of the extension will be removed. Surface drainage design will protect the ravine slopes of Sassafras Woods from erosion as a result of runoff.

Any noise that may be produced from the operation of the proposed extension will be insignificant and will have insignificant ecological impact on existing populations of wildlife. Little impact on fish and wildlife habitat is anticipated.

All-terrain vehicles are causing and aggravating severe degradation of the erodible slopes and the valley bottoms. Most vegetation surrounding the site will be maintained for its value as a visual buffer. The site is effectively screened from the view of most residences. Certain stages of the landfill operations at its highest point may be visible from one residence located northwest of the site. Ravine vegetation partially obstructs the view from this residence. There will be little perceptible change in topography when the landfill is viewed from areas outside the property.

The Region's plans for progressive site rehabilitation will minimize visual effects of site operations.

Recommendations

Mr. Stevens made the following recommendations:

For the protection of the erodible clay-shale slope:

Prevent runoff flow over the slope.

Implement erosion control measures in drainage ditches.

Implement temporary erosion control measures of banks of Falcon Creek during the construction of drainage for the ditch and outlet.

Minimize the period and extent of construction activity near Falcon Creek.

Undertake site preparation outside of the heavy rainfall period.

Minimize vegetation removal and revegetate the valley slope after construction of the drainage outlet.

Rehabilitate the eroded slope on the existing site.

Prohibit all terrain vehicles on the site.

For the protection of surface water quality:

Erosion control measures in all drainage ditches will reduce sediment input to runoff.

If feasible, install sediment barriers in drainage ditches to filter runoff before discharging into Falcon or Indian Creeks.

Prohibit the migration of leachate into watercourses.

Install temporary sediment barrier (or similar measure) downstream of construction activity for drainage outlets to Falcon and Indian Creeks.

Protect creek banks from soil erosion during construction of drainage outlets.

Implement permanent erosion control measures in valleys as soon as construction is completed.

For the protection of vegetation:

Erect a wire mesh fence along the hedgerow and ravine woods edge on the boundaries of the site extension.

Erect a temporary fence around the perimeter of the forest abutting the clearance near the drainage outlet of Falcon Creek.

For the protection of fish and wildlife habitat:

Control dust.

Confine landfill operations within fence boundaries.

Protect aquatic habitat with erosion and sedimentation control measures on site, in drainage ditches and in Falcon and Indian Creeks.

For the protection of air quality:

Apply water and/or calcium chloride to site access roads for dust control during dry conditions.

Calcium chloride should not be used to control dust within 10 meters of the brow of the Falcon Creek ravine.

Waste oil should not be used for dust control.

CROSS-EXAMINATION OF MR. STEVENS:

By Mr. D. C. Brown

Mr. Brown questioned Mr. Stevens extensively about his observations with respect to the damage caused by all-terrain vehicles (dirt motorcycles and four wheel drive vehicles) on the property and the surrounding property. Although Mr. Stevens did not inspect the neighbouring properties he did indicate that there was evidence of dirt bike trails on the

National Sewer Pipe property to the east of the site. In fact, he could hear the noise of these vehicles at the time of his site visit. He agreed with Mr. Brown that these all-terrain vehicles have caused severe ecological damage to the National Sewer Pipe lands. It would appear that these uninvited vehicles gain access to the National Sewer Pipe lands and then spill over onto adjacent properties.

By Mr. R. O. Elstone

Mr. Elstone questioned Mr. Stevens about Sassafras Woods. Also he noted that there were all-terrain vehicle tracks on the site extension which is owned by Papeland Developement. He also questioned the Biologist about the erosion on the west side of the existing landfill site. Mr. Elstone complained that there were no attempts to plant grass and trees on the existing site to prevent erosion. Mr. Stevens noted that the rehabilitation was delayed because of the anticipated site expansion. There was no evidence of a litter fence at the existing site.

By Mr. C. W. Johnson

Mr. Johnson questioned Mr. Stevens about the visibility of the site to other homes up the escarpment, especially in the wintertime when the foliage on the trees has been reduced. Mr. Stevens replied that his investigation indicated that only from one residence is there a potential for seeing the site.

Another concern of Mr. Johnson was the noise problem. Mr. Stevens stated that noise would be insignificant in terms

of the noise environment that is indigenous to the area. The noise from additional machinery activity would not be significant. Also some of these machines would be working behind a pile of earth or refuse which would buffer the noise. However, Mr. Stevens noted that no specific study was done to evaluate the noise.

Another concern of Mr. Johnson's was dust. It was Mr. Steven's evidence that there was not a severe dust problem on the site.

RE-EXAMINATION OF MR. STEVENS BY MR. PERLIN

Mr. Perlin asked Mr. Stevens if the Carolinian species that are found in the Sassafras Woods are only found in Burlington and nowhere else in southern Ontario. Mr. Stevens replied negatively and indicated that they are found generally in the Niagara Peninsula area, the rim of northern Lake Erie, northern Lake Ontario and as far as Kingston. It has been identified as a regionally unique area.

On re-examination Mr. Stevens did indicate that he saw litter fencing at the existing site.

Mr. Stevens thought that the Sassafras Woods would act as a good filter for blowing dust. It was reported that most of the winds come from the south on either the west or east side.

EXAMINATION IN CHIEF OF MR. W. F. WELLS BY MR. PERLIN

Mr. Perlin's third witness was Mr. W. F. Wells, P.Eng., Manager, Waste Management Engineering, M. M. Dillon Limited and Project Manager for the Burlington Site expansion. Mr. Wells provided information regarding the design and operation of the site as outlined in his firm's report (Exhibit 16)

entitled "Burlington Landfill Site, Design and Operations Report" dated January 1980. Mr. Wells provided information about his extensive background with respect to sanitary landfill.

Alternatives

Mr. Wells explained that on July 5, 1978, M. M. Dillon Limited was retained to prepare an Interim Waste Disposal Feasibility Study for the Regional Municipality of Halton. The purpose of the study was to recommend the best strategy for the provision of landfill capacity until such time as the major new Regional facilities for waste disposal and/or processing could be approved and developed. The above study (Exhibit 5) was completed in September 1980.

The alternatives considered in this interim report were:

1. maximize the use of the existing Burlington, Oakville and Georgetown sites;
2. expand the existing sites onto small portions of apparently available adjacent lands;
3. establish an interim landfill operation at a quarry on NATCO lands on Highway 403 in Burlington;
4. use the Milton Brick Yard Quarry (Site H) as a dry waste site only; and
5. temporary burning of certain wastes.

The latter alternative was deleted from consideration when it became apparent that the Ministry would not permit burning. Thus the study involved 5 options consisting of the existing Burlington Site, the existing Oakville Site, the existing Georgetown Site, the Milton Brick Yard and the NATCO Quarry.

Thus Mr. Wells noted that his report, Exhibit 16, outlined the Phase II expansion onto lands adjacent to the site and a regrading of the area known as Phase I.

Proposed Site Expansion

Mr. Wells described in detail the property limits of the existing site and proposed site expansion and the surrounding property, by using the property ownership plan Exhibit 36.

The property of the site expansion was reported to be within the Parkway Belt West Plan and was designated General Complementary Use Area. A regulatory exemption was granted to the Region in April 1979 for the proposed landfill expansion. Mr. Wells indicated that the development of a landfill appears compatible with the intent of the plan without requiring a rezoning. The property is currently in private ownership by Papeland.

Existing Site

Mr. Wells reviewed the operation of the existing site. He reported that there are normally two machines at the site, a landfill compactor, and a tractor-type loader for moving and placing fill material. A bulldozer is brought in as needed. There is a paved access road with a gate, a maintenance building and weigh scale. The site is locked during the off hours which have been described previously. The site is flown over every six months and using aerial photo techniques to update contour plans, the amount of waste deposited and the remaining capacity are calculated.

Using Exhibit 39, Mr. Wells described the leachate and toe drain arrangements on the existing site. Drains down the

easterly and westerly sides of the site connect at the centre of the site and proceed southerly to a sewer line installed on the North Service Road. The toe drain leachate system is still under construction. Manholes have been designed so that the leachate can be monitored. The leachate will be treated at the Burlington Skyway Sewage Treatment Plant.

Mr. Wells reported that the two main problems with the existing landfill operation relate to surface drainage and leachate handling because of improper handling of surface drainage eroding cover materials of those areas that were landfilled. Also the surface drainage was discharged down very steep routes causing erosion in the Falcon Creek valley. Drainage works are proposed to rectify this problem. Drainage along the east side of the site will continue to discharge into the Indian Creek Watershed.

Final design of these drainage works is now under way. These works, outlined on Exhibit 40, he believed, will allow for the handling of clean surface drainage that will not cause erosion or siltation of the water ways including the Falcon Creek Watershed. They are required to properly close out the existing Burlington Landfill Site and to properly undertake the Phase I expansion.

Burlington Landfill Site - Design and Operations Report

Mr. Wells reviewed the contents of the above report which was submitted as Exhibit 16.

Waste Quantities and Characteristics

It was estimated that 104,000 tons of refuse from the City of Burlington and 229,000 tons from the Region would be generated in 1983.

The Georgetown site closed in October 1979 and the refuse from that area was diverted to the Oakville Site. If expansions are not approved then the Oakville Site would close in June 1980 and the Burlington Site in August 1980. With Phase I expansion and no Oakville expansion, the Burlington Site would be full in April 1981.

If the Oakville expansion is permitted and also Phase I expansion at Burlington, then the Burlington Site would have capacity through to May 1982 and the Oakville Site would close in August 1982.

With no Oakville expansion, but with Phase I and II expansion, the Burlington Site would be available until October 1982.

If Phase I and Phase II expansions, along with the Oakville expansion, are included then there would be capacity available at Burlington through February 1984, with Oakville closed in November 1982.

If a new Regional site is obtained then the life of the Burlington site under the above conditions would be extended to July 1985.

The proposed extension would be available to municipal and private haulers collecting wastes within the Region. Wastes from outside the Region would not be accepted. The solid wastes accepted at the site include domestic and household wastes, commercial, institutional and industrial wastes, and construction and demolition debris. Wastes not accepted at the site are pathological wastes, industrial chemicals and sludges, liquid industrial wastes, hazardous

and toxic wastes, septic tank pumpings, radioactive wastes and sewage sludge.

The control of wastes to the site would be the Region's responsibility. The site scalemen would be authorized to reject loads of restricted wastes.

Traffic Projections

Access to the site from the City of Burlington is by way of the King Road to a traffic light on the North Service Road and westerly on the North Service Road to the access to the landfill site.

A traffic survey was conducted by the Region during the week between Monday, February 26, 1979 to Saturday March 3, 1979. The hour of arrival for vehicles was recorded and the type of vehicle recorded.

From the survey (see Table 5 of Exhibit 16) Mr. Wells noted that there was a significant difference in the number and type of vehicles that use the landfill on weekdays versus Saturdays. The peak traffic was 20 vehicles in any one hour and that occurred twice during the study. This represents one vehicle every three minutes.

During the week a large percentage of the waste is brought to the site by the larger trucks. About 60% of the 128 vehicles to the site on any one day during the week are large trucks while on Saturdays only 11% of the vehicles are large trucks. The Burlington waste constitutes about one third of the waste traffic load in the Region.

On table 9 of Exhibit 16, the projected traffic to the site for 1983 was listed. Mr. Wells concluded that it is a relatively light traffic generator and it would not exceed the design capacity of Plains Road which is a four lane road.

Site Design

Mr. Wells noted that the site expansion was designed to meet the requirements of the Ministry of the Environment as well as to take into consideration the environmental and hydrogeological recommendations as outlined previously in this report.

A final contour plan was prepared with intentions of making a landform compatible with the surrounding topography and integrated into the contours of the existing landfill. The consultant utilized the natural site features to minimize the landform's visibility from adjacent properties. The final contours would incorporate a surface drainage concept which would minimize erosion and maintenance.

A base contour plan would establish the depth and grading of excavations. This design would permit a sufficient supply of earth cover to support landfill operations.

A conceptual design of the leachate control system was prepared based on the recommendations of the hydrogeological study.

The final contour plan and the base contour plan establishes the volume available for landfilling.

The site is or will be under the ownership of the Region of Halton. Once the landfill site is closed, the owner maintains responsibility for maintenance of the site facilities, such as the leachate system and continue to monitor the facilities. The entire site will be covered with a minimum of 2 feet of final cover material and will vegetate

the area. Also the Region would repair any problem areas resulting from erosion or differential settlement.

It was reported that the City of Burlington has expressed an interest in converting the site into parkland. The Region is prepared to provide the lands to the City for the development of a park.

The design capacity of Phase II expansion is 325,000 tons which would take about 18 months to fill. Phase I can accommodate 142,000 tons. Thus the total capacity of Phase I and Phase II is 467,000 tons.

Final Contour Design

In Exhibit 42, the final contours were outlined by Mr. Wells. It consists of a plateau sloping gently (1.5% slope) from the existing contours in the north part of the site to contours in the Phase I expansion area of the existing site. From this plateau, downward slopes facing east and west toward the ravines, and south toward the existing landfill will be graded at a maximum grade of 4 to 1. The landform in the existing site will obstruct the visibility of the expansion area operations from the south. From the west, a heavily wooded area; and from the east, a hedgerow, provide vegetative screening. Viewed from the north there will be little perceptible change in site topography.

Landfilling in the south part of the site will be generally above existing grades, while in the north it will be in deep excavations. The design for the expanded area makes use of additional capacity in the most northerly area on top of the Phase I expansion. It ties into the 170 meter

contour and comes to a maximum elevation at the most northerly section of the site of 180 meters.

The toe of the landfill slopes will coincide with the limit of the landfilling and will be set back a minimum of 10 meters (33 feet) from the brow of the ravine slopes to allow sufficient area for the construction of ditches, fences and swales.

Final contours will have minimum grades of 2% to promote drainage and maximum grades of 4 to 1 to minimize erosion and facilitate maintenance. Mr. Wells was confident that the expanded site would not be visible from Highway 403 since the site lines would be obstructed by filling that has already taken place on the existing site.

Base Contour Design

Mr. Wells outlined the base contours as noted on Exhibit 43. The base contours would be established so that the leachate collectors could be installed at minimum grades of 1.0%. Also a minimum of 1.5 meters of clay till overburden would be maintained over the Queenston Shale before refuse is deposited. There is only one location in the southwest corner where 1.5 meters is not available, therefore it would be necessary to add this amount before landfilling could take place. The base gradients would promote the flow of leachate to the leachate collector piping.

The site capacity would be maximized by providing landfill volume in site excavations. Sufficient earth cover would be provided from site excavations to supply an adequate amount of earth cover to support landfilling and site rehabilitation operations.

The bottom contour elevation at the north end of the

site would be 174 meters above sea level. The bottom grade slopes at a minimum grade of 2% to the south to a bottom elevation of 166 meters. The average depth of excavation would be 3 meters (10 feet) with a maximum of 7 meters (23 feet). About 303,000 cu.ft. of material would be excavated.

It is anticipated that landfill operations will continue from the existing landfill area to the Phase I expansion area and then onto the Phase II expansion area. Excavations at the Phase II expansion have been designed to provide cover material for both Phase I and Phase II since cover material is in short supply on the existing site. If Phase II is not approved then cover material would have to be imported for Phase I.

A 2 foot final cover will be provided on the site and a ratio of 4 refuse to 1 cover material has been estimated with an average refuse density of 600 kg per cubic meter (1010-lb. per cubic yard).

Surface Drainage

As previously noted, runoff draining over the Falcon Creek ravine slopes has eroded the clay till overburden and exposed the Queenston Shale.

The proposed drainage scheme was outlined on Exhibit 42. Perimeter ditches or swales would be constructed between the toe of the landfill slopes and the brow of the ravine and will discharge to natural site surface drainage features. The swale to the west of the operation would discharge to Falcon Creek immediately north of the North Service Road, while the swale to the east would drain to Indian Creek. These ditches and swales would be designed to minimize

silting and measures would be taken for protection against erosion. The maximum channel width would be 5.5 meters (15 feet).

Leachate_Collection_and_Disposal_System

The leachate collection system was outlined on Exhibit 43. It comprises parallel runs of 6-inch diameter perforated pipes installed in granular bedding in a trench below the bottom grade of the landfill with runs spaced at maximum intervals of 148 feet (45 meters). These pipes slope from east to west and drain to a solid leachate header collector located along the western perimeter of the landfill. This header pipe would be connected to the leachate collector system on the existing site. Manholes would be installed at both ends of each section of the collector piping for inspection, maintenance and monitoring.

The perforated collector pipes would be installed at least 0.3 meters (12 inches) below the base contour and a minimum of 0.5 meters (18 inches) of graded granular material would be placed over it to protect it from vehicle traffic, since these pipes would have to be installed before landfilling takes place. It would be a gravity system connected to the sanitary sewer system. The system would operate so that there would be no build-up of leachate within the landfill site.

Mr. Wells also described the drain leachate collector system that has been designed for the existing site and is now being constructed. This system was outlined on Exhibit 40. The system will control the surface discharge of

leachate from the existing landfill slopes. It comprises perforated pipes installed in a granular bedding at the toe of the landfill slopes. The collectors will lower the level of leachate below the surface of these slopes and prevent the break out through the layer of cover material.

The design of the system allows for the installation of two pipes, one above the other. A perforated pipe to collect the leachate and a solid pipe immediately below it to convey the collected leachate from manhole to manhole and eventually to the sanitary sewer system for treatment at the Burlington Skyway Sewage Treatment Plant. The route of the toe drain system is shown on Exhibit 40 and basically extends along the east, west and south toe of the landfill where it is conveyed in a collector sewer to the municipal sewer system. The use of the two pipes permits the system to function without interruption even if a section of the perforated pipe becomes plugged.

Mr. Wells believed that the installation of the toe drain system would help solve the leachate problems that are occurring at the existing site. He did not consider the installation of underdrains, similar to those proposed at Phase II, for the existing site to be feasible since large depths of refuse would have to be excavated.

If leachate did break out along the Falcon Creek valley walls, then the contingency plan of installing additional toe drain collectors below that location within the valley would be implemented. This leachate would then be pumped to the sewer system.

a 13-foot litter control fence would be installed around the proposed site expansion.

Detailed records of the landfilling operations would be maintained. These records would contain information on the amount and weight of refuse received, volume of material excavated and stockpiled, etc. Every 6 months aerial photos would be taken of the site and using computer techniques the contours would be plotted so that the volume of refuse landfilled and the remaining capacity could be calculated.

As indicated, the landfill site would be rehabilitated following the application of 2 feet of cover material and 4 to 6 inches of topsoil with seeding a vegetative cover to minimize erosion. A program of grass maintenance would be implemented on revegetated areas. The Region has had preliminary discussions with the City regarding the possible recreational use of the completed site. However, no decision in this regard has been made.

Monitoring

The monitoring program was outlined in Exhibit 11, entitled "Monitoring Program Report, Burlington Regional Landfill Site" by Gartner Lee Associates Limited. In this report a monitoring program was recommended for both ground and surface waters. There would be approximately 12 borehole sampling points around the existing and expanded site. The water quality in Falcon Creek would be monitored upstream, at the landfill area, and downstream of the site. No permanent gas monitoring was proposed since methane gas migration at the site was not considered to be a problem. Visual

observation of the vegetation could be made and portable gas probe sampling could be carried out once yearly during the winter months.

Conclusions

Mr. Perlin asked Mr. Wells if his design conformed with the recommendations of the Gartner Lee hydrogeological Study (Exhibit 19). Mr. Wells explained how his proposed design would meet all the concerns expressed in the hydrogeological report. Similarly, Mr. Wells outlined how his design dealt with the environmental concerns which were detailed by Mr. Stevens in his Environmental Analysis (Appendix A of Exhibit 16).

In addition, Mr. Perlin had Mr. Wells illustrate how the proposal would conform with Section 10 of Regulation 824, made under the Waste Management Act, which deals with requirements for landfill sites.

Mr. Wells did not believe that there would be any adverse impacts due to noise dust or visibility on the neighbouring properties, such as on those owned by Mr. Elstone or Mr. Johnson on the escarpment, due to the screening and buffer distances provided. Thus he suggested that the site should be recommended for approval.

CROSS-EXAMINATION OF MR. WELLS:

By Mr. D. C. Brown

Mr. Brown, Solicitor for the City of Burlington, questioned Mr. Wells whether the proposed leachate system would be able to handle leachate flows from Bayview Park which is the completed landfill located east of the proposed

site. Mr. Wells could not answer this question since there was no information presented regarding the quantity of flow of leachate emanating from the Bayview Park site. Also he noted that more time would be required to establish the volume of leachate from the proposed site so that the spare capacity in the proposed leachate system could be established.

Mr. Wells advised Mr. Brown that the purpose of the Region retaining the ownership of the site after it closed was so that perpetual care of the leachate system could be maintained and the necessary monitoring could be undertaken. He noted that passive recreational or open space use of the site would be permitted, however, under the Environmental Protection Act, if any other use within a 25-year period, which would include the construction of buildings, was contemplated, then special approval from the Ministry of the Environment would be required.

In response to questions from Mr. Brown about the depth of final cover, Mr. Wells reported that at least a minimum of 2 feet would be applied along with 4 to 6 inches of topsoil. He noted that it was possible that a larger depth of cover might be applied if the Region continues to permit clean fill being delivered to the site. In some cases the depth of final cover might approach 5 feet.

Mr. Wells reiterated his recommendation that only wastes outlined in his report be accepted at the site for landfilling.

Mr. Brown questioned Mr. Wells about his role as consultant for the proposed large Regional site known as site

"F" in the Milton area. It was noted that planning approval has been obtained from the Ontario Municipal Board for that site. Mr. Wells anticipated that the Region would be requesting a public hearing on site "F" by the Environmental Assessment Board in the fall of 1980. Site "F" could accommodate 2 million tons as compared to the 424,000 tons that Phase I and Phase II of the Burlington site can handle. Optimistically, Mr. Wells predicted that site "F" would not be available before the end of 1981 or 1982. Thus Mr. Wells advised Mr. Brown that Phase II was not a substitute or alternative to site "F".

By Mr. R. O. Elstone

Mr. Elstone, who owns the John McColl property to the north of the site, asked Mr. Wells about the status of refuse disposal in the Region after the Burlington site is closed in 1985 . The consultant advised Mr. Elstone of the status of site "F" in Milton which the Region was anticipating to have in operation prior to February 1984. Mr. Elstone expressed concern that if site "F" was not approved, then the Burlington site might be expanded to the east. Mr. Wells reported that there was no intention to make further expansions to the Burlington site at the present time, however, if an expansion were considered at a later date, then another public hearing would be required at that time.

Mr. Elstone questioned the consultant about reclaiming material such as papers, iron and steel. Mr. Wells informed Mr. Elstone that his firm was engaged by the Region in 1975 to undertake a resource recovery study. That study

recommended that the Region continue feasibility studies on a plant to process refuse into refuse derived fuel (RDF). In the past year the Region hired another consulting firm to look at resource recovery and reportedly their study confirmed the Dillon recommendations. Mr. Wells indicated that source separation programs in Burlington initiated by the Ministry of the Environment in the 1970's were not overly successful. The Region has an active solid waste committee which is continually reviewing this problem.

Mr. Elstone wanted assurances that there would not be an access road constructed to Phase II of the site from the north, that is, from King Road, which is much closer to that area than is the North Service Road. Mr. Wells noted that there is only a trail at the location which is not suitable for car or truck traffic. Also, since an entrance from the north would be off the escarpment steep grades would be involved. Thus Mr. Wells indicated that another entrance to the site was not considered since it would: affect the equestrian park in the area; be costly to upgrade for truck traffic; require more land acquisition; and require additional weigh scales and guard house. Further, a good quality access to the site is already available.

Mr. Elstone was concerned that he would be able to view from his residence the 20 to 30 foot high stockpile of topsoil which would be located on the land with an elevation of 182 meters. Mr. Elstone suggested that this stockpile should not be higher than the 30 to 40 foot height of the trees in the area. Mr. Wells indicated that problems would

probably develop if the topsoil were stockpiled any higher than that. Mr. Elstone suggested that topsoil would be flushed into Falcon Creek. Mr. Wells did not agree since it would be protected with a straw mulch.

Another concern of Mr. Elstone was the ability to exclude certain undesirable wastes from the site. Mr. Wells explained that many of these types of wastes are controlled at the source. Also the Ontario Government has introduced a "way-bill" system which requires that the waste be catalogued from its source by the generator until it is disposed of in a licensed disposal site. This form is then sent to the Ministry for their records. The site operator can also identify wastes that would not be acceptable at the site by noting the type of vehicle and container in which the wastes are delivered to the site. The Regional Municipality would be responsible for policing the site with respect to excluding the undesirable wastes which were listed in the consultants' report.

Another area of concern of Mr. Elstone was the indiscriminate dumping of refuse by the public on other persons' lands. Mr. Wells explained that providing a container outside the site gate for off-hours dumping has not been satisfactory in the past since this type of facility had been abused by commercial operators. He suggested that the gate area could be illuminated at night, and a guard posted to take licence numbers of vehicles involved in this illicit dumping. However, he believed that the provision of a container inside the gate was the best arrangement for

serving the public vehicles. The Region does not charge for refuse deposited in the containers at the site by private citizens. Also there are transfer stations located in the Region so that citizens do not have to drive all the way to the site to deposit their wastes.

By Mr. C. W. Johnson

Mr. Johnson, who owns property north of the proposed extension, questioned Mr. Wells about the height of the landfill in Phase II. It was noted that the landfill area is about 600 meters from King Road, about 1400 feet from the base of the escarpment, and 1600 feet from the brow of the escarpment. It was noted that 180 meter elevation for the final contour line of Phase II would be about 25 feet above the natural ground surface.

In regard to Phase I, it was noted by Mr. Johnson that this proposal would increase the final contours at the north extremity of Phase I where it connects to Phase II slightly above the previously approved contour of the Certificate of January 1980 of 172 meters, as shown on Exhibit 42. Mr. Wells agreed but noted that if Phase II is not approved, then Phase I would be closed as noted in the Certificate.

Mr. Johnson wondered if Site "F" is not approved then the Region might wish to increase the size of the Burlington site. Mr. Johnson was advised that if such an extension was applied for at a later date then another public hearing would be required at that time.

Mr. Johnson referred to Exhibit 20, the Parkway Belt West Plan of July 1978, regarding the designation of uses in

the "Complementary Use Area". It was noted that Phase II is in the above designated area. He questioned Mr. Wells about the designated use under that section. The consultant reported that it was a permitted use under the category of public use, such as public works. Mr. Johnson wondered if the height of land above the natural ground level would not be compatible with section 55(1)(b) iii of Exhibit 20. Mr. Wells believed that the rehabilitation of the site would enhance the open-space character of the land. He reported that he reviewed the height of land with the Burlington Parks and Recreation Department and it was found to be acceptable.

Mr. Johnson was concerned that the presence of the landfill next to his property would decrease the value of his land. Mr. Wells could not provide any information in that regard.

RE-EXAMINATION OF MR. WELLS BY MR. PERLIN

In re-examination by Mr. Perlin, Mr. Wells noted that a landfill could be defined as a utility type function since fees are collected for the services provided. Also it was noted that there is a transfer station at the closed Georgetown Landfill site so that residents in that area would not have to drive to Burlington to deposit their refuse.

EVIDENCE OF MR. R. O. ELSTONE

Mr. Elstone, the owner of the John McColl property, presented his views regarding the proposal. His main concern was that there are no assurances that the proposal will be carried out as designed. Thus his brief was in opposition to the extension.

His farm, called Woodhill Farms has one of the oldest buildings in Burlington on it dating back to 1833. It is a sheep farm located in the green belt. He stated that he did not believe that a landfill should be situated in the green belt area. He particularly wanted to ensure that the trees and the area are preserved.

One of his main objections to the landfill was the abuses of adjoining properties. Motorcyclists gain access to the property and have caused environmental damage to the wild flowers, the soil and the stream. He referred to the silt runoff in Indian and Falcon Creeks. When people come to the landfill site during off hours they consequently spread their refuse on the adjoining properities for miles around. Such items as mattresses, old refrigerators, etc. are reportedly dumped on surrounding properties. He did not know whether this situation was caused by the landfill being closed, or because of the \$3.00 fee for all refuse over 300 pounds.

He also complained about the noise from the bulldozer at the landfill site. When the bulldozers stopped, he claimed that the motorcycles took over the site in the evenings and on Sundays, and there are no regulations to stop them.

He reported that old cars were pushed over the bank into the stream bed. Trees were killed and the roots unearthed about them by the fill. The water in the stream, he contended, was no longer fit for livestock to drink. After a wind storm he reported that a tremendous amount of litter was spread from the landfill site as far away as Brant Street and the North Service Road. He also said that there was a very large fire at the site a month ago contrary to regulations.

The landfill attracts animals, especially dogs which cause problems with the sheep.

However, Mr. Elstone stated that if the Board believes that the landfill site extension should be approved, then very strict rules and conditions should be included in the approval so that it is done in a responsible manner. One of the conditions he suggested was that a strong high link fence should be installed instead of a farm fence because litter can be blown through it and motorcyclists can push it over. This fence should be constructed around the whole site and not just around the landfilling area. The Region should pass a by-law prohibiting the use of all-terrain vehicles on the property. Immediate steps should be taken to correct the erosion on the existing landfill area and the litter of neighbouring properties should be collected.

He complained about the state of the existing site since no vegetation has been started on it. Mr. Elstone suggested that the Region should work with the police to provide better control over the landfill site.

CROSS-EXAMINATION OF MR. ELSTONE BY MR. BROWN

Under cross-examination by Mr. Brown, Mr. Elstone advised him that beside being a sheep farmer he operates a stationery store in Burlington. He reported that his sheep farm property was purchased a year ago on September 5, 1979. He has 65 sheep on it. His principal residence is located in Ancaster near Hamilton, but reportedly he is selling that home because there is a garbage dump behind it.

Under cross-examination by Mr. Brown, Mr. Elstone stated that he has no objections to the proposed expansion providing

that it is done properly. In fact, he stated that it would be a very fine landfill if all Mr. Well's recommendations were followed. He felt much more assured since the hearing opened. He preferred to have a 50-foot buffer instead of the 30-foot one that is proposed. Also a higher and better fence than farm fencing should be installed. If the bulldozer works behind a mound as indicated by Mr. Wells, he believed that would make a tremendous difference with respect to noise levels.

Mr. Roger Muse, Mr. Elstone's farm manager, lives on the 91-acre sheep farm which is located immediately below the escarpment.

In discussing the motorcyclists on the land, it was noted that they gain access through the National Sewer Pipe Lands and then proceed to the adjoining properties. Mr. Brown advised Mr. Elstone that the City of Burlington is currently prosecuting them in court.

CROSS-EXAMINATION OF MR. ELSTONE BY MR. PERLIN

Mr. Perlin questioned Mr. Elstone about his statement that he had assurances prior to his land purchase in 1979 from Regional staff that Phase II expansion of the Burlington site would not be undertaken. However Mr. Elstone could not name the particular staff member who allegedly gave him that advice.

Mr. Perlin suggested that it would have been prudent for Mr. Elstone to have written the municipality for such information before he bought his property.

Under cross-examination by Mr. Perlin, Mr. Elstone reported that he was advised in July of 1979 that the site

would be closed in one or two years. Mr. Perlin suggested that since he subsequently bought the farm property in September, he was satisfied to live beside the landfill for one or two years, therefore two or three years more should not make much difference. Mr. Elstone disagreed.

Mr. Elstone advised Mr. Perlin that it was not the Region that was dumping garbage on the lands outside the landfill site.

EVIDENCE OF MR. C. W. JOHNSON

Mr. Johnson, who lives at 1761 Old Waterdown Road in Burlington, presented a brief that was submitted as Exhibit 45.

In his brief he suggested that the site extension appeared to contravene the Parkway Belt guidelines. However he was satisfied with Mr. Well's explanation that it was a public use in the complementary area.

He noted that additional height of the landfill was allowed to what had been planned. This additional height and size of the landfill, he claimed, created an environmental eyesore to motorists on Highway 403. Mr. Johnson also complained about the litter in the area. No one wants to live next to a landfill. Therefore he claimed that it would be difficult for adjacent property owners to sell their property at market value. He purchased his property in 1967. Mr. Johnson also complained about the all-terrain vehicles on the properties. He did not consider a farm fence effective in restricting their entry.

Noise and gas were more concerns of Mr. Johnson. Since he can hear the noise from the existing operations, he

believed that it would get worse since the extended site would be closer to his buildings.

On April 8th, 1980, he questioned Mr. Brown, the City Solicitor, about his concerns regarding the site extension.

Mr. Johnson suggested that the Region should purchase the adjoining properties from the landowners to provide a natural area that could be preserved. He believed that such a purchase would eliminate the property owners objections.

CROSS-EXAMINATION OF MR. JOHNSON BY MR. BROWN

Mr. Brown questioned Mr. Johnson about his visit to the solicitor's office on April 8. Mr. Brown suggested that the confusion about the 6 to 8 feet elevation difference which Mr. Johnson thought referred to the elevations of Phase II above the natural land, probably referred to the differential elevation between Phase I and Phase II. Mr. Johnson did not agree with Mr. Brown's explanation.

Mr. Johnson stated that he was satisfied with the consultants' explanation of the proposal at the hearing.

ARGUMENT BY MR. BROWN

Mr. Brown, the City of Burlington Solicitor, stated that the City's portion was outlined in the Resolution dated August 27, 1979, Exhibit 22. In that resolution the City of Burlington approved of the acquisition of the land for the expansion of the Regional landfill site, subject to four conditions. The first condition related to the payment of costs by the Region for upgrading the North Service Road. The second related to the submission to the City of the consultants' reports regarding the site. The third condition

referred to the non-acceptance of liquid industrial waste, sewage sludge, or hazardous waste at the site. The last condition recommended that the lands not be acquired until all environmental approvals are received.

Mr. Brown was satisfied that all four conditions have been met or will be met by the Region and therefore he asked that the Board recommend approval of the application. He noted that the Region has agreed to the exemption of the list of wastes on page 7 of Exhibit 16 and thus these should be excluded from the Certificate of Approval.

ARGUMENT BY MR. PERLIN

Mr. Perlin, the Regional Solicitor, reviewed the applicant's evidence. He noted that the Region has the statutory responsibility for refuse disposal for the 260,000 residents in the area. At the present time there is capacity in the Region only until the spring of 1981. The Oakville expansion has not yet been approved.

The Solicitor noted that the Region is working on a long-term waste management policy that has a number of components; source separation, resource recovery, transfer facilities and landfilling. Landfilling is still an important component of the waste management program. The status of the long term site "F" near Milton was reviewed by Mr. Perlin and he noted that it continues to receive strong opposition. He also noted that a private owner has expressed interest in developing a landfill on the National Sewer Pipe property to the east of the existing Burlington landfill site.

Mr. Perlin noted that 5 alternatives were studied in the M. M. Dillon Limited report on the interim waste disposal program. The NATCO Quarry, the Milton Brick yard, the existing Georgetown Site, the existing Oakville site, and the existing Burlington site were investigated. He reviewed the reasons that have previously been discussed in this report for selecting the proposed expansion Phase II of the Burlington site, noting that this is just an interim measure until the long-term solution of site "F" can be initiated.

Mr. Perlin reviewed the evidence presented by Mr. G. Anderson in his hydrogeological report. He noted that leachate and gas can be controlled so as not to adversely impact the environmentally sensitive area, the Sassafras Woods, the creeks, and the surrounding properties. There would be an underdrain system on the expansion, a toe drain system, and continuous monitoring.

The monitoring program outlined in Exhibit 11 has already been submitted to the Ministry in connection with Phase I expansion, and it has been expanded to include Phase II.

He noted that Mr. Wells confirmed that there would be an underdrain system, a toe drain system along the base picking up the leachate and conveying it to the existing toe drain system in the existing site, and then to a sanitary sewer on the North Service Road and hence to the Skyway Sewage Treatment Plant in Burlington.

The creek boundaries would act as a natural barrier and prevent leachate and gas from migrating to adjacent

properties. Therefore Mr. Johnson and Mr. Elstone would not be affected.

Mr. Perlin argued that the landfill is a permitted use, as a public use in the Parkway Belt Plan.

In regard to Mr. Steven's environmental evidence, Mr. Perlin noted that the landfill extension would not adversely affect the ecosystem which was identified by Mr. Stevens to include the environmentally sensitive area, the Sassafras Woods. He pointed out that Mr. Stevens was satisfied that all his environmental recommendations had been respected in the engineer's design for the site expansion.

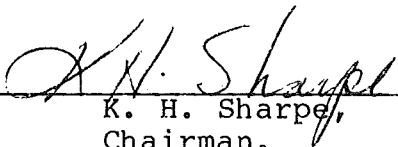
Mr. Perlin believed that Mr. Well's evidence met all the concerns of the other witnesses.

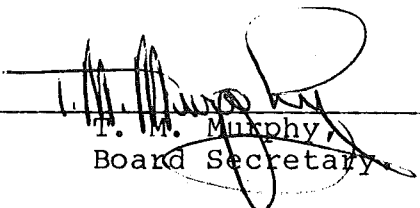
He noted that Mr. Johnson's lands are located in the special complementary use area of the Parkway Belt Plan which substantially affects his ability to market his land. Mr. Perlin argued that there was no expert evidence that the landfill site was established in 1972 before the Parkway Belt Plan came into existence in 1973.

In regard to Mr. Elstone's claim that he was advised by someone verbally that the site expansion would not take place, Mr. Perlin indicated that all the evidence presented by the applicant confirmed the Region's intentions to proceed with the project. In any case, he suggested that Mr. Elstone should have obtained such information in writing.

Mr. Perlin noted that representatives of the Conservation Authority were not present to argue their request for a 50-foot buffer. Therefore he concluded that it

2. Liquid industrial and toxic wastes as outlined in consultants' report are not accepted in the landfill site.
3. An adequate monitoring program is implemented.


K. H. Sharpe,
Chairman.


T. M. Murphy,
Board Secretary.

June 19, 1980



Ministry of the
Environment

Ontario

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APPLICATION FOR A CERTIFICATE
OF APPROVAL FOR A WASTE
DISPOSAL SITE

APPENDIX A

Legal Dept. -

IMPORTANT NOTE: This form must be submitted through the office of the Regional Waste Management Engineer See back of form for instructions for completing this form.

1. Owner (Applicant)	Under the Environmental Protection Act and the Regulations, this application is made by:—	Regional Municipality of halton (Name) 1151 Bronte Road Oakville, Ontario (Address) L6J 6E1
2. Type of disposal site	For the Reissue Issue of a Certificate of Approval for a	Landfill Site
3. Site location	Located	Parts of Lots 3 and 4 Conc. 1 and 2 Township of East Flamborough (now City of Burlington)

IF APPLICATION IS FOR REISSUE, COMPLETE SECTIONS 4 AND 5 (A OR B)

4. Previous Certificate details	Certificate of Approval:— Provisional Certificate for this site was issued on:—	No. 197
5. Changes.	(A) The following changes in use, operation or ownership (have occurred since the date of the original application) OR (are proposed) (B) No change in use, operation or ownership of the site has occurred since the date of the original application.	☐

IF APPLICATION IS FOR ISSUE, COMPLETE SECTIONS 6 AND 7.

6. Operator.	The site will be operated in conformity with the Environmental Protection Act and the regulations by:—	Public Works Department (Name) Regional Municipality of Halton 1151 Bronte Road (Address) Oakville, Ontario L6J 6E1
7. Additional information	The required supporting information to this application is attached.	☒

Dated this 14th day of January 1980

Signature of Owner/Applicant - Per: R.W.J. Moore, P
Director of Public Works



Environment

Ontario

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File A -

210102

APPENDIX A

SUPPORTING INFORMATION TO AN APPLICATION FOR APPROVAL OF A LANDFILL DISPOSAL SITE

APPLICANT TO COMPLETE ITEMS 1-4 INCLUSIVE

1. Site Details

APPLICANT

Regional Municipality of Halton

SITE LOCATION

Parts of Lots 3 & 4, Conc. 1 & 2
Township of East Flamborough (Now
City of Burlington)

TOTAL AREA OF SITE

169 ACRES

TOTAL AREA TO BE UTILIZED FOR WASTE DISPOSAL

72 ACRES

ANTICIPATED LIFETIME

3 YEARS

DISTANCE TO NEAREST WATERCOURSE

250 FT.

DISTANCE TO NEAREST POTABLE WELL WATER SUPPLY

2000 FT.

DEPTH OF WELL NOTED AT LEFT

- FT.

DISTANCE TO DWELLING

2000 FT.

DISTANCE TO PUBLIC ROAD MEASURED FROM WORKING AREA

1700 FT.

DISTANCE TO CEMETERY

- FT.

DEPTH FROM ORIGINAL SURFACE TO BOTTOM OF WASTE

15 FT.

DEPTH FROM ORIGINAL SURFACE TO TOP OF FILL

25 FT.

GROUND CONDITIONS ENCOUNTERED MEASURED FROM ORIGINAL SURFACE

Top Soil FROM 0 Ft. TO 0.7 Ft.

Clayey Silt FROM 0.7 Ft. TO 25.6 Ft.

Till FROM - TO -

Shale FROM 25.6 Ft. TO 45.9 Ft.

DEPTH TO WATERTABLE BELOW SURFACE

15 FT.

ON (DATE)

23 July 1979

GENERAL DESCRIPTION OF SITE (LOCATION, TOPOGRAPHY, ETC.)

Landfilling has been carried out on 55 acres of the existing 96 acre Burlington Landfill. The expansion property (62 acres total-17 acres for landfilling) slopes to the southeast at 3-12% grades.

PROPOSED USE OF LAND AFTER SITE FULLY UTILIZED

Open Space
(Agricultural and Recreational)

2. Wastes to be disposed of comprise

DOMESTIC	%	AGRICULTURAL WASTE	- %
COMMERCIAL	66 %	HAZARDOUS WASTE	- %
INDUSTRIAL WASTE	30 %	HAULED SEWAGE	- %
HAULED LIQUID INDUSTRIAL WASTE	- %	OTHER Dry	4 %

*DESCRIBE

Construction and Demolition

ORIGIN AND COMPOSITION OF PRINCIPAL COMPONENTS OF WASTE (OTHER THAN DOMESTIC AND COMMERCIAL)

Manufacturing and Industrial Process.

FOR REGIONAL OFFICE USE

Authorities consulted:

HEALTH UNIT

OBJECTION

NO OBJECTION

A.M.B.

MUNICIPALITY

CONSERVATION AUTHORITY

SANITARY ENGINEERING

INDUSTRIAL WASTES

WATER QUANTITY

OTHER

Inspection Record Forms attached Yes ☐ No ☐

Number of Forms

Regional Engineer's Report attached ☐

REQUIRED

AVAILABLE

Ground Water monitoring Yes ☐ No ☐ Yes ☐ No ☐Surface Water monitoring Yes ☐ No ☐ Yes ☐ No ☐

3. Quantities

TOTAL TONS PER DAY

TOTAL GALLONS PER DAY

739 (1983 projection)

ESTIMATED ☒

OR MEASURED ☐

8:00am-5:30pm-Mon/Fri.

SITE OPENED 6 DAYS

FROM 8:00am to 4:00pm-Sat.

POPULATION SERVED 260,550

NAMES OF MUNICIPALITIES SERVED

Regional Municipality of Halton

OFFICIAL PLAN ☐ Parkway Belt West Plan ZONING BY-LAW ☐

SITE LAND ZONED Regulatory exemption granted April/79.

ADJACENT LAND ZONED Complementary Use.

EQUIPMENT OWNED ☐RENTED ☒

4. The following documents are attached

1. Burlington Landfill Site - Design and Operations Report, January 1980 by M.M. Dillon Limited
Mr. Dillon

2. Hydrogeological Study - Proposed Burlington Landfill Site Expansion. January 1980 by Gartner Lee Associates Limited.
Paul Gartner

The Regional Municipality of Halton
PREPARED BY

Per: R.W.J. Moore, P.Eng.,
Director of Public Works

DATED

January 14th, 1980

SIGNATURE OF OWNER (APPLICANT)

LIST OF EXHIBITS

1. Regional Municipality of Halton Act - Section 131 (2) & (3)
- 2(a) General Long Term Solid Waste Policies of Region - Expressed Through Council Resolutions.

(b) Main Map of Adopted Regional Plan.

(c) Map 6 of Regional Official Plan - Environmentally Sensitive Areas.
3. Resolutions - Medium and Long-Term Landfill Component Expressed Through Council Resolutions.
4. Regional Resolution dated July 5, 1978.
5. Interim Waste Disposal Feasibility Study by M. M. Dillon dated September 1978.
6. Regional Resolution dated September 6, 1978.
- 7(a) Oakville Portion of Interim Waste Disposal Feasibility Plan - Planning Approval.

(b) Environmental Approval for Oakville Site.

(c) Land Acquisition for Oakville Site.
8. Survey Plan of Burlington Site - Plan 20R-4648.
9. Approved Contour Map of Burlington Site before expansion of Phase I & II approval dated August 1979.
10. Ministry of Environment - Certificate of Approval dated January 31, 1980 for Phase I and modifications to existing Burlington Site.
11. Gartner Lee Associates Ltd. Report - "Monitoring Program - Burlington Regional Landfill Site for the Regional Municipality of Halton." Dated April 1980.
12. Report by M. M. Dillon dated October 1979 - "Burlington Landfill Site - Phase I Expansion."
13. Implementation of Phase I Program.
14. Report by M. M. Dillon dated February 1979 - "Review of Waste Quantities and Characteristics."

LIST OF EXHIBITS (cont'd)

15. Application for a Certificate of Approval for Phase II Expansion of the Burlington Site.
16. Report by M. M. Dillon dated January 1980 - "Burlington Landfill Site - Design and Operations Report."
17. Sheet with corrections to Exhibit 16.
18. Burlington Landfill Capacity Scenarios.
19. Burlington Landfill Site Hydrogeological Study dated September 1979 by Gartner Lee Associates Ltd. for M. M. Dillon.
20. The Parkway Belt West Plan - July 1978.
- 21(a) Land Use Regulation made under The Parkway Belt Planning and Development Act 1973.

(b) Ontario Regulation 263/79.

(c) Letter dated May 31, 1979, from Mr. F. S. Miller, Treasurer of Ontario to Regional Chairman Mr. J. Raftis.
22. Resolution approving request to acquire land for Burlington Landfill Site extension, dated August 27, 1979.
23. Agenda and Minutes of Development Committee Meeting, August 20, 1979.
24. Letters re: Regional Co-operation with City of Burlington.
25. Letters re: Consultation with Halton Region Conservation Authority.
26. Letters re: Consultation with present owner of lands on which expansion would take place and which Region would acquire if environmental approval received.
27. Résumé and summary of hydrogeological evidence of Mr. G. Anderson.
28. Résumé of Denis Stevens, Senior Ecologist of M. M. Dillon.
29. Summary of Qualifications of Wallace Fredric Wells, P. Eng. of M. M. Dillon Ltd.
30. Regulation 824 of Environmental Protection Act.

LIST OF EXHIBITS (cont'd)

- 31(a) Plate 1 of Exhibit 19 - Site Plan.
- (b) Plate 2 of Exhibit 19 - Physical Setting.
- 32(a) Plate 6 of Exhibit 19 - Geological Cross Section A-A.
- (b) Plate 7 of Exhibit 19 - Geological Cross Section B-B.
- (c) Plate 8 of Exhibit 19 - Geological Cross Section C-C.
- 33(a) Plate 4 of Exhibit 19 - Ground Water Regime
(Water Table)
- (b) Plate 5 of Exhibit 19 - Ground Water Regime (Bedrock).
- 34(a) Plate 9 of Exhibit 19 - Ground Water, Section A-A.
- (b) Plate 10 of Exhibit 19 - Ground Water, Section B-B.
- (c) Plate 11 of Exhibit 19 - Ground Water, Section C-C.
- 35(a) Plate 13 of Exhibit 19 - Ground Water Chemistry
Section B-B.
- (b) Plate 14 of Exhibit 19 - Ground Water Chemistry
Section C-C.
- 36. Plate 2 of Exhibit 16 - Ownership Map.
- 37. Drawing A of Exhibit 16 - Aerial Photo.
- 38. Mounted Chart - Burlington Landfill Site Environmental
Analysis Process.
- 39. Phase I and Phase II Site Facilities and Leachate
Collection System.
- 40. Plate 7 of Exhibit 16 - Phase I Site Facilities and
Leachate Collection System.
- 41. Plate 3 of Exhibit 16 - Final Contour Plan.
- 42. Plate 6 of Exhibit 16 - Phase I - Final Contours.
- 43. Plate 4 of Exhibit 16 - Base Contours and Leachate
Collection System Plan.
- 44. Plate 5 of Exhibit 16 - Site Operations.
- 45. Brief by Mr. C. W. Johnson dated April 22, 1980.

