

IN THE MATTER OF an application
by the City of London to establish
a sanitary Land-fill site in the
Township of Westminster, Ontario

DATE: July 30th, 1973

HELD AT: Lambeth, Ontario

VOLUME 1

OFFICIAL REPORTERS
NETHERCUT & COMPANY LTD.

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TORONTO
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Nethercut & Co. Ltd.

Toronto, Ontario

ENVIRONMENTAL HEARING BOARD

IN THE MATTER OF an application
by the City of London to establish
a sanitary landfill site in the
Township of Westminster, Ontario.

HEARD BEFORE:

John Root	Chairman
D. Aubrey Moodie	Vice-Chairman
H. E. Brown	Member
H. Browne	Technical Adviser
T.A. Murphy	Secretary

Hearings held at Lambeth United
Church Auditorium, Lambeth, Ontario
On Monday the 30th day of July, 1973.

APPEARANCES:

Geo. F. Plaxton, Q.C.	For the Corporation
Roland J. Haines	of the City of
	London

A.C. Wright	The Westminster
J.W. Sifton	Anti-Landfill
	Committee

Nethercut & Company
Official Reporters,
44 York Street,
Toronto 116, Ontario.



1 --- Upon commencing at 10:45 a.m.

2 THE CHAIRMAN: I wonder if we can have --
3 I am speaking right into the microphone. This is a
4 hearing held by the Environmental Hearing Board at
5 the request of the Executive Director of Air and Land
6 Pollution Control of the Ministry of Environment. The
7 City of London has made an application to establish
8 a landfill site in the Township of Westminster.
9 Before a Certificate of Approval can be issued a
10 hearing must be held and we have been asked to hold
11 this hearing.

12 On my right is Mr. Aubrey Moodie,
13 Vice-Chairman of the Hearing Board. On my left is
14 Mr. Hugh Brown, a member of the Board. On my extreme
15 right is Mr. Harold Browne who is our Technical Advisor,
16 Administrator and Engineer. On my left, extreme left
17 is Mr. Tom Murphy, Secretary of the Hearing Board.
18 My name is John Root and I am Chairman of the Board.

19 Following the hearing we will report
20 to the full Hearing Board and go over the evidence,
21 comments presented here today. Incidentally, we are
22 taking a recording of what is said. There is a
23 stenographic reporter, as you may have noticed. The
24 Hearing Board will go over the contents of the evidence
25 presented here and we will prepare a report and make
26 a report and may make recommendations to the Executive
27 Director. We will see whether this application should
28 be allowed.

29 The purpose of this hearing is to get
30 the views of the people from the City of London why



1 | this particular site and how they intend to operate it.
2 | Following their presentation the hearing will be
3 | opened for questions or comments relevant to the
4 | proposals. Before we proceed with the hearing, I'm
5 | going to ask Mr. Harold Browne to check whether the
6 | required notice has been advertised.

7 | MR. BROWNE: Thank you, Mr. Root. As
8 | required by the Act, on July 6th, 1973 registered
9 | correspondence was directed to Mr. Kirk the Clerk
10 | of the Township of Westminster indicating the
11 | hearing and also the plan or proposal which he has
12 | retained in his office. In addition, the various
13 | registered correspondence was directed to Mr. Ross
14 | Haines of London acting for the proposal also re-
15 | questing that plans for the proposal be retained in
16 | his office so that the ratepayers could view it.

17 | In addition, registered correspondence
18 | was directed to adjoining property owners on July 6th,
19 | 1973. Also the notice for the hearing was advertised
20 | in the London Free Press on July 12th, July 19th, and
21 | July 26th. In addition, the notice was also ad-
22 | vertised in the Lambeth News Star on July 12th, 19th
23 | and 26th.

24 | THE CHAIRMAN: It appears that the
25 | proper notice was given so we will proceed with the
26 | hearing. I'm going to ask Mr. George Plaxton who
27 | I believe is going to explain the project and the
28 | location so we will know. Following his explanation,
29 | he may be calling witnesses but I'm not sure how he
30 | is going to proceed, the hearing will be opened for



1 questions or comments relevant to the proposal and
2 I would like the name of anyone speaking just for the
3 record for when we report back to the full Board. If
4 you are representing an organization, the name of the
5 organization you are representing. I have before me
6 a number of people whose names have indicated they
7 wanted to speak. I'm going to ask you when you speak
8 to come to the microphone which will make it much
9 easier for the stenographer who is taking down what
10 you say if you speak into the microphone in that
11 corner. He is sitting over at the table here.

12 MR. WRIGHT: My name is Wright, initials
13 A.C., and I'm representing the Westminster Anti-Land-
14 fill Committee. I would request the Board give me
15 permission to examine and question any of the witnesses
16 Mr. Plaxton puts in, as I am acting in opposition, if
17 I may.

18 THE CHAIRMAN: You are asking for the
19 right to question each witness?

20 MR. WRIGHT: Yes.

21 THE CHAIRMAN: I think -- I presume
22 this hearing will go on longer than was thought and
23 it might be fair to do it that way.

24 MR. WRIGHT: Thank you.

25 THE CHAIRMAN: Mr. Plaxton, I believe
26 you wish to speak.

27 MR. PLAXTON: Thank you.

28 THE CHAIRMAN: I believe the reporter
29 would like you to spell your name so we will get
30 the right spelling.



1 MR. WRIGHT: W-R-I-G-H-T.

2 MR. PLAXTON: My name is Plaxton, Mr.
3 Chairman, and I am here with Mr. Haines from our
4 office. We represent the City of London. I was
5 going to introduce ---

6 A SPEAKER: We can't hear, Mr. Chairman.

7 THE CHAIRMAN: They can't hear in the
8 back, they say.

9 MR. PLAXTON: Can you hear me now?

10 THE CHAIRMAN: Can you hear?

11 A SPEAKER: It is better.

12 MR. PLAXTON: My name is Plaxton and I
13 have Mr. Haines here. We are with a law firm in the
14 city representing the City of London in this appli-
15 cation. I was going to introduce Mr. Wright who
16 just introduced himself a moment ago. He is from
17 the firm of Wright and Whaley and Mr. Rick Arnold
18 is here as well as counsel. He is with the firm of
19 Cram and Blackwell.

20 Now, Mr. Chairman, the application in
21 question is one for a Certificate of Approval under
22 the Environmental Protection Act authorizing the
23 use of land for a landfill site. The lands in ques-
24 tion comprise about 405 acres and are located in the
25 Township of Westminster between Concession Roads 6
26 and 7. They comprise parts of lots 18, 19 and 20.
27 The configuration of the site or site location first
28 of all is shown on the first easel to your left and
29 to my right. The diagram there indicates the locat-
30 ion of the City of London as the dark blue area enlarged



1 by annexation by the lighter blue area adjoining it.
2 The site itself is shown in red to the south and some-
3 what to the west of the centre of the city. I have
4 personally driven from the City Hall to the site, which
5 I did last week, and I measured the distance by auto-
6 mobile and the distance from the City Hall firstly
7 along Wellington Road to the south limit of the city
8 is five miles plus or minus very little. From that
9 point to the site is four miles, taken to the south-
10 east corner of the site where the proposed entrance
11 to the site would be. The total distance, therefore,
12 from City Hall which is roughly the centre of our
13 city is nine miles.

14 The site in question is shown on the
15 second Exhibit and outlined in red. I will stand
16 up to indicate the boundaries of the site, but before
17 I do I should indicate that the north is -- to the
18 north is a concession road. There is one complete
19 concession surrounded by roads depicted on that easel
20 which is a topographical aerial photograph. On east
21 or the right-hand side of the aerial photograph is
22 Wellington Road. On the south is Concession Road #7.
23 To the north is Concession Road #6. To the west is
24 the White Oaks Side Road. References will be made in
25 the evidence to these various roads, particularly
26 Wellington Road and the proposed access road which
27 is the Concession 7 road at the south or bottom of
28 this Exhibit.

29 I would like to stand up and just in-
30 dicate the boundaries of the site, Mr. Chairman.



1 we are giving or alternatively we could go right into
2 the evidence.

3 THE CHAIRMAN: What would you like
4 to do?

5 MR. PLAXTON: I could outline the
6 nature of the evidence we propose to give.

7 THE CHAIRMAN: I think it would be
8 rather helpful to people who may want to question
9 you later on if it won't take too long.

10 MR. PLAXTON: Thank you, Mr. Chairman.
11 Before I do that, I perhaps could bring to the attent-
12 ion of the public, and I am sure the Board is aware
13 of this but the public may not be, and that is the
14 legislative approvals that are hereafter required.
15 This hearing, as I understand it, is to deal with
16 the technical requirements of a Certificate of
17 Approval based upon the suitability of the site and
18 engineering and in fact from engineering and environ-
19 mental points of view. The Chairman has indicated
20 a function of the Board is to report to the Board
21 in total. The Board in turn reports the total of
22 their recommendations to the Executive Director of
23 the Waste Management Branch of the Ministry of the
24 Environment. The Executive Director then may or may
25 not issue the Certificate of Approval. If in fact
26 he issues the Certificate of Approval, the city is
27 then bound by the circumstances of this case to apply
28 to the Ontario Municipal Board for the approval of the
29 Board in reference to a number of matters. These deal
30 with the site if in effect the Board authorizes the



1 acquisition of the lands by the city. It also would
2 authorize presumably, if they are satisfied with the
3 application, of course, the rezoning which would be
4 necessary to accompany the use of the land intended
5 and there may be necessity to have debentures of the
6 city to acquire the lands, if this is approved by
7 the Ontario Municipal Board. Those are the approvals
8 that would be required to enable the city to undertake
9 this landfill site.

10 This hearing is one of two and it
11 is dealing with the issuance or not of the Certificate
12 of Approval. The evidence of the city will deal with
13 the following matters, subject to the approval, of
14 course, of the Board at all times: we intend to
15 ask the Board to allow us to show a film which in-
16 dicates how a landfill site is operated. We think
17 that the film is useful from the point of view of
18 giving some indication of how a site is operated to
19 the public. It also will indicate some of the
20 expressions which will come up in the evidence and
21 give the people a better understanding of what is
22 meant in the technical evidence to follow.

23 Then I propose to refer to the
24 certificate of Mr. Ross, the Clerk of the City of
25 London. This forms part of the brief and is in
26 fact Exhibit B to the brief. This certificate
27 refers to the action that has been taken by the city
28 in bringing this application to the extent we have
29 to date, the action taken over the years leading to
30 a proposal for the acquisition of the landfill site.



1 In addition, and more importantly,
2 this certificate refers in detail to the standards
3 of operation recently adopted by the city with respect
4 to the operation of a landfill site. These standards
5 are set out and, Mr. Chairman, we had 100 copies here
6 this morning. We handed them out at the door and I
7 am sure everyone has a copy, but if they don't, we
8 would be delighted to run off more.

9 Then, following that, we would deal
10 with the evidence of Mr. Brian Dowse, D-O-W-S-E. Mr.
11 Dowse is with the firm of H.Q. Golder and Associates
12 who are sub-soil investigation engineers and are well
13 known for that work. Mr. Dowse will be referring to
14 the investigations conducted by his firm and giving
15 evidence concerning sub-soil conditions, geology in
16 the area generally and other related matters.

17 We will then come to the evidence of
18 James F. MacLaren Limited given by Mr. Victor Morris
19 who is a professional engineer with that firm. This
20 will refer to part of the very bulky report and in-
21 formation gathered by these engineers as city advisors.
22 He will, in his evidence, be referring to much of the
23 planning that he has in mind for the development of
24 this site. He will also outline such things as the
25 site selection, how it was brought about, he will
26 comment briefly on soil conditions, existing soil
27 topography, site design and I fear he will get into
28 it in some detail on engineering design, how it will
29 be developed over the years and how it will be operated.
30 He will be referring as well to the standards of the



1 city which were recently adopted.

2 There are a number of Exhibits which
3 will be placed on easels and some of which are already
4 on easels which will indicate the nature of the develop-
5 ment. These Exhibits are placed on the wall along
6 here, and, of course, the crowd is invited to take a
7 look at them during the break in the hearing, and to
8 ask questions as they arise.

9 I would appreciate it, however, if each
10 witness could be allowed to give his testimony on
11 behalf of the city and each witness would then be
12 available for examination by those who wish to ask
13 questions.

14 The next witness would be from the
15 city staff, Mr. Jack Morgan who is in charge of
16 traffic for the city. He will be testifying as to
17 traffic conditions, both present and anticipated.
18 Then we do have Mr. Roze with the firm of (inaudible)
19 Belt & Harrington Ltd., who will give evidence concern-
20 ing the planning considerations applicable to this
21 use. We further have a Mr. L.R. Webber, Professor
22 Webber from the University of Guelph, Department of
23 Soil Sciences. This application, I think, differs
24 from any one I have heard before. The city's appli-
25 cation does involve a proposal for the return of
26 this land to agricultural use. Professor Webber
27 has been consulted on the matter and has prepared
28 an extensive report and he will be giving evidence
29 concerning the return of the land to agricultural
30 use.



1 We then propose calling two engineers
2 from the City Engineering Department. These gentle-
3 men -- Mr. Robertson will be the first and Mr.
4 Rowntree, the City Engineer, will be the last. Mr.
5 Robertson will give evidence concerning the operation
6 of the site, how he would visualize it actually
7 operating, and referring as well in his evidence to
8 the standards of the city recently adopted. These,
9 of course, are the Environmental Protection Act itself
10 and regulations thereunder.

11 We then propose calling the City
12 Engineer who will deal with questions related to the
13 policy of the city concerning the development of a
14 site of this nature and future anticipated efforts
15 of the department with regard to other methods that
16 may be employed from time to time to deal with waste
17 and matters of like importance.

18 This would complete our presentation
19 and I would ask for the right to make a representation
20 personally more or less to gather together all the
21 evidence we have heard on behalf of the city. As
22 well I gather at that point before I would make my
23 submission I gather it would be the pleasure of
24 the Board to hear from the opposition, to hear witnesses
25 they may wish to call and if they will I will ask to
26 cross-examine those witnesses if new issues arise.

27 At the conclusion of all this we would
28 propose making a submission. As I have said, an
29 argument, and with respect my friends should do the
30 same. The hearing would then be concluded. This is



1 the outline, Mr. Chairman, that I have.

2 THE CHAIRMAN: Thank you, Mr. Plaxton.
3 I said in my first comments that we would try to keep
4 these hearings informal so that there may be people
5 who are not represented by counsel who may want to
6 ask questions and we will entertain that. We don't
7 swear people. We presume that they are honourable.
8 We do make it possible for individuals to ask ques-
9 tions, as you know.

10 MR. PLAXTON: Yes. That would be at
11 the conclusion of the evidence given by each witness
12 for the city and then they would be open to examinat-
13 ion by individuals?

14 THE CHAIRMAN: Yes, we give them all
15 that right. Do you now want to proceed with the
16 questions?

17 MR. PLAXTON: Yes. The first item
18 on the presentation is the film. This will take
19 approximately 23 or 24 minutes. It is set up and we
20 are ready to go. I would like to proceed with that
21 now.

22 MR. WRIGHT: I am wondering if we could
23 get the movies and films out of the way right off the
24 bat. We have some slides. We could show our client's
25 slides immediately following this presentation.

26 THE CHAIRMAN: It may warm up in here
27 and just if you want to take your jacket off, feel
28 free.

29 MR. PLAXTON: We do not propose to make
30 any comments during the course of our film.



1 --- (Film presentation)

2 A SPECTATOR: Boo!

3 MR. WRIGHT: Mr. Chairman, these pictures
4 are photographs that were taken by Mrs. Joyce Sifton
5 who is a member of our group and they were taken at
6 the landfill site as presently proposed. On June 7th
7 and June 17th of this year these pictures were taken
8 by her. There will also be some slides in here of
9 the proposed site at ground level. I don't propose
10 any comments be made. I think the pictures will
11 speak for themselves.

12 THE CHAIRMAN: During the last present-
13 ation I was watching the film and I heard some inter-
14 jections. People were applauding the presentation.

15 Go ahead.

16 --- (Slide presentation)

17 MR. WRIGHT: Would it be all right for
18 Mrs. Sifton to make some comments?

19 MRS. SIFTON: The pictures don't say
20 very much, unless -- it must be very difficult for the
21 person who is taking the record.

22 MR. WRIGHT: Yes.

23 THE CHAIRMAN: Do you want to number
24 your slides?

25 MR. WRIGHT: They have been numbered
26 and we will put the names to them later on in the
27 hearing.

28 THE CHAIRMAN: All right.

29 MRS. SIFTON: This slide was taken over
30 at the sanitary landfill site at Parkside. This shows



1 the culvert taking the water away from the road down
2 to the river.

3 This shows the other side of the culvert
4 and you can see the two types of water draining into
5 this culvert. It is going down to the river.

6 This shows a closeup of the kind of
7 water that you see in this area. The ground shows a
8 softness here where the water has been coming out.

9 That is a side view. We have it in
10 wrong. It shows the other side of the waterway, the
11 drainage culvert.

12 This is a closeup of a culvert that
13 is taking this water that is a milky colour and this
14 is where it comes from. This goes right through the
15 culvert.

16 This bulldozer was bulldozing earth
17 that was a bluish colour. Our camera didn't show this
18 up.

19 This shows a greenish-yellow substance
20 and when we smelled it in this area it smelt like a
21 battery acid build-up. In the upper left-hand corner
22 the fluid draining out of the side of the hill came
23 down into the drainage culvert.

24 This is another picture of the fluid
25 coming out of the side of the hill and draining down
26 into the drainage culvert.

27 When we first visited this site on
28 June 7th, there were piles of sewage piled all over
29 the area here. The second time we came back, a little
30 less than a week later each one of these piles had been



1 piled up in a deep pile and banked.

2 This is the sewage fluid that runs down
3 from these little heaps and collects in that pond at
4 the bottom. You can see the darker colour.

5 This is a sewage truck unloading.

6 This shows the covered garbage.

7 A SPECTATOR: Oh!

8 MRS. SIFTON: This is another picture
9 of the covered garbage.

10 This shows the drainage trench on the
11 north side. You can see the debris and also there
12 is no berm and there is no screen for the people who
13 live in the background up on top.

14 This is a close-up of the water found
15 in a drainage culvert in this area.

16 This is another close-up showing the
17 kind of debris you find.

18 This is all along.

19 This shows the kind of litter and
20 garbage that is being piled up at Parkside site after
21 a packing truck has unloaded. The paper was floating
22 around and blew all over the site and off.

23 This shows another part of the drainage
24 culvert.

25 This is a view from River Road looking
26 onto the site from River Road. Across this area there
27 is no fence except a snow fence.

28 This is the Commissioner's/s/site. This
29 site has been closed since December of 1971.

30 This shows the residue that was left



1 after the water passed through.

2 This is covered garbage and it also
3 shows that people still dump.

4 This is again a side view which is
5 turned around showing the residue after the water
6 flows through or the fluid.

7 This shows in the background -- this
8 was taken on June 13th -- a car was there for 20
9 minutes dumping.

10 This shows the fluid that comes out
11 of the hillside at the Commissioner's Road site.

12 This is a close-up of another part of
13 where it is coming out of the hillside. You can see
14 the bubbles.

15 This shows near the top where there
16 is a wet line and this is where the fluid is starting
17 to come through the hill again where they have covered
18 up for this.

19 This is a picture showing the rivulets
20 made by the fluid running down the hillside.

21 This is another side view again. You
22 can see the swamps are being joined from higher up
23 on the hill as well.

24 This is the type of fluid.

25 This shows the fluid coming out of the
26 grass in the hill which will be made into parkland.

27 This is a side view again. At the top
28 there it shows no grass grows on the top and it also
29 shows the water erodes the hill and exposes garbage.

30 This is a view from our house showing the



1 land in the background that is going to be used.

2 This is a view from Earl Hogden's on
3 the corner of the south concession. The barn in the
4 background will be left but just the other side of it
5 is the site area. That is the same picture.

6 This is another view of the same area.

7 This is a view from Bill Facey's looking
8 back onto the site area.

9 --- (Applause)

10 MR. PLAXTON: We would like to address
11 a number of remarks to the pictures that were just
12 shown. We anticipated they would show pictures of
13 this kind and we do have copies.

14 Before that, however, we will be
15 following the order of our presentation and Mr.
16 Robertson will be commenting on the descriptions
17 that were given with the pictures as an engineer.

18 Dealing with the next item, Mr. Chairman,
19 which was to review briefly the activities of the
20 Council of the City of London related to this appli-
21 cation or leading to a landfill site of this kind, I
22 might say there were further activities related to
23 the Ontario Municipal Board application. We didn't
24 feel those activities should be included in this
25 application. So, the first item, Mr. Chairman, is
26 action taken by council on October 20th, 1969. The
27 evidence will show that the City Engineers Department
28 first sought to undertake studies and so on within
29 its own fraternity in the fall of 1968, but about a
30 year later, after extensive work was done and a number



1 of consultants came to the city and made proposals,
2 action specifically was taken by council to adopt
3 terms of reference for the appointment of a consult-
4 ant. The terms of reference appear in Appendix B
5 and while I don't wish to read them at length, I
6 simply wish to indicate that methods of disposal,
7 including landfill, but others as well, were to be
8 investigated. The actual work which was undertaken,
9 Mr. Chairman, by the MacLaren Company, environmental
10 engineers, that action was authorized by council in
11 November, November 20th, 1969. On August 4th, 1970,
12 an interim report of the consultants was submitted
13 to the Board of Control and council. Council adopted
14 that report on that date and had instructed as well
15 or authorized, the same consultants, to prepare a
16 report with respect to the detailed design and other
17 services required for the development of sanitary
18 landfill sites.

19 The report in question forms part
20 of the evidence and has been handed to all parties
21 concerned and was handed out with the brief.

22 Then in October, 1970, a more complete
23 report embodying recommendations about sites was made
24 by James F. MacLaren and adopted by council in May
25 of 1971. Much activity went on at city meetings and
26 the report itself was not adopted until the following
27 May.

28 Then in that report, Mr. Chairman, it
29 recommended site W-12. We are dealing here with
30 site W-12A. The evidence will show site W-12 originally



1 was a site lying to the north of the north part of
2 the concession road appearing on the photograph, the
3 topographical photograph. For reasons which will be
4 made clear, the site W-12 was found to be not suitable
5 from the point of view of water pollution, the potential
6 for that which would occur and it was abandoned in
7 favour of site W-12A.

8 Then on February 6th, 1973, following
9 these investigations with respect to ground and soil
10 conditions, it was determined that site W-12 was
11 inappropriate and that site W-12A was appropriate.
12 The council adopted a resolution indicating their
13 intention to seek to apply in effect for the approvals
14 for site W-12A. James F. MacLaren Limited, consulting
15 engineers, were authorized to proceed with the detailed
16 design for the waste disposal at this site.

17 On April 2nd, 1973 council adopted a
18 resolution authorizing an application to the Minister
19 of the Environment, Waste Management Branch, with
20 respect to a request for the issuance of a Certificate
21 of Approval and that is now how this meeting came about,
22 in furtherance of that application.

23 On July 3rd, 1973, council adopted the
24 following policy with respect to sanitary landfill sites
25 of the City of London. Mr. Chairman, I have handed
26 out copies of this policy to the crowd. I don't know
27 whether everyone has a copy. If there are further
28 copies required, perhaps they could indicate at the
29 break by coming to my table and we could note their
30 name and get them a copy after lunch. In the meantime,



4

1 this is a set of standards which are by way of
2 addition to whatever the normal law requires. I
3 think, Mr. Chairman, for the benefit of the crowd I
4 would like to explain that they are rather detailed
5 operational regulations. They affect the operation
6 of a landfill site and were passed under the Environ-
7 mental Protection Act. The provisions of the Act
8 and the regulations apply to give the Waste Manage-
9 ment Branch of the Department of the Environment very
10 wide authority and discretion in respect to the manner
11 in which and standards by which a landfill site is to
12 be operated. What is set out here is simply in
13 addition to the normal law and the city is instructing
14 its engineers in effect to adopt these methods in
15 connection with the landfill site.

16 Now, Mr. Chairman, the evidence will
17 show these are not static recommendations. They will
18 be reviewed and from time to time updated to reflect
19 more recent practices. The policy statement here is
20 in effect an undertaking to the community and the
21 neighbourhood given by the City of London with respect
22 to the manner in which this site will be operated. If
23 they have^{had} difficulties with respect to older sites, I
24 would like to point out the evidence will show that
25 the sanitary landfill method is a recently adopted
26 method. It hasn't been in practice for that long and
27 new methods have been found to eliminate some of the
28 problems that were depicted in the films shown here.
29 These methods, I might say, operational standards were
30 prepared by James F. MacLaren Limited in consultation



1 with the city engineers and the two working together
2 produced a code of conduct or method of operation
3 which will give some reassurance to the neighbours
4 in the area.

5 The first item deals with buffer strips,
6 including roadways, water courses and feedback shall
7 be shown on the plans. More detail than this will be
8 given by the witnesses.

9 Existing surface features are to be
10 preserved where possible and recorded on plans. The
11 witnesses can be asked about that.

12 The fencing will be fully described
13 and the nature of it and the security of the area, and
14 the kind of fencing in question will be fully des-
15 cribed.

16 There will be an under-drainage system
17 for the collection of the leachate. This is a
18 technical expression referring to water which emanates
19 out of a garbage area. It is polluted frequently or
20 it may not be, depending on the circumstances. That
21 is the kind of water which you see collected and re-
22 moved from the site. You will hear the evidence
23 concerning that.

24 Then, Mr. Chairman, the standards call
25 for ground and surface water monitoring programs.
26 These are programs that are not only required by
27 the standards, but by the normal law to which I made
28 earlier reference. The evidence will show that city
29 officials will attend at various monitoring points,
30 including all wells in the immediate vicinity of the



1 site. They will be doing this every two weeks,
2 collecting samples of water and taking them to four
3 different labs for testing. The evidence will show
4 that these labs then produce one report together in
5 consultation and in effect distribute the results to
6 various governmental authorities, including the
7 Medical Officer of Health of the County of Middlesex,
8 the City Engineering Department, James F. MacLaren
9 Limited and the Waste Management Branch of the
10 Provincial Government. The tests are made for a
11 number of things and we will discuss that in the
12 evidence.

13 Then connected with that point, Mr.
14 Chairman, if there should be found to be some adverse
15 effect to the supply of water, notwithstanding the
16 of best efforts/engineering and science to produce a more
17 satisfactory result, we refer to the policy appearing
18 on page 11 of the brief under No. 3.

19 It deals with the policy of the city in guaranteeing
20 an adequate supply of potable water to supply homes
21 presently having wells adjacent to the site. We will
22 talk about that policy and the way the guarantee will
23 affect them and exactly how it works. This will
24 include, of course, any pollution effect, although it
25 is hoped it will not in the light of what we are doing,
26 that could emanate from the site.

27 The remainder, Mr. Chairman, seems to
28 describe the way in which daily activity will be
29 conducted on the site and it gives instruction as to
30 how the operation will be run. I will submit, Mr.

Potable
water
guarantee



1 Chairman, that this part of the brief should form an
2 Exhibit in this case. It is certified by the clerk
3 as action taken by the City of London and it is rather
4 lengthy. I hesitate to read it all. I would ask those
5 who are here to give this matter a fair consideration,
6 that they read the matter throughout. Unfortunately,
7 it is so long that I don't feel I should read it, but
8 from this you should be able to determine the efforts
9 that will be put by the city for a proper operation.

10 Now, Mr. Chairman, I would like to call
11 the first witness. We were referring to Mr. Dowse's
12 evidence earlier. He is with H.Q. Golder and Associates.

13 THE CHAIRMAN: You are going into detailed
14 explanation now?

15 MR. PLAXTON: Yes.

16 THE CHAIRMAN: Would it take very long
17 or would this be an appropriate time for an adjourn-
18 ment?

19 MR. PLAXTON: Whatever you feel, Mr.
20 Chairman. I think he will be at least half an hour
21 giving specific evidence and then my friends may wish
22 to cross-examine him.

23 MR. WRIGHT: I am wondering if there
24 will be anybody from the city I could ask questions
25 of (inaudible). There are things I think were left
26 out. I'm wondering if I should ask Mr. Roze or some-
27 one from the city.

28 MR. PLAXTON: I don't propose calling
29 Mr. Roze unless my friend would indicate what he has
30 got in mind.



1 MR. WRIGHT: Mr. Chairman, I have two
2 particular deletions that I think should be raised.
3 One is a letter from the Kettle Creek Conservation
4 Authority, dated July 20th ---

5 MR. PLAXTON: First of all, we will be
6 getting into that evidence. That is not action taken
7 by the City Council. There is all kinds of corres-
8 pondence and reports and we intend to get into the
9 pertinent correspondence relating to this application
10 with the city engineer. That letter does not con-
11 stitute action taken by the City Council. What we
12 are setting up here does.

13 MR. WRIGHT: Perhaps my friend will call
14 someone who will -- Township of Westminster (inaudible)
15 co-operation ---

16 MR. PLAXTON: We will get into that as
17 well.

18 MR. WRIGHT: My third thing is I think
19 there are serious objections raised as to why the
20 City of London chose a year and a half site and one
21 month later opted for this site when this was not one
22 of the sites initially studied.

23 MR. PLAXTON: You can ask that in
24 cross-examination.

25 MR. WRIGHT: Of whom?

26 MR. PLAXTON: Of the city engineer.

27 MR. WRIGHT: Thank you.

28 THE CHAIRMAN: Then I think we will
29 adjourn for lunch and resume at 2:00 o'clock.

30 --- Luncheon adjournment



1 --- Upon resuming at 2:10 p.m.

2 THE CHAIRMAN: Ladies and gentlemen,
3 our apologies for the delay. Please proceed, Mr.
4 Plaxton.

5 MR. PLAXTON: Before we proceed with
6 the first witness, I would suggest that we hand out
7 the standards of the city to those who have not
8 received them yet. We have had more copies done
9 over the lunch hour. Mr. Haines will distribute them.
10 If you do not have a copy of the standards of the
11 City of London, will you please put up your hand?

12 Mr. Chairman, if you would like to
13 proceed, I will call the first witness, Mr. Brian
14 Dowse.

15 BRIAN DOWSE, called:

16 EXAMINATION BY MR. PLAXTON:

17 Q. Mr. Dowse, would you speak into
18 that microphone?

19 A. I will do my best. Is it on?

20 Q. What is your full name?

21 A. Brian Edward Wesley Dowse, D-O-W-S-E.

22 Q. And you reside in London?

23 A. Yes, I do.

24 Q. What is your occupation?

25 A. I am a professional engineer
26 specializing in geotechnical engineering.

27 Q. What firm are you employed with?

28 A. I am an associate of the firm
29 of H.Q. Golder Associates Limited which has an office
30 in the City of London. I am manager of Golder Associates



1 office in London.

2 Q. How many years have you been
3 with the Golder firm?

4 A. I have been with Golder Associates
5 for 11 years and six of these -- seven of these were
6 in the City of London as manager of their office.

7 Q. Can you indicate to the Board
8 the nature of your educational background and experience?

9 A. I am a graduate engineer of the
10 Community College in Scotland where I got my commerce
11 degree in civil engineering in 1960. I obtained a
12 post graduate fellowship at the University of
13 Illinois and a masters degree from that university
14 in 1961 specializing in soil mechanics/structural
15 engineering. Since that time -- after a brief
16 period of working in the States, since 1962 I have
17 worked for Golder Associates in Ontario and Quebec
18 and overseas for a period of a year and since 1966
19 in London, Ontario.

20 Q. Thank you. Can you indicate
21 what experience you had with similar landfill projects?

22 A. I have been involved in geo-
23 technical and soil investigation at 10 refill sites
24 in Southwestern Ontario. These include sites in
25 Essex County, Lambton County, City of London and the
26 surrounding townships, Strathroy, Woodstock, Cambridge.

27 Q. And can you indicate when your
28 firm first was called to assist the investigation into
29 sites for the City of London?

30 A. My firm was first approached by



1 James F. MacLaren on behalf of the City of London
2 in September of 1962.

3 Q. 1962?

4 A. Sorry -- 1972. At this time
5 James F. MacLaren were examining the possibilities
6 of a site, W-12, and they asked our company to put
7 down three bore holes at that site.

8 Q. Will you refer to the Exhibit
9 right behind you to indicate where W-12 was located?
10 I believe it is on the top end.

11 A. This general area here (indicating).

12 Q. To the north and somewhat to the
13 west?

14 A. Part of it extends over this end.

15 Q. Would you care to continue then
16 in relation to your investigation in regard to that
17 site?

18 A. Site W-12 in September of 1972,
19 we put down three bore holes. They extended to
20 depths of 95, 93 and 40 feet, respectively in the
21 three holes. All the holes encountered very pervious
22 sands, gravel, or sands and gravels with very thin
23 layers of clay material inbetween the sand layers.
24 At the conclusion of drilling these holes we re-
25 ported the factual results to James F. MacLaren.

26 Q. Having regard to your experience
27 with the soil conditions there, could it be used for
28 this purpose or not?

29 A. Based on my experience from a
30 geotechnical point of view site W-12 did not appear to



1 be very satisfactory for a development as a landfill
2 site because of the very pervious nature of the sub-
3 soil below the proposed landfill site.

4 Q. This pervious nature of the soil,
5 would it therefore be good as a sanitary landfill
6 operation site?

7 A. This would allow leachate to
8 filter down into the base of the landfill site and possibly into
9 other land sources of gravel.

10 Q. Yes. What was the next -- before
11 you go into that, perhaps you could describe for the
12 Board the general overview as an expert of the geo-
13 logical condition of the soil generally in the area?

14 A. I will do this in relation to
15 a geological map of the area which is presented over
16 here.

17 Q. Thank you.

18 A. This is a general view of the
19 glacial geology in the area of the City of London
20 and particularly the south side of the City of London.

21 I will point out a few features here
22 which I think everybody can recognize.

23 Q. Before you continue, would you
24 pull the easel out so the crowd who are sitting to
25 the right and to the back of the room can see it?

26 A. Can everybody see that?

27 Q. I think so.

28 A. This is the river, the point
29 the north and south branches of
30 downtown where the Thames River meet. This is the
new Westmount development, Commissioner's Road, South



1 Kent Road, Wellington Road running north and south,
2 401 running through here and the proposed landfill
3 site as shown here in the 6th Concession of Westminster
4 Township. The whole area of Southwestern Ontario has
5 been controlled geologically by the action of glaciers
6 in the past. From the evidence the area has been over-
7 ridden by enormous thicknesses of ice in the geological
8 past which has laid down the various soil conditions
9 which you would find in the city and the townships
10 around the city. I will point a few of these out so
11 you can recognize them.

12 The areas which are coloured in purple
13 are the bog holes or peat swamps which we get in the Pond
14 Mills /and Walker Pond area and various areas around to the
15 south of the 401. There is another one up just north
16 which is known as System Bog.

17 Q. Can you show us where 401 would
18 cross that?

19 A. 401 crosses there (indicating).
20 It is a little hard to see from a distance.

21 Q. And the subject site is where?

22 A. Right there (indicating). It is
23 on the far right. The areas shown in blue are very
24 coarse deposits of granular material which we re-
25 cognize we get in the barren area and we get in
26 the Lambeth area and various other isolated areas.

27 The deposits marked in yellow are
28 very recent river deposits or elluvial deposits
29 and these follow the major water courses, any streams
30 you get in the area.



1 The areas marked in orange are granular
2 deposits as well and you can see there is one immediate-
3 ly north of the site. These are deposits which are
4 laid down under stagnant ice conditions. When the
5 glacier stops moving, deposits are laid down and we
6 get a development of this type. The same thing occurs
7 on Commissioner's Road,
8 /just at the end of Adelaide Street. The areas marked
9 in brown are flat, glacial lacustrine or pond deposits.
10 You get that in downtown London and normally you find
11 sands with quite a bit of silt in them. They occur in
12 sand deposits that are quite big.

13 The area marked in green which is a
14 significant soil type in the London area is a plastic
15 impervious clay till. It is very heavy loam which
16 we know exists in this area here (indicating) and
17 within the site itself. This material, because of
18 the way it was laid down, can be in places 100 feet
19 thick or over, it can be interbedded sometimes with
20 deposits which I have marked here in orange so that
21 you get a sequence of strata which vary from clay
22 with thin layers of sand and then more clay and thin
23 layers of sand. Basically these are the six different
24 types of soil which are found in the area of London.
25 You will see here the site is located in a band of
26 heavy plastic impervious clay.

27 We have examined this in relation to
28 existing well lots from the various water wells which
29 have been drilled in the area and these two sections
30 here (indicating) represent a cross section, two
cross sections which have been constructed through the



1 -- here is the landfill site just about where they
2 intersect, and this is the terrain you get through
3 the area. This extends about seven miles across. It
4 begins at Lambeth and extends away south of the site.
5 This is on a large scale, a cross section drawn
6 through the site. The green is the clay, the same
7 clay I referred to here (indicating) and the sand is
8 interbedded strata of sand which exists with clay on
9 top and clay below but in occasional areas daylight
10 and this is what is up here where the sand has
11 daylighted. The same can be seen here. It is a
12 very indefinite outline. These have been based on
13 the records of actual wells which have been drilled
14 in the area. To give you an idea of the pattern of
15 soils through the site, the landfill site is located
16 just about in the middle of each of these sections.

6

17 Q. When was your firm first re-
18 tained in this matter?

19 A. We were retained to -- this is
20 W-12A?

21 Q. Yes.

22 A. We were retained in November,
23 October or November of 1972 to carry out an investigat-
24 ion at the W-12A site.

25 Q. And what investigation did you
26 undertake?

27 A. We undertook initially to put
28 down one deep bore hole and this was followed up
29 later with additional bore holes at the site as the
30 geological and soil conditions became apparent. I



1 | could demonstrate this on the map where the bore holes
2 | were put down.

3 | Q. Yes, I would appreciate that.

4 | A. Looking at the site here, we have
5 | a plan which is orientated the same way. North is up.
6 | These are the locations of the bore holes. Bore hole
7 | 101, which is around this area here (indicating), bore
8 | hole 102, which is on this boundary of the site, bore
9 | hole 103, in the north part of the site and bore hole
10 | 104 and bore hole 201. These were put down over the
11 | period of our investigation.

12 | Q. Would you care to comment on the
13 | findings of each bore hole?

14 | A. Yes. I think these were pre-
15 | sented in three reports. For the record the first
16 | report was presented in October, 1972, which dealt
17 | with the first bore hole.

18 | The second report was presented in
19 | November-December, 1972, which dealt with bore holes
20 | 102 and 103 and 104.

21 | The third report was presented in June,
22 | 1973, which dealt with bore hole 201. I have some
23 | cross sections drawn up here which indicate the soil
24 | conditions which were found across the site.

25 | I will keep those two exposed because
26 | I think by referring backwards and forwards between
27 | these two we can see how we found almost exactly the
28 | same soil conditions as one would have predicted on
29 | the basis of this information beforehand. In other
30 | words, the green in both diagrams representing a



1 pervious clay and the yellow represents potential
2 pervious strata. Bore hole 101 which you remember
3 was in the middle of the site was the deepest of the
4 bore holes and extended a depth of 169 feet.

5 This extended a total depth of 169 feet.
6 I will go into that in detail in a minute.

7 Bore hole 102 doesn't appear on this
8 particular section but basically the soil conditions
9 were the same. Bore hole 103, where the soil conditions
10 are even better, there was only one very small thin
11 layer of sand.

12 Bore hole 104 which shows upwards of
13 50 feet of impervious clay and sand strata.

14 Bore hole 201 showed approximately
15 30 feet of impervious clay over the sand strata.

16 I should mention that in putting down
17 these bore holes the purpose was threefold. Firstly,
18 to determine the exact sequence of soil conditions
19 that exist at / site and ^{the} secondly in determining the
20 water conditions which exist in the aquifers and thirdly
21 in measuring the permeability of the soil. Permeability
22 in simple terms is the velocity at which water will
23 flow through the soil.

24 Q. In the course of your investigat-
25 ion did you develop permeability patterns?

26 A. Yes.

27 Q. If so, what were your findings
28 in that regard?

29 A. This is a blowup of bore hole
30 101 where we get approximately 70 feet of impervious



1 clay. The coefficient of permeability in that strata
2 was measured at one divided by 10 million. In other
3 words, in engineering terms, one times 10 to the
4 minus seven centimetres per second. Putting this
5 into other terms, that is equivalent to a water
6 velocity of about .1 of a foot per year.

7 In the sand strata and in this sandy
8 silt till we measured the permeability at 1/10,000ths
9 of a centimetre per cent which related to a velocity
10 in normal measurements is 100 feet per year. In
11 other words, water will flow through that at a rate
12 of 100 feet per year under normal pressure. The
13 water will flow through this strata at the rate of
14 .1 inch per year under normal pressure conditions.

15 These permeabilities were obtained
16 from carrying out field permeability tests and also
17 by carrying out water tests and the values related
18 to them.

19 Q. Can you describe the level at
20 which you encountered what you called aquifers and
21 perhaps before you do that you could describe to the
22 Board and the audience here what the term "aquifer"
23 means?

24 A. Aquifer in simple terms is an
25 underground source of water. In this particular
26 bore hole which is the deep one put down in the
27 centre of the site to determine initially the overall
28 conditions at the site, we measured two different
29 water table conditions. In this upper aquifer here,
30 we measured a water table which was up here which is



1 about 30 feet below ground surface.

2 In the lower aquifer shown here in
3 blue, we measured a water table which is in round
4 figures 120 feet below the ground surface.

5 Q. When you speak of an aquifer
6 I get visions of caverns under the ground with water
7 flowing through them like a stream. Would you des-
8 cribe precisely what is an aquifer?

9 A. Aquifer can occur in caverns
10 but it normally occurs in a porous media. The more
11 porous the material, the more abundant the supply of
12 water. Where we have coarse sand and gravel, we can
13 get more water out of that than fine sand. It is
14 basically a granular material with voids between the grains
15 of sand or gravel and in the voids the water exists.
16 You put extraction equipment into that and pump the
17 water out for use.

18 Q. You described two aquifers.
19 Could you relate this in terms of their size over
20 the topographical map which is number one?

21 A. Right. If we relate these two
22 sections together, this aquifer which has been proven
23 by literally 20 or 30 tests, you know, in two directions
24 with a total of maybe 100 drill holes. All these
25 lines represent known wells or bore holes or test
26 holes in the area. The total known dimension of this
27 is at least seven miles and the very minimum average
28 thickness is about 25 or 30 feet, which means that
29 the capacity of this aquifer is probably something
30 in the order of about 30 billion cubic feet of water



1 potentially.

2 Q. Is that the upper or the lower
3 aquifer?

4 A. This is the upper aquifer. The
5 lower one will occur here. In some places it will
6 be in the rock and some places there will be sand and
7 gravel over the rock. That would probably be 180 or
8 200 feet deep.

9 Q. That is where bedrock is found
10 in this general area?

11 A. Yes. It will vary, but in round
12 figures 180 to 200 feet is the average depth of a
13 deep well that goes into bedrock.

14 Q. Are you familiar with the general
15 nature of the development or proposal for the develop-
16 ment of this site from an engineering standpoint, how
17 it would be done?

18 A. Yes, I am. I have been involved,
19 as I said before, in geotechnical development of at
20 least 10 different landfill sites and I have inspected
21 sites after they have been in operation and I am
22 reasonably familiar with the operations.

23 Q. You are familiar with the extent
24 to which it is intended that the City of London's
25 engineering plans, if they were approved on this site,
26 would dig into the site from the surface?

27 A. Yes, I am. I understand there
28 will be an excavation from eight to 10 feet deep.

29 Q. Can you relate that to the extent
30 to which there would be impervious material lying beneath



1 the level of eight to 10 feet beneath the upper level
2 as we now see the land?

3 A. Yes. The most critical area I
4 feel is down near bore hole 201. I will present
5 another display here.

6 Q. Why do you say that is the most
7 critical area?

8 A. Because it is the thinnest
9 amount of impervious clay between the base of the
10 excavation and the top of the upper aquifer. That
11 dimension was 16 feet.

12 Q. And in the other instances they
13 were greater than that?

14 A. You can see here, the dimension
15 here is one inch to 10 feet. Here it is about 80 feet
16 of total material so there would be 50 to 60 feet of
17 impervious clay. Over here there would be 30 to 35
18 feet and here there might be 30 feet. At this
19 location here the thinnest amount is and the landfill
20 site happens to be deepest at that part as well. There
21 is a minimum of 16 feet of cover below the deepest
22 excavation and the top of the aquifer.

23 Q. You gave your earlier assessment
24 of the permeability of the soil. How long might it
25 take for liquids lying at the bottom of this excavat-
26 ion which you are saying is nine feet to in fact
27 penetrate into the 16 feet of impervious clay material
28 lying beneath?

29 A. Yes, I have. I demonstrated over
30 here the conditions that I have taken. I took a fully



1 saturated sanitary landfill. The 16 feet which is the
2 absolutely worst condition you can have on a site,
3 the known permeability of the soil which we have both
4 calculated / from field tests and confirmed in laboratory
5 tests, and the length of time for the first drop of
6 water to go from the lowest part of the excavation to
7 the highest possible part of the aquifer is 150 years.
8 In other words, from the time the landfill site goes
9 into operation until at this rate of 1/10th of a foot
10 per year, the water from the site percolates down to
11 the sand fill will be 150 years.

7

12 Q. What significance does that have
13 to you as an engineer in recommending or not re-
14 commending this site for landfill?

15 A. It demonstrates that the clay --
16 how impervious it is and how in fact this very type
17 of clay is used as a sealant for things like frying
18 pots in the petroleum industry or toxic waste pots
19 in other industry. We are dealing with a very, very
20 impervious type of soil.

21 Q. Are you assuming there would be
22 a certain head on the water?

23 A. Yes, in this calculation we ^{natural}
24 did assume rain water falling on the ground and a/head
25 of water which would be pushing the water into the
26 ground which is probably not a condition we will get.

27 Q. How much of a head?

28 A. In the base of the landfill site
29 you potentially could have 10 feet of head, but under
30 working operations, once the fill has been in operation,



1 the amount of water getting into the fill because of
2 the cover provided would probably be very minimal so
3 we would just be dealing with water which is generated
4 by the garbage itself.

5 Q. And that was taken into account
6 in arriving at your calculations?

7 A. Yes, the head of water in that
8 it was the worst condition and we assumed the worst
9 conditions.

10 Q. Can you describe the nature of
11 this soil from the standpoint of the use of this soil
12 at other locations for the purpose of introducing an
13 impermeable layer for other applications?
/I'm thinking for example of industrial applications?

14 A. We have used it on projects where
15 there have been need to seal off ponds of toxic waste
16 and this sort of thing from the ground water in the
17 area and we have been involved in design where one to
18 two feet of this type of clay have been used as an
19 actual seal to protect the ground water in the area.

20 Q. These are toxic wastes of a kind
21 that by other evidence we will show are not amenable
22 to a landfill site because they constitute hazardous
23 materials. Is that right?

24 A. I believe they are forbidden on
25 this particular site.

26 Q. So 16 feet compared to two feet
27 in that application constitutes what kind of protection in your
28 opinion?

29 A. It constitutes at least eight or
30 nine feet of protection that you -- 16 feet constitutes



1 | eight or nine feet of protection.

2 | Q. What is your opinion as to the
3 | suitability of this site for the purposes intended
4 | having regard to the potential for water hazard, that
5 | is to say, water pollution?

6 | A. Based on my experience working
7 | with other sites I consider this to be an ideally
8 | suited site for -- from a geotechnical point of view
9 | for development as a landfill, sanitary landfill site
10 | in that no leachate from the landfill will percolate
11 | into the ground at such a slow rate.

12 | Q. Out of the 10 sites of which
13 | you have had previous experience where would you
14 | categorize this site from the point of view of
15 | suitability for landfill purposes?

16 | A. I would have to put it in the
17 | upper two or three. Two sites which I had seen where
18 | you have better soil conditions would be in the
19 | Lambton-Hamilton area where the clay cover was over
20 | 100 feet thick and the Essex County area where the
21 | clay cover is probably 50 or 60 feet thick. We are
22 | talking in very relative terms. The protection that
23 | we have with the clay cover here in my experience is
24 | more than adequate.

25 | Q. To what extent are you personally
26 | aware or have you formed an opinion on the leachate
27 | lying at the bottom of the excavation about nine
28 | feet beneath the top level of the soil and it percolates
29 | for a period of 150 years and penetrates through the
30 | upper water aquifer would there be a cleansing effect



1 or not with respect to leachate as it passes through
2 the soil that you have described, that 16 feet of
3 impervious soil?

4 A. I don't think I'm in a position
5 where I can give any expert testimony on that. In my
6 experience I would expect the majority of impurities
7 to be removed after that period of time.

8 MR. PLAXTON: Thank you very much,
9 Mr. Dowse. If you stay where you are, my friends have
10 some questions.

11 EXAMINATION BY MR. WRIGHT:

12 MR. WRIGHT: If I can be heard here, ladies
13 and gentlemen, because I have been told I could not
14 be heard.

15 Q. On your permeability tests, what
16 consideration did you people give to possible smear
17 effect in the test section during testing?

18 A. We carried out our permeability
19 tests using what is known as a falling head method
20 of testing in the field. This involves inserting a
21 casing into the ground with a known head of water on
22 it and measuring the rate at which the water percolates
23 into the ground. This is back calculated through
24 various formulae to come up with a coefficient of
25 permeability. In the laboratory we related the grain
26 size, the distribution of the grain size particles in
27 the soil and, if you have seen copies of this on your
28 desk, you will see the clay content in this clay material
29 is over 50% in some cases. It never drops below 30%
30 and the values we got from our field tests are completely



1 consistent with the laboratory tests, so there was
2 very good correlation and also our experience with
3 this type of head tended to confirm this.

4 Q. In your calculations did you
5 take account of the fact that when you were boring
6 down you would be disturbing the strata and therefore
7 reducing the permeability?

8 A. When we tested we were testing
9 undisturbed soil, the base of the hole rather than ^{the}sides.

10 Q. My question is did you take that
11 into consideration when you were testing permeability?

12 A. Yes.

13 Q. Why wasn't that in your report?
14 Why didn't you say so in your report?

15 A. Because this is a detail we
16 don't normally mention in our reports.

17 Q. Are there any other details you
18 know of that you don't normally mention?

19 A. No.

20 Q. What about -- you didn't mention
21 talking about taking account of the fine sediment that
22 might build up on the sides of your bore holes?

23 A. I think I mentioned a minute ago
24 that we didn't do a test through the side of the bore
25 hole. We did it through the base.

26 Q. You are taking out sediment with
27 water and you run it out. At the bottom where you
28 are drilling through all this impermeable clay there
29 is going to be clay sediment in that water and even
30 when it runs clean there is still going to be some clay



1 in it?

2 A. There is sediment in there but in
3 the length of time it takes to carry out a permeability
4 test in the field the only sediment you get is sediment
5 which is coarser than the clay material, so this has
6 no bearing on the permeability test results. You are
7 testing through a coarser material and measuring the
8 permeability of the finer material behind any sediment
9 that drops to the bottom because all the fine particles
10 stay in suspension in the drill bore in the hole.

11 Q. They would stay in suspension
12 until that head of water starts pushing through?

13 A. They stay in suspension for years.
14 They are so fine.

15 Q. If you put your hole down and if
16 I understand it, you push another six inches or so or
17 maybe more than that -- maybe it is feet -- which isn't
18 encased with your bore hole and it is into that section
19 you put your water and measure the fall?

20 A. That is correct.

21 Q. There is going to be a head on
22 that which is going to be a certain amount of gravity
23 pushing the water through that section and it is by
24 fall you measure the permeability?

25 A. You flush the bore hole out before
26 you do the permeability test. The amount of sediment
27 in the bottom of the hole will be coarser than the
28 material you are testing.

29 Q. You didn't take account of any effect
30 it might have on the permeability?



1 A. We took account and the results
2 we have indicated in the report are consistent with
3 the type of material that is there. Our firm has
4 been involved in doing permeability tests all over
5 the world and I think we know what we are doing.

6 Q. I'm just wondering if this was
7 taken into account. You tell me it wasn't because
8 you didn't think it was important?

9 A. Not in this particular instance.

10 Q. Bore hole #102 shown here isn't
11 even on the site?

12 A. One-oh-two is at the southeast
13 corner of the site.

14 Q. But it is off the site?

15 A. It was taken on the road allowance.

16 Q. You have cross sections of land
17 seven miles long and they intersect approximately
18 north of the site?

19 A. Yes, just north, almost due north
20 of the site.

21 Q. Those cross sections indicate
22 that you are having daylighting sand in just about
23 the middle of each of those cross sections. Is that
24 your interpretation of those?

25 A. Yes.

26 Q. So basically you have demonstrated
27 that approximately in the area where we are having
28 this landfill site there is serious potential for
29 daylighting sand?

30 A. We haven't demonstrated that. I



1 think we have proved by drilling on the site that that
2 strata does not daylight within the sand. We know
3 where it daylights. It is at the site just directly
4 north where we drilled initially and went down 95
5 feet.

6 Q. What testing have you done
7 between bore hole 201 and 104? What, if any, testing
8 has been done to show there is no daylight sand or
9 gravel in that area?

10 MR. PLAXTON: I want (inaudible).

11 THE WITNESS: I will have to check it
12 on the map.

13 MR. WRIGHT: Q. It is the easel behind
14 you.

15 A. Which?

16 Q. Now, you have got bore hole 201
17 down in the corner where the landfill operation is
18 going to start. Right at the other end of the land-
19 fill site as proposed you have bore hole 104?

20 A. Correct.

21 Q. That is the whole land of that
22 site?

23 A. Right.

24 Q. What tests have been done to
25 determine there is no daylighting sand in that mile and
26 a quarter?

27 A. The only tests we have done in
28 the field are the tests shown on the plan there. In
29 addition to this, as I mentioned in my evidence, we
30 have examined the geology of the area and have examined



8

1 the bore hole records from the wells in the area and
2 I think you can see from the geological map here --
3 this is done in detail -- it is based on detailed
4 work done by Professor Dreimanis of the University
5 of Western Ontario. This is a detailed geological map.
6 These two facts together, combined with the actual
7 information we discovered in the bore holes, allowed
8 us to interpret between those.

9 Q. I'm not looking for guesses
10 based on overall views. I am looking for facts. I
11 think you should get those facts. I think that is
12 the relevant point in an area where you have daylighting
13 sand in a relatively close area to this landfill site
14 and you have here five bore holes, one of which is
15 off the site, and one of which is a good mile from
16 anything else. You have a lot of territory in there
17 and you have no facts.

18 A. The whole site was covered by
19 aerial photographs and the soil conditions were
20 determined ---

21 Q. You covered W-12 with aerial
22 photographs too.

23 A. There would be no geotechnical
24 work done on W-12 until we drilled the first bore
25 holes there.

26 Q. The aerial photographs would
27 demonstrate the kind of information you want and on
28 W-12 it didn't show up the kind of information you
29 want ---

30 A. They confirmed the type of



1 information -- we always need a number of bore holes
2 at a site, but based on the development of this site
3 and the work we have done on other sites, five bore
4 holes is a reasonable number, combined with the
5 geology of the site to predict what the soil condition
6 is going to be like at the site. We know the area
7 where daylighting^{is}/is north of the site. It is well
8 defined and a well known feature.

9 Q. So it is your opinion that no
10 more investigation of this site need be made? You
11 don't have to make any further investigation to
12 find out if there is any possibility that the 30
13 feet you are so concerned about might rise closer
14 to the surface?

15 A. Not at long as the depths of
16 the landfill site as proposed remain the same. In
17 the final -- before construction if it is proposed
18 to put it deeper, we might do additional bore holes,
19 but at the moment it is my belief we have sufficient
20 information on the site to predict the conditions.

21 Q. Your opinion puts it at 30
22 billion cubic feet of water. If you are wrong and if it
23 extended the aquifer, wouldn't that be the best thing to
24 have without guessing?

25 MR. PLAXTON: We have got facts.

26 THE WITNESS: We have facts.

27 MR. PLAXTON: Right over there. Let's
28 not overstate the case.

29 MR. WRIGHT: I'm simply saying we don't
30 have enough facts.



1 Q. Now, Mr. Dowse, I have some other
2 questions. You have indicated that you have the
3 records of all wells that have been drilled in the
4 area. Now, I suppose what we are concerned about
5 generally is whether or not these leachates are going
6 to get down through the clay and into the aquifer.

7 A. This is one of the geotechnical
8 considerations.

9 Q. So we have got to make sure
10 that there are no cracks, no leaks and what we are
11 talking about is the danger that if we have daylight-
12 ing we might get down to the aquifer?

13 A. Yes.

14 Q. What record or records are there
15 of any boring that has been done on this particular
16 site? As I understand it, if you have a well hole
17 that hasn't been backfilled properly, there is potential
18 that leachate could seep down into this?

19 A. This is correct.

20 Q. What kind of investigation has
21 been made along these lines?

22 A. I think if you look on this map
23 here -- I'm afraid it is pretty small scale -- this
24 contains a record of all the wells which have been
25 drilled or test holes which were never developed as
26 wells. You will see that there is a group up in this
27 corner. The holes we drilled were all sealed after
28 drilling so there is no danger of those but in this
29 corner here (indicating) there are a number of holes
30 drilled by the Public Utilities Commission, some 10 to



1 15 years ago for tests which were never developed
2 as wells, and this we have investigated and, based
3 on the soil conditions at the site in the upper --
4 from there to there (indicating) -- the consistency
5 of clay is not extremely hard. We are talking about
6 six inch diameter holes and in our experience that
7 size of a hole in that consistency of clay will
8 squeeze in after a period of about 10 years maximum,
9 so we are looking at holes which have been drilled
10 in the past which undoubtedly now have already
11 sealed themselves. It was one aspect we were con-
12 cerned about and it was investigated during our
13 phase of the work.

14 Q. Could you not put a cement seal
15 on these things?

16 A. Our records as to the location
17 of these holes are something similar to 3,000 feet
18 west of what has been drilled so we don't feel we
19 would be able to locate these to fill them. The
20 consistency, if you consider this soil here, in
21 engineering terms it has a high water content which
22 makes it an impervious soil. It also has a fairly
23 low sheer strength in relation to the tills you
24 normally get in this area and our experience is these
25 will be well sealed in a period of about 10 years.
26 If they are not, we could seal them.

27 Q. So the potential risk is not
28 there that an unfound well could cause leakage through
29 there?

30 A. There is a very small element of



1 risk there, naturally.

2 Q. I am a little concerned about
3 bore hole 103. Perhaps we should look at bore hole
4 101 first. You put into bore hole 101 a pretty good
5 bentonite
6 /seal. Why did you do that? What is bentonite?

7 A. Bentonite is a clay which is
8 used for sealing wells and sealing any type of
9 engineering work to guard against water.

10 Q. Is there no danger with it?

11 A. Bentonite has a quality that
12 when you mix water with it it expands so that when
13 you put it in water it expands like a rubber stopper
14 and seals everything that is in there.

15 Q. Thank you. Tell us something
16 about 103. I notice first of all there is no
17 bentonite in the hole. Why is that?

18 A. There is a cement seal on that
19 hole.

20 Q. But it is below the aquifer,
21 below the first aquifer?

22 A. You mean this aquifer here
23 (indicating)?

24 Q. Yes. It is below that one.

25 A. Are there troubles expressed
26 there with that hole? There may be clay already
27 squeezed into the hole and the seal couldn't be put
28 any higher.

29 Q. I don't see it. Perhaps you
30 could point that out.

A. If you notice there, the upper



1 part of the hole was filled with clay backfill and
2 this, you know, as I said before this clay is used
3 for sealing and in some cases has the same properties
4 as bentonite.. Here the clay backfill was used as a
5 seal.

6 Q. While I talked about bentonite
7 you were most enthusiastic but when I talked about
8 clay backfill you said there was a cement seal in
9 there. Now you say it is okay.

10 A. We have three methods of sealing
11 holes. We use bentonite, cement crush or clay back-
12 fill. The very best is bentonite and cement rather
13 than clay backfill is/ the same because bentonite has
14 a property of swelling under the ground water conditions.
15 Once you put it below the water, it swells.

16 Q. With reference to these wells
17 that we talked about you said these all will seal
18 themselves in 10 years. This operation, if it goes
19 ahead, which I'm arguing it shouldn't, this thing is
20 going to go ahead immediately and this backfill is
21 going to be covered with garbage. It is going to be
22 a potential place for leachate within two years.

23 A. We do have clay backfill in those
24 holes.

25 Q. That is what was going to be in
26 these other well holes which you told me would seal
27 themselves in 10 years?

28 A. I said the holes would squeeze in.
29 This is clay which is put down the hole in the same
30 way as bentonite is put down the hole.



1 MR. PLAXTON: As distinguished from
2 another situation where the PUC put nothing down and
3 there is a gradual working in?

4 THE WITNESS: And the holes slowly
5 squeeze themselves in.

6 MR. WRIGHT: Q. Is there any particular
7 reason why that was put below that you can think of
8 other than -- there is not much point of putting in
9 a cement plug if you figure clay is okay. You are
10 putting it in for some reason?

11 A. The reason for putting in a
12 cement seal was to measure if there was an aquifer
13 in that lower sandy silt. You can see the seal was
14 put in above it and the end of the sand pipe, you
15 see the vertical line -- this is the stand-pipe
16 which is used to measure the water pressure in
17 various strata. It was sealed so that we were
18 measuring it from that sandy silt from the two lower
19 aquifers there. As you can see from the conditions,
20 the bore hole is dry and this is the information we
21 wanted to get from that particular bore hole.

22 Q. So now you are telling us the
23 cement seal wouldn't have anything to do with sealing
24 it at all?

25 A. In this particular bore hole
26 that is correct. In the other bore holes it was
27 used as a seal.

28 Q. So your first response to my
29 first question was ---

30 A. I forget your first question.



1 Q. My first question was -- talking
2 about backfilling it with clay and you said there was
3 a cement seal there. So really the cement seal didn't
4 have anything to do with it?

5 MR. PLAXTON: That is not what he said.
6 What he said was the cement seal worked as a seal in
7 a number of holes or one or two of them and in one
8 hole it is working for a purpose which is to deter-
9 mine the extent of the aquifer above it and in that
10 hole he filled the hole or caused it to be filled
11 with clay.

12 MR. WRIGHT: I prefer to believe we
13 found that after some questioning. It would be
14 used as a plug ---

15 MR. PLAXTON: That is your assumption.

16 MR. WRIGHT: Yes. We will have to
17 leave it there, Mr. Plaxton.

18 Q. Let me ask you something about
19 permeability, looking at bore hole #101. I am looking
20 at your pull-out chart which is quite long.

21 A. About two feet long.

22 Q. Yes. Unfortunately, the audience
23 doesn't have copies of this and there is nothing up
24 on the board to support this but maybe the members
25 of the Hearing Board would like to take a moment to
26 pull out their records of bore hole #101. This is
27 the original bore hole?

28 A. If you are going to refer to the
29 permeability/^{values,} it might be easier to refer to the
30 chart.



9

1 Q. You correlated the chart to
2 lines on this?

3 A. Yes.

4 Q. I think maybe I can deal with it
5 more easily that way.

6 MR. PLAXTON: Mr. Chairman, you could
7 refer to the report of November, 1972 where there is
8 a sheet which is enveloped into the report, the first
9 one marked "Record of Bore Hole 101." On the right-
10 hand side is a picture of the plug that is in that
11 bore hole. On the left is what was encountered in
12 the nature of soil at various levels.

13 MR. MURPHY: Is that in the November
14 report?

15 MR. PLAXTON: Yes.

16 MR. WRIGHT: Q. Mr. Dowse, there is
17 a lot of information you have described -- there is
18 a lot of information to be found on this long sheet ---

19 MR. PLAXTON: You mean a lot of facts.

20 MR. WRIGHT: That is your opinion of
21 facts. There is a difference.

22 Q. I am concerned about permeability
23 and it is written on this table by the location of
24 lines which appear on the second column from your
25 right. At the top of the column you see, "Coefficient
26 of permeability," and there is a line with lines at
27 the top and bottom. Underneath that they talk about
28 water content per cent. Now I am concerned about the
29 coefficient of permeability. These are the little
30 circles with the dots in the middle of them. Now,



1 Mr. Dowse, correct me if I am wrong, but I understand
2 that the length of those lines is an indication of
3 the amount of dirt that was taken out of each of those
4 spoons, is that correct?

5 A. Yes.

6 Q. And it is the location of that
7 line from left to right that determines the permea-
8 bility?

9 A. This is the field measurement
10 of permeability.

11 Q. As we move to the left, it be-
12 comes more permeable -- no, less permeable?

13 A. As you move to the left, it
14 becomes more impermeable or less permeable.

15 Q. As we move to the left, there
16 is less water can be expected to go through?

17 A. Correct.

18 Q. When we move to the right, of
19 course, the converse is true and we can expect more
20 water to be going through?

21 A. Yes.

22 Q. Now, I would draw your attention,
23 Mr. Dowse, to the very dense gradient line to medium
24 sand porous clay between 64 feet down and 74 feet down.
25 The permeability of that is almost immeasurable. There
26 is so little water going through it.

27 A. It is a till deposit. It is
28 granular but because it is so dense the permeability --
29 it tends to be very impermeable. You can get -- the
30 thing that controls its permeability is how much silt



1 you have in it and as long as it is granular material
2 it has the potential of being permeable if it is
3 clean and everything, even though it is very dense.
4 Here with a lot of silt in it it is very impermeable.

5 Q. Well, it seems to me that this
6 rough stuff is the stuff we are concerned about. Isn't
7 this where the water is running?

8 A. Yes, potentially this is the
9 area to be concerned about, that is right.

10 Q. Your clay higher up is relatively
11 permeable, isn't that a fact? What this graph
12 demonstrates to us is the area where you are concerned
13 about having water is less permeable than the clay
14 which you said where you won't find any cracks or
15 any water going through?

16 A. Well, I think if you can refer
17 to the figures later in this report, I think show
18 you the reason why we are more concerned about the
19 granular material than ---

20 Q. Do not these lines fairly reflect
21 the figures we would be looking at?

22 A. These are the field permeability
23 tests but these are evaluated in conjunction with
24 the grain size distribution tests which are shown
25 later in the report and based on the two tests we
26 come up with our value, the coefficient of the per-
27 meability.

28 Q. So this isn't really what we
29 are talking about because -- I just don't understand
30 your figures.



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1 A. I think, as I stated earlier in
2 my evidence, we carried out both laboratory tests and
3 field tests and between the two we came up -- and
4 our experience in the area, which is considerable --
5 we came up with realistic values of the permeability of the
6 various strata. I mean conservative values under
7 the very worst conditions you could have and the
8 values which I have presented are in my judgment the
9 very worst values you could have in the strata.

10 Q. What is the difference between
11 field test permeability studies you tell me are re-
12 flected on this graph and the figures which appear
13 later in the book and why wasn't that distinction
14 made in the report?

15 A. They are two different methods
16 of testing. In the reports we combined the results
17 together and gave our interpretation of the permea-
18 bility conditions at the site.

19 Q. Would you agree with me that
20 based on the records of bore hole 101 that the more
21 permeable soil is in the top and the least permeable
22 is at the bottom?

23 A. Based on those results in bore
24 hole 101 we shouldn't be worrying about anything
25 because in that the upper material is highly im-
26 permeable, in that particular test we measured the
27 lower material to be a thousand times less permeable
28 again. All my evidence has been based on conditions
29 which are a lot more severe than the conditions shown
30 in that bore hole.

7



1 Q. To be quite frank with you, I
2 am not -- what I am concerned about is the figures.
3 I am really questioning your calculations because
4 what you have been telling us before is that in this
5 yellowy stuff we have potential for what? The clay
6 is impermeable and now your figures show that the
7 clay is in fact more permeable than the yellow stuff.

8 A. Relatively speaking, but they are
9 both highly impermeable in that bore hole. I would
10 like to just refer to demonstrate this ---

11 Q. Let me continue here for a minute.

12 MR. PLAXTON: I take exception to that.
13 If he wants to explain something, let him.

14 THE WITNESS: We are dealing with
15 engineering facts here and there you must take every-
16 thing into consideration. I agree in that particular
17 bore hole relatively speaking the lower strata is less
18 permeable, but we are still concerned about it because
19 we know there is a possibility that it could be more
20 permeable, so based on the grain sizes there which you
21 see here as figure 3 which I think is a typical one
22 from that strata, where potentially that can be quite
23 pervious. In other words, 10 to minus four. To come
24 up with a realistic appraisal of the site we have
25 taken the lowest possible permeability figures for
26 all strata instead of the highest possible ones.

27 MR. WRIGHT: Q. I'm still concerned
28 about these figures and I will ask you to compare the
29 coefficient of permeability in the blue aquifer with
30 the coefficient of permeability in that first layer of



1 clay, and you will find that the coefficient of per-
2 meability in the clay is equal to or less than you
3 will find in the water bearing aquifer . Doesn't
4 that strike you as strange?

5 A. Yes, it did. This is the reason
6 we put a note in our report.

7 Q. How did you explain that?

8 A. I think if you refer to that --
9 I think if you look on page 4 of our report dated
10 November, 1972, you will notice we refer to this.
11 The test of this particular strata was done at quite
12 a depth and we say, "This is probably a function of
13 caving and possibly smearing by the
14 sampler."

15 Again to come up with a conservative answer, we feel
16 that the value obtained in the field was too low a
17 value of permeability and the permeability down here
18 is a lot higher. This is based on other holes we have
19 drilled in the area and experience from the PUC.

20 Q. Basically what you have done is
21 say, "This is what the tests actually show, but we
22 know better"?

23 A. We used our engineering judgment
24 in the interpretation of the test, as we do every time.

25 Q. This is a pretty serious business
26 we are talking about. Thirty million gallons of water
27 by your estimate and that is only at the upper level.

28 A. This is the other aquifer.

29 Q. Yes.

30 A. We feel that the work done at the



1 site has been adequate to satisfy ourselves and the
2 other engineers involved that the clay is an im-
3 pervious strata. I think really all you have to do
4 is ask anybody who farms in that area and they will
5 tell you it is an impervious strata as well.

6 Q. We will be asking them. It just
7 seems strange to me that your findings in the field
8 did not bear out what you expected to find, so you
9 threw out the figures ---

10 A. We didn't throw out the figures.

11 Q. How many permeability tests did
12 you do?

13 MR. PLAXTON: Please! He is trying
14 to answer the question and you interrupted him again.

15 A SPECTATOR: Tsk, tsk, tsk.

16 THE WITNESS: We carried out 26 per-
17 meability tests in the field and in addition to that
18 we carried out laboratory tests. In our experience
19 and personally I have been involved in over 1,000
20 projects in this area and I know the soil conditions
21 fairly well. I am giving my engineering interpret-
22 ation of the coefficient of permeability of the
23 various strata.

24 MR. WRIGHT: Q. Twenty-six separate
25 tests. I just had a fast look at my notes and your
26 report and I don't see any but those that are marked
27 on 101. When you say 26, did you mean 26 on 101?

28 A. These are listed on table one.
29 On 101, yes.

30 Q. But I think you are going to have



1 to agree with me that those figures don't come up
2 to what you expected? You set in their place what
3 your expectations were, but it seems to me that you
4 should have done other tests in other holes and the
5 thrust of my question is: what other holes have you
6 tested permeability in?

7 A. We related the soil conditions
8 we found in bore hole 101 to the soil conditions we
9 found in the other holes by laboratory tests, what
10 we refer to as laboratory classification tests. The
11 constituents in the soil. If you get the same con-
12 stituents in the soil at each location and you know
13 the coefficient of permeability at one point, we
14 correlate from one bore hole to the other. We are
15 dealing with a heavy clay here with 30 to 50% clay
16 particles in it and it is highly impermeable soil.

17 Q. So there were no other field
18 permeability tests done?

19 A. Not beyond bore hole #101.

20 Q. Bore hole 104, where is the
21 yellow?

22 A. One-oh-four is here.

23 Q. How far down is that?

24 A. That is about 50 feet. The
25 exact measurements are given in the report.

26 Q. It was your opinion that there
27 is water in that upper aquifer that could be welled
28 off?

29 A. There is or is not?

30 Q. There is.



1 A. In some places there is and some
2 places there isn't. I think you will find in one of
3 the bore holes we found an aquifer to be dry and
4 that is consistent with the information here (indicating)
5 from the PUC well records where sometimes the aquifer
6 occurs above the -- the sand occurs above the water
7 and sometimes it occurs below.

8 Q. Are you aware there is a 40 foot
9 well on the other side of the concession road by that
10 bore hole?

10

11 A. Yes, I have seen the well.

12 Q. And it goes down 40 feet?

13 A. This here?

14 Q. The well does.

15 A. They are getting water from a
16 depth of 40 feet.

17 Q. And it is reasonable to assume
18 that that is coming from the upper aquifer?

19 A. Yes. If you had a well here,
20 you would be getting it from 30 feet.

21 Q. So we don't want to puncture
22 that clay?

23 A. No. I think here I have demon-
24 strated where I assumed the 16 feet to be the minimum
25 depth based on the records we have from the bore holes
26 and the deepest excavations on the site.

27 Q. If for some reason there were
28 cracks in the clay sub-soil ---

29 A. If there was a crack?

30 Q. A crack or accidentally we missed



1 daylighting sand or gravel or for some reason the
2 leachate had access to the upper aquifer, there is
3 going to be some sort of gradient effect pulling that
4 leachate toward all the wells in the area, is that
5 right?

6 A. Yes, I agree "if".

7 Q. Of course. If there is a crack,
8 then for sure it is going to end up in every well
9 within half a mile?

10 A. I think in the operation of all
11 landfill sites which are developed these days there
12 is an automatic monitoring program which guards
13 against this "if" because as engineers we try to
14 predict to the best of our knowledge, but there is
15 always an "if" that the aquifer could daylight. It
16 is against all geological evidence and against all of
17 the evidence we have at the moment, but there is.
18 There are safeguards built into the development of
19 every landfill site to take care of this. This
20 would -- if any pocket of sand was found during the
21 excavation, that part of the landfill site would be
22 abandoned until the extent was determined and it
23 was effectively sealed. This is an automatic
24 precaution.

25 Q. You may not be an expert in
26 this, in which case you are always inclined to
27 answer my question, but what would the effect on
28 a human being of drinking leachate polluted water
29 for two weeks be?

30 A. I have no idea, but I know leachate



1 that comes off some landfill site is pure enough to
2 drink.

3 Q. Can you swear to that?

4 A. I'm not an expert. I have no
5 idea of the effect.

6 Q. I still have a few questions
7 yet to ask you. This sandy soil, when it becomes
8 dry, does it not crack?

9 A. The sandy soil does.

10 Q. Well, I ---

11 A. It cracks on the surface but
12 the seasonal fluctuation in moisture content is
13 only within the upper four to five feet, so any
14 cracking would be confined to the surface.

15 Q. So on the design of a final
16 fill on the south is not the upper level going to
17 be about four feet?

18 A. It is going to be all excavated.

19 Q. I'm talking about the final --
20 you said four to five feet would be susceptible
21 to cracking and I wonder if that four to five feet
22 is going to be at the top of it where ---

23 A. I have not been involved in
24 the design of the landfill site so I don't know
25 what goes on.

26 Q. But it is your opinion the top
27 four or five feet being this type of soil would be
28 susceptible to cracking?

29 A. During dry weather but as soon
30 as the rain falls again the rain will get into the



1 cracks and they will swell and the cracks seal again.

2 There is a seasonal type of fluctuation.

3 Q. What will happen with this soil
4 when it freezes?

5 A. The upper, in this area, 30
6 inches of it freezes and you will get some ice forming
7 and so on.

8 Q. So in the winter if one would
9 try to dig this out it would be virtually impossible.
10 You would have to have very heavy machinery?

11 A. I wouldn't dig it out with a
12 hand shovel but any small back-hoe will dig it out.

13 Q. Thirty inches or so of frozen top-soil?
14 --- (Laughter)

15 Mr. Dowse, just some general questions
16 based on your experience of landfill sites. I don't
17 really have to deal with leachate problems at any
18 great length because there are leachate problems to
19 contend with in any site. Would you agree with me
20 that there is a certain amount of extra noise would
21 flow from a landfill site?

22 A. There is heavy equipment working
23 on a landfill site. I can't testify how much would
24 be operating on this site but it does require bull-
25 dozers and scrapers, yes.

26 Q. And there is going to be in your
27 experience with these landfill sites, you must have
28 seen there is a heavy increase in traffic?

29 A. I am afraid -- there will be
30 people who can answer these questions for you.



1 Q. I'm just asking you as a general
2 rule from your experience, all your experience with
3 landfill sites, you must do a little more than over-
4 seeing the first landfill?

5 A. The garbage trucks have to get
6 there.

7 Q. And it looks like the devil?

8 A. I can't tell you the number ---

9 MR. PLAXTON: He is hardly qualified,
10 Mr. Chairman. My friend is aware of this. Obviously,
11 the traffic expert is the right person to direct the
12 questions to.

13 MR. WRIGHT: I don't think it takes
14 an expert to know this. I want to know whether any
15 of your expert witnesses have ever visited a land-
16 fill pit. They have visited the site ---

17 Q. Have you ever visited a land-
18 fill site?

19 A. Yes.

20 Q. Then you can answer all these
21 questions!

22 --- (Applause and laughter)

23 THE CHAIRMAN: Order, please. I
24 think you should ask the other witnesses in this
25 respect.

26 MR. WRIGHT: All right, Mr. Chairman.
27 All I was trying to establish is that even from a
28 non-expert who has visited, as a human being you
29 would see a lot of trucks going over the traffic
30 site, traffic, dust, smell. I guess we don't need



1 to be experts to see that. Maybe, Mr. Chairman, if
2 you give me 30 seconds I could conclude my questioning.

3 Those are all the questions I have.

4 THE CHAIRMAN: Thank you.

5 Is there anyone in the audience that
6 would like to ask a question?

7 Will you give your name and come to
8 the microphone?

9 EXAMINATION BY MR. MacDOUGALL:

10 Q. I have a couple of questions
11 for Mr. Dowse mainly for clarifications. One is in
12 the case of -- if it takes 150 years for water to
13 penetrate through this heavy clay, can you give me
14 an explanation of the recharge to the water supply
15 by the aquifer?

16 A. Yes, I can. This aquifer has
17 been studied in a series of recharge tests which
18 were carried out since the City of London ceased
19 to use it in 1967. It was written up in an article.
20 Their understanding of the recharge -- we know this
21 aquifer daylights at a couple of locations. One
22 of them is over here (indicating) and it possibly
23 daylights over here, here and here. The recharge
24 is through those areas, rather than through the
25 ground. In my opinion it would be very little soil
26 or water that gets through the soil. I have been
27 working with the maximum possible conditions.

28 MR. PLAXTON: For the benefit of the
29 record, I wonder if you could indicate when he
30 said, "here, here and here", is that north of the site?



1 THE WITNESS: This is the area of W-12
2 which we indicated at least 95 feet of material day-
3 lighted and this is a natural recharge for the
4 aquifer. This blue area here which is just north
5 of the 401 -- actually it extends right across the
6 401, it daylights there and possibly the Lambeth
7 area where we know it daylights. In all the gravel
8 pits in the Lambeth area and in possibly this area
9 are the sources that generate the aquifer, the
10 rising aquifer. The figures indicate that it comes
11 up by one inch per year from these various sources.

12 MR. PLAXTON: All those areas are
13 beyond the site?

14 THE WITNESS: They are all outside the
15 site.

16 MR. MacDOUGALL: Q. Mr. Dowse, during
17 your answer to one of the questions you indicated the
18 usefulness of this land for agricultural use. I'm
19 wondering if you know the classification of this
20 land in this particular area according to the
21 Canadian Inventory classification?

22 A. I am not familiar with the
23 agricultural classification but I think there will
24 be evidence on that later.

25 MR. MacDOUGALL: Thank you, Mr. Chairman.

26 MR. FETTER: I live in an area -- I
27 live on the Wellington Road where the land is silt
28 and not clay and in the spring the water table gets
29 so high that you can dig six inches and hit water.
30 What I'm worried about, this yellow section here



1 (indicating) that is the silt and it has got to follow
2 through and eventually it comes to my place. Then,
3 it mines the lowest land lying so it has got to come
4 up and in the spring it bubbles up. It is all down-
5 hill from the land site to my place and it must be
6 pretty high there because they got all the radio
7 towers up on the top of the hills. This water is
8 eventually going to leach down and come up in this
9 area. There is yellow material through here or silt
10 loam.

11 THE WITNESS: I think the evidence
12 indicates that it will be something in the order of
13 150 years before any possible leachate gets from
14 the landfill site into this aquifer. I believe
15 we are going to have expert evidence later to
16 indicate what sort of purity that water will have
17 after a period of 150 years, but there is a very --
18 assuming it was contaminated, there is a very heavy
19 -- a tremendous dilution effect when you consider
20 the potential of the amount of water from the 300
21 acre landfill site and that is the area of operation
22 not the buffer zone as well, compared to the 30
23 billion cubic feet. I think there will be expert
24 evidence on this later.

25 MR. FETTER: The silt is leached from
26 the glaciers down onto this property by the Dingman
27 Creek. If the glaciers pushed silt down there, why
28 shouldn't the sewage or dump trash go the same way?
29 naturally
30 If the glacier/goes that way into that area, why
don't nature take its course that way and go this way



1 also?

2 THE WITNESS: We are talking again
3 about the possibility of leachate perculating through
4 this impervious clay into this aquifer or water
5 bearing zone. I agree, anywhere that it daylight
6 you will have water coming out of it, but if we are
7 looking at an extremely long time period, we are also
8 looking at a very small amount of leachate. We are
9 the equivalent of
10 looking at 12 cubic feet per day per acre of land
11 fill site. When you put this amount into the very
12 large capacity of the reservoir, you get a toxic
13 dilution effect. I think this is one of the areas
14 the city will be guarding against and there will
15 be evidence on this monitoring program of testing
16 wells and creeks to make sure there is no possibility
17 of this happening.

18 MR. FETTER: Man is going to beat nature
19 at this point with this dump? Man is going to beat
20 nature. Nature let the glaciers run the water and
21 silt down there and now man is going to try to put
22 something there to beat nature. Do you think we can
23 beat nature?

24 MR. PLAXTON: Just ask a question of
25 the witness.

26 Are you aware of the
27 location across this site of the watershed?

28 THE WITNESS: Well ---

29 MR. PLAXTON: What area drains to the
30 north and what area drains to the south?

THE WITNESS: I have personally not



1 investigated the watershed conditions. I believe
2 evidence will be given on this subsequently.

3 MR. FETTER: I can maybe answer part
4 of that question. I lie between Dingman Creek with
5 a drainage ditch at the back and a drainage ditch
6 to the south of me, so I am surrounded by drainage
7 ditches. As a result I can't till my land in the
8 spring sometimes because the ditches are so full of
9 water mine won't possibly leave the area. With the
10 sewage coming down I am in the lowest area. I think
11 the lowest area is Dingman Creek and I think the
12 Wellington Rd. /Odeon Theatre owns that piece of land. I am two
13 places from there, but it does get quite water-
14 logged and if it gets caught between the clay --
15 we had a dug well -- talking about drill wells, I
16 know the Schaeffer Subdivision is mostly dug wells
17 which only runs 16 feet. I have a 12 foot well which
18 was sufficient for the one woman that lived there
19 when I bought the house, but I put in a new well
20 that was 12 feet deep. Now, from the first 10 feet
21 there was silt, silt loam soil. Then they hit a
22 hard core of clay. I didn't like drinking above
23 the clay because that is surface water, so we went
24 below this hard core of about four feet of clay and
25 hit water sand or quicksand. What I'm worried about
26 is the quicksand is the same as this yellow material
27 here. Does it keep running along until it gets to my
28 area or the rest of the farmers? If this is the
29 case, I'm afraid it is going to pollute my well.

30 THE WITNESS: It is possible. If you



1 are taking your water supply from a quicksand or
2 sand which is saturated in the areawith water, it
3 is possible it is connected to this aquifer, but
4 the whole engineering of the landfill site has been
5 such to locate it so that there is no access for
6 that leachate from the landfill site.

7 MR. FETTER: I don't know if there
8 is more deep wells but the price of deep wells when
9 I priced them a year ago -- it is probably \$10 a foot
10 now and I couldn't afford that at the time I moved
11 to Westminster Township. I couldn't get them to
12 drill a well for me. The only well-driller in this
13 area said it would be three months before he could
14 do it because I was only a family man with three
15 children and farmers and other people needed the
16 water more, which is reasonable. Anybody with
17 livestock needs water at the price of feed today.
18 I guess that is all.

19 THE CHAIRMAN: Where does your farm
20 lie?

21 MR. FETTER: Unfortunately, I am not
22 a farmer. I only have an acre of land. I was a city
23 boy who lived in London for 26 years and I appreciate
24 the fact ---

25 THE CHAIRMAN: Where is your property
26 located?

27 MR. FETTER: On the Wellington Road,
28 one mile south of the 401 Highway. I am inbetween
29 the 4th and 5th Concessions. It is silt loam and
30 actually it is good for vegetable growing but un-



1 | fortunately it is all zoned industrial, so probably
2 | industry won't worry too much but when you drill
3 | water you have to put in a deep well rather than
4 | shallow. Scheaffer Subdivision is half a mile to the
5 | south of us and I'm sure that most of them are
6 | shallow wells. It is fine to say the deep wells
7 | are going to get pure water, but what about the
8 | people with shallow wells who can't afford to put
9 | in a 100 foot well at \$8 a foot? When I put my
10 | dug well in it was \$12.50 a foot for it and 16 feet
11 | was only two or \$300.

12 | MR. PLAXTON: Maybe I can answer
13 | the question a little bit for you. We intend to
14 | call city engineers who will inform you of the
15 | policy of the city with respect to not only checking
16 | to make sure there is no contamination occurring in
17 | the water, but if through an accident of some nature
18 | it should happen, what policy the city has in connect-
19 | ion with that. As I gather your point, you are about
20 | three and a half miles as the crow flies from this
21 | site?

22 | MR. FETTER: Yes. And I'm young
23 | enough to be there another 30 years. You said the
24 | city will check into it. I moved into the area and
25 | ran out of water the first year. I phoned the city,
26 | being a city person, which was kind of ignorant,
27 | and asked for water and they told me it would be
28 | \$80. Two dollars for the water and the rest for
29 | the trucking. I am a little smarter now and now
30 | I buy it from the mill truck, from the bulk people.



1 If it costs \$80 for 2,000 gallons of water, it is
2 going to cost a lot of money. That is all I have
3 to say. Thank you.

4 KLAES VAN GAARD: I don't think this
5 is possibly concerned with myself as much as it will be
6 possibly my grandchildren maybe or somebody like that.
7 We heard it will take 100 years -- 150 years. That
8 is perfect. I guess it is all right for us in the
9 City of London to simply go ahead and say, "it doesn't
10 bother us about the water." In another 50 or 80 years
11 and these people will not be here to look after us.
12 I don't agree with this city thinking at all.
13 Actually, after ---

14 MR. PLAXTON: Mr. Chairman, I take
15 this view about this witness: he is turning himself
16 into a witness and not a questioner. We have our
17 case to put in. He has got his case to put in.
18 There is a time when he should put it in and we
19 are welcoming his views but the question is at what
20 time during this hearing should he be making his
21 presentation? I am wondering if Mr. Van Gaard could
22 be asked what question he has of Mr. Dowse.

23 THE CHAIRMAN: That was the question
24 I was just going to put to you. Have you any
25 question to ask?

26 MR. VAN GAARD: I don't know anything
27 about whether Mr. Dowse could answer me. Does he
28 think it is morally right for us to simply go ahead
29 and pollute the water, whether it is for right now
30 or 100 years from now?



1 THE WITNESS: I think we have
2 established the fact that we are not going to pollute
3 the water. That is what we are engineering -- that
4 is why we are engineering the site so that we do not
5 pollute the water.

6 MR. PLAXTON: Just to assist in this
7 point, later evidence will show the removal of
8 leachate from the site by tank truck. Is that not
9 a fact?

10 THE WITNESS: This is correct.

11 MR. PLAXTON: What we are talking
12 about is the residue of leachate and after that it
13 will be removed.

14 THE WITNESS: We are assuming the
15 very worst possible conditions for that residue.
16 The leachate which flows off the site will be tanked
17 away and treated in the same way as sewage will be
18 treated. Any possible leachate which is left there,
19 the engineers have picked a site where they have got
20 highly impermeable soil. This is why. It is like
21 W-12 -- as soon as they found the soil conditions
22 were permeable there, they immediately began to look
23 for other sites. This is the whole engineering
24 behind the landfill site, to try and find an im-
25 permeable soil on which to construct it.

26 MR. PLAXTON: Any other questions,
27 Mr. Van Gaard.

28 MR. VAN GAARD: No, thank you.

29 THE CHAIRMAN: Thank you. Does
30 anyone else want to put a question?



1 We will now take a 10 minute break.

2 --- Recess

3 --- Upon resuming

4 THE CHAIRMAN: Ladies and gentlemen,
5 come to order, please.

6 Mr. Plaxton, are you ready to proceed?

7 MR. PLAXTON: I call Mr. Victor Morris.

8 VICTOR MORRIS, called:

9 EXAMINATION BY MR. PLAXTON:

10 Q. Mr. Morris, are you a resident
11 of London?

12 A. Yes.

13 Q. And a professional engineer?

14 A. Yes.

15 Q. Employed by MacLaren?

16 A. Yes.

17 Q. Is that company represented by
18 an office here in London?

19 A. Yes.

20 Q. Could you describe the nature
21 of your employment or occupation with that company?

22 A. I am office manager of the
23 London Branch office. We specialize in environmental
24 consulting, water supply, waste disposal, conserv-
25 ation projects.

26 Q. Would you briefly describe your
27 educational background and then your experience as
28 a professional engineer?

29 A. I was an articulated apprentice
30 with (inaudible) -- with a certificate of the Royal



1 Technical College at Glasgow. I came to Canada and
2 became a registered professional engineer and worked
3 for two years with another consulting firm. I
4 attended the University of Minnesota and got a
sanitary
5 master's degree in/engineering in 1961. I came to
6 London the following year and have been in London
7 ever since that time.

8 Q. For 10 years?

9 A. Yes.

10 Q. Can you describe briefly your
respect to
11 experience with/the various kinds of tasks you have
12 had to undertake as an engineer?

13 A. Designing and supervision of
14 construction of water supply systems, water
15 treatment plants, waste disposal systems and waste
16 treatment plants, with the Conservation Authority
17 and with solid waste disposal with the City of
18 London and also with the (inaudible).

19 Q. In connection with the report
20 you prepared for the City of London related to
21 solid waste disposal, can you indicate with who
22 you consorted to produce this report? Was it a
23 joint report?

24 A. It was a joint report between
25 our London and Toronto offices realising that the
26 personnel were the same under the direction of Mr. Sexton,
27 another senior engineer in our firm who had had
28 experience with the Metropolitan Toronto Waste
29 Disposal Report and that team was used working with
30 our London people to produce this 1971 report.



1 Q. Is Mr. Sexton available at the
2 moment?

3 A. Unfortunately not.

4 Q. When was your firm commissioned
5 to undertake this study you have just told us about
6 on solid waste disposal?

7 A. In December of 1969.

12 8 Q. Can you indicate briefly the
9 nature of the competition involved in this appointment
10 and were other firms presenting proposals to the city?

11 A. The City Engineers Department
12 consulted several consulting engineering firms to
13 discuss the terms of reference which the City Engi-
14 eers Department would prepare for requests from
15 consulting engineers to do a study on the long term
16 solid waste disposal/^{system}for the City of London. We
17 participated in these activities.

18 Q. So a number of firms sought
19 to have themselves commissioned to prepare this and
20 I take it you were the one that was selected?

21 A. That is correct.

22 Q. And that is having to do with
23 the nature of the proposal you had in mind and the
24 extent of ability you displayed?

25 A. Yes.

26 Q. Following or just prior to your
27 appointment did you assist the city in the drafting
28 of the terms of reference that you as engineers
29 wanted to see given to you to enable you to
30 undertake this task?



1 A. Yes.

2 Q. Do they form part of your report
3 which is an Exhibit in this case?

4 A. Yes. They are in the introductory
5 part of the report.

6 Q. Can you indicate whether you were
7 asked to consider other additional methods of waste
8 disposal including landfill?

9 A. We were asked to do a complete
10 appraisal in terms of reviewing all prior methods
11 and going into detailed studies on particular ones
12 which could be applicable to the City of London.

13 Q. Yes. Of all these methods
14 would you describe just briefly the methods you
15 gave some consideration to in your report and then
16 later describe the method to which you applied your
17 detailed consideration?

18 A. If I could refer the Board
19 to page II - III of the report, it briefly
20 summarizes the different methods which were reviewed.
21 As a result of this review, we concluded that a
22 detailed study for the City of London was warranted
23 for assimilation with peak recovering for landfill sites
24 and we went into some detail in the advantages of
25 transfer of waste. The other aspects mentioned
26 there, the first one, open burning was rejected as
27 completely unsatisfactory. I mentioned sanitary
28 landfill, consideration of a central plant. Then
29 other methods were considered which were not re-
30 ported in here in great detail because they were not



1 considered applicable. There was composting, central
2 grinding, baling, incineration, feeding of garbage
3 to hogs, hydrolysis which is a (inaudible) method
4 which is still in the experimental stage which
5 not was/considered in 1970 as a viable alternative method.
6 Hydrogenation. Then separation of solids at source
7 was also reviewed, but at that time it was dismissed
8 as impractical in terms of dealing with total waste
9 of the city. If it did in fact occur and the market
10 was open for separated material, it would help the
11 assimilation capacity of land refill or recycling
12 capacity in terms of providing more (inaudible).

13 Q. And the areas or methods to
14 which you gave very detailed consideration were
15 what?

16 A. Incineration and sanitary
17 landfill.

18 Q. For what reasons were these
19 the only two that you gave very in depth study to?

20 A. Well, these appeared to be the
21 only two methods which were viable at this time in
22 view of the time aspect of the City of London and
23 they couldn't wait for 10 or 15 years for new methods
24 to be developed. Incineration and sanitary landfill
25 seemed to be the two most viable solutions.

26 Q. I would like you to comment
27 just briefly on -- what were your conclusions about
incineration?

28 A. We concluded that the cost
29 would be over twice as much for incineration as
30 sanitary landfill. We established from our review



1 that the City of London could develop a sanitary
2 landfill system economically. We recognize that
3 is not always the case. We found that as well as
4 the cost we felt similar problems we had encountered
5 in getting sites and so on for these two alternatives,
6 it was logical to go with the land refill method. I
7 should mention also I think we feel that sanitary
8 landfill is a little more flexible rather than rapidly
9 developing a change in the field. Incineration is not
10 making a lot of progress. However, it does tie you
11 down when you have such a method of solid waste
12 disposal.

13 Q. What would your comment be in
14 this regard, with regard to landfill: is it or is
15 it not a method which is capable of flexibility?

16 A. Yes, it is.

17 Q. Why is there flexibility under
18 this system?

19 A. One ---

20 Q. Has the state of the art developed
21 over a period of years? What is there flexible
22 about the sanitary landfill system?

23 A. First of all, so far as we can
24 project, any system developed will require sanitary
25 landfill sites of some description. It depends on
26 the type of possible reclamation possible. The
27 system can be combined with such things as transfer
28 stations which probably eventually for the City of
29 London will develop as an economical method of
30 transporting waste.



1 Q. That would be quite consistent
2 with the landfill?

3 A. Yes. This could be to whatever
4 extent is practical with the transfer stations being
5 shifted from the landfill sites.

6 Q. So if it was the intention of
7 the engineers to have separation of garbage, would
8 that be the place it would happen, at the transfer
9 stations?

10 A. That would be the most logical
11 place for a bulk separation.

12 Q. Separation would actually occur
13 at the source and people would be asked to put their
14 bottles in one bag and something else in something
15 else and so on?

16 A. That is one possibility, but
17 not necessarily the only one. It could be separated
18 at the transfer station.

19 Q. The transfer station would be
20 the point at which the refuse trucks would move in
21 and they would go back from their to their respect-
22 ive beats and go back and forth to a central point,
23 probably within the city grounds?

24 A. That is correct.

25 Q. Then the transfer would occur
26 where they would remove the garbage from their
27 trucks at the transfer station and a processing of
28 various kinds would go on there and essentially
29 would there be a need for some of that garbage to
30 end up in a landfill site based on present-day



1 knowledge?

2 A. Yes, that is correct.

3 Q. It would be transferred into
4 large vehicles, would it?

5 A. Yes.

6 MR. WRIGHT: Mr. Chairman, perhaps he
7 would let the witness tell the story.

8 MR. PLAXTON: Q. Taking that position
9 on the transfer station, can you expand on it? I'm
10 just trying to get you to enlarge on it, the way
11 a transfer station would work.

12 A. A transfer station can be
13 developed to different degrees. In conjunction
14 with a landfill site it would be an improvement on
15 the system to the extent that it would cut down the
16 amount of material hauled to the landfill site. It
17 would cut down the amount of material deposited in
18 the landfill site by the separation process.

19 Q. And traffic?

20 A. Traffic would be reduced because
21 the material brought in the normal way would be trans-
22 ferred to a large haulage van, probably three or four
23 times the size of the present collection vehicle and
24 trucked to the site in those. Traffic would be re-
25 duced going to the landfill site, the number of vehicles

26 Q. You were commissioned to under-
27 take this study. When did you in fact bring this
28 study down?

29 A. October, 1970.

30 Q. And what were your recommendations?



1 I know they were very extensive, but can you refer
2 to your recommendations insofar as they relate to
3 landfill?

4 A. Basically our recommendation
5 was that the city should proceed with the sanitary
6 landfill alternative for disposable solid waste and
7 that site W-12 which we used to describe the locat-
8 ion in Concession 5 in the Township of Westminster
9 was the recommended site for the sanitary landfill.

10 Q. Over the period of^a/year from
11 the time of your appointment in the fall of 1969
12 until you came down with your report in October, 1970,
13 how many sites did you actually consider, give
14 some consideration to in arriving at your conclusion?

15 A. If the Board would refer to
16 page VII-XII in the report, this gives a summary
17 of the potential of landfill sites. Basically you
18 have an initial screening process,^{field}/inspection,
19 aerial photographs and so on, to look over the
20 whole area within an eight mile radius of the
21 centre of London for potential landfill sites.
22 Along with the initial screening we looked at 46
23 sites. These were examined in more detail looking
24 for criteria which would further reduce the number
25 of likely sites. On the basis of these 46 sites
26 they were reduced to 23 sites. The 23 were basically
27 dropped for lack of potential capacity and the likeli-
28 hood of strong ground water or surface water pollution
29 arising from these sites. Then, 23 sites were scored
30 as shown on table 7-1.



1 Q. You started at 46 and had 23
2 left for consideration. We are now looking at the
3 23?

4 A. That is correct.

5 Q. Would you set out the scoring
6 process dealing with these sites?

7 A. We tried to make an objective
8 evaluation of the sites without giving local prefer-
9 ences or feeling, so we set up a system which has
10 been used in several other places, being used in
11 the National Capital Report we were doing for
12 Ottawa-Hull. This meant setting up a scoring system
13 to which all the sites are compared. Five principal
14 objectives were to avoid jeopardy to public health
15 and safety, not to offend the public sensitivity, that
16 the resulting approved land use be capable of proper
17 development, operation and finishing and (inaudible).
18 Out of these objectives criteria was
19 chosen through discussion between different disciplines
20 and our office with the City Engineers Department,
21 Planning Department, anyone who took an interest in
22 these criteria. Examples of these criteria are
23 given on table 7-1: to evaluate the objective of avoid-
24 ing public health and safety, jeopardy to public health
25 and safety. We would consider ground water pollution
26 hazard, danger of gas movement, potential pollution
27 of ground water, potential pollution of surface water,
28 general traffic into the site in respect of potential
29 hazards and isolation from motor dust. These were re-
30 cognized aspects of a sanitary landfill site which can be



1|| designed and improved to exist in some degree.

2 These criteria were rated by a group
3 of people without them knowing, first of all, what
4 order of importance would be given to the criteria.
5 The different sites -- for each criteria they would
6 select their preference and the criteria rating was
7 10 to one and was then fed into the objective range
8 allocation which you see figured here in order of
9 descending priority was 1,000, 700,000 to 200 points. These
10 were then filled out by a computer and an order of
11 preference was evolved so that on that table 7-1
12 you can see the final selection of the site in order
13 of preference. The numbers are indicative of
14 preference rather than specific values, specific
15 values which could be attached to each site. You
16 have to give them in order of preference.

17 Then the top six were further evaluated
18 on a detailed map to establish/capacity, land require-
19 ments, development costs, capital costs of finishing
20 and total costs. That is on page VII-XXXV, expressed on the
21 following table 7-1. That very briefly is how
22 the final sites were chosen.

23 Q. You started with 46 and reduced
24 that by half and were left with 23. You made a
25 detailed testing and then you again reduced the 23
26 to six potential sites which you further more in-
27 tensively investigated?

28 A. That is correct.

29 Q. So there would be a greater in-
30 tensification of your effort in the selection process?



1 A. That is correct, recognizing there
2 was further investigation to be done before any use
3 could be tied to any specific site.

4 Q. And through that process you
5 arrived at the selection of site W-12, is that correct?

6 A. That is correct.

7 Q. And you earlier referred to the
8 fact that site W-12 became disqualified for reasons
9 of sub-soil conditions there. Correct?

10 A. Yes.

11 Q. And you then investigated site
12 W-12A?

13 A. Correct.

14 Q. When you ultimately came down
15 to selection of the site as you have described, what
16 was your next task as an engineer?

17 A. My next task was -- you mean
18 after the ---

19 MR. WRIGHT: I'm not sure what site
20 you are talking about.

21 MR. PLAXTON: The subject site.

22 THE WITNESS: W-12A. Our next approach
23 to that was to establish the land requirement for the
24 projected 20 year waste from the city for that site.

25 MR. PLAXTON: Q. Can you describe
26 how this process was carried out?

27 A. Basically when we did this re-
28 port there were no records in the City of London
29 of actual quantities of solid waste which were being
30 generated and taken to the existing fill site. A two



1 week weighing program was established and records
2 collected as to the weight of refuse being taken
3 to the site. From these figures projections were
4 made in here on the required site capacity and so on.
5 It became obvious when the Clark Road site got under-
6 way that the actual quantity of refuse coming in was
7 higher than we had projected. The city obtained a
8 weigh scale which has been installed in the new site
9 since April of 1973 with which to measure the quantity
10 of refuse coming into the site. Using the information
11 which we had obtained from the weigh scale and making
12 allowances for future growth of the city, increase
13 in refuse generation, et cetera, we arrived at a
14 total solid/waste figure which had to be disposed of. We
15 then considered the site. We had the soil inform-
16 ation and we considered it a good site from the
17 ground water pollution control viewpoint.

18 We decided, in picking the site that
19 was adjacent to W-12, which has been evaluated here,
20 in many cases of looking at the sites they were
21 actually picked in one particular field and many of
22 the criteria that made that attractive applied to
23 adjoining areas. We -- site W-12 was next to a
24 gravel pick which is an advantage in starting off
25 a landfill site, but we were outweighed in that
26 advantage when we considered the better ground con-
27 ditions on W-12A.

28 We were concerned about the alternate
29 use of the site and many of the old sites waste land
30 which was seen in the film this morning was chosen and



1 restored. In many cases there are old quarries and
2 have been used in the past without adequate consider-
3 ation for ground water pollution. Engineers becoming
4 involved in this and geotechnical people, then more
5 consideration is being given to this question of ground
6 water pollution. So, the old advantage of going into
7 a piece of waste land, such as a quarry, was not often
8 as attractive as it would appear on the surface. So,
9 we considered here that this looks like a safe site
10 and the big disadvantage is we will be taking agri-
11 cultural land in production. Can we restore it for
12 agricultural use? We consulted with (inaudible)
13 and considered the general topography of the site,
14 et cetera, and decided that we could restore agri-
15 cultural use, taking only a piece of the site into
16 operation at any one time. It was then a case
17 of deciding how high the site would be relative to
18 the surrounding area and be useful for agriculture
19 and be aesthetically acceptable in the area. The
20 result was that we picked a figure of 30 to 40 feet
21 above the existing ground levels which we felt would
22 fit in with the surrounding area shown on this model
23 (indicating).

24 Working back from that we calculated
25 the amount of ^{cover} material required to raise the ground
26 level to this height and this is with an average
27 depth of nine feet of excavation. Within these
28 parameters we decided upon the acreage required to
29 accept the waste generated over the next 20 years.

30 Q. Perhaps we could put one question



1 right now and that is the application was for 390
2 acres and now I understand it is 405 acres. Would
3 you explain this to us?

4 A. When the application went in,
5 we scaled off the acreage involved and came to 390
6 acres. However, when we got into the detailed
7 property for this and so on to stay with the property
8 lines on the north side of the site, then we ended
9 up with an area of 405 acres. Of this 405 acres
10 approximately 310 acres will actually be used for
11 the landfill operation.

12 Q. How do you characterize this
13 site from the standpoint of its potential hazard,
14 if any, to ground water? Is it ideal, is it fair,
15 is it good, is it poor?

16 A. I say it would be an excellent
17 site on the basis of the information we were able
18 to obtain. It is a vast, vast improvement over
19 many old landfill sites. The site -- can I continue
20 and explain the shape of the site?

21 Q. Yes.

22 A. I mentioned the acreage involved.

23 Q. We will take a look at it from
24 a topographical point of view.

25 A. Can the Board see this? It ended
26 up a rather odd shape for two reasons: it would
27 appear at first glance that is a square block which
28 would be more economical. However, on the basis of
29 the soil information which we took on the first site,
30 W-12, and then here in W-12A and all the background



14

1 and so on and discussions with the Ministry of Ground
2 Water and Hydrology, we concluded that we should leave
3 at least 1,000 feet up here which we considered to be
4 basically solid material between here (indicating)
5 and this recharge area. So, this was a cushion which
6 was provided as a safety item for contamination
7 vertically not so much as laterally to (inaudible).
8 Initially when we were working with the lower waste
9 disposal figures, I didn't think we needed quite all
10 of this and we considered asking for a little more
11 site so if Westminster or anyone else came in, it
12 would be available. When we got the up-to-date
13 figures from the weigh scales, we found in fact we
14 needed all of this site for the 20 year capacity.

15 The topography of the site -- I
16 think the question came up before -- we have lost
17 the drawing. Basically the majority of the site
18 slopes southwards to the Kettle Creek watershed. A
19 small portion in this corner and from the under-
20 lying drawing was shown to drain to the Dingman
21 Creek and into the Thames River.

22 Q. At that point you are referring
23 to the Thames River?

24 A. Yes. The site, apart from that
25 area, generally slopes from north to south with an
26 average gradient of half to one per cent but this
27 swells through the site which has no drainage areas
28 draining to the south. These are shown in the under-
29 lying drawing. The importance of these in our minds
30 was that we didn't want to interfere with the water



1 generated and passed on in these swales to areas
2 downstream so that developing a site, we shaped it
3 so that we would maintain the same draining to these
4 and hence the same amount of water going down the
5 side of the drainage. We also, in consultation with
6 farm procedures, set the general grade on the north
7 to the south from one to two per cent.

8 Q. This would be involved in any
9 landfill use?

10 A. That is correct. On this basis
11 we generated a site which means really cutting into
12 the ground this average depth of nine feet and it
13 will slope from the south side of the site up to the
14 north side. We then raise the landfill 30 to 40 feet
15 above -- I'm not being vague in saying that, but
16 depending on existing contours this is the range of
17 height that we would be involved with. We have this
18 top surface sloping 30 to 40 feet above the existing
19 ground from north to south. This gave us this flat
20 area within the line shown here (indicating) on the
21 top and the sides sloping down to the original ground
22 level at an average slope of one and six.

23 Q. How many of the surface drains
24 running water, rain water, would you have running to
25 the south?

26 A. At various times of the year
27 these are dry. Four -- these two actually combine
28 over the roadway into one. As one goes across here,
29 it -- one goes out here to the northwest.

30 Q. Can you describe to the Board the



1 nature of the design you would see envisaged in
2 regard to a development of this type for landfill
3 purposes? Perhaps you could tell us topographically
4 initially, some idea of what would be around the
5 perimeter of the site so that we could look at the
6 natural working space where the garbage dump would
7 be?

8 A. We envisage, one, that Concession
9 Road #7 will be paved to the southeast corner of the
10 site. The paved roadway will be carried in from
11 Concession Road #7 and into where the first cell
12 will be developed. The cell is this part of the
13 site here (indicating).

14 Q. That is the area most easterly
15 -- I'm sorry to interrupt you, but we are taking
16 this evidence down and when you say "this" it is
17 a little difficult for someone to understand when
18 he is reading the evidence.

19 A. Right. The site preparation
20 work is the first stage in the development of a
21 landfill site. The first stage in that development
22 would be enclosing the site with the safety fence
23 and it is envisaged this would be a six foot high
24 chain link fence around the site, fronting on the
25 concession roads and the farm fence on the internal
26 boundaries.

27 Another aspect of the site is to
28 provide screening so that the operation taking
29 place is screened from the ^{view of} people around the site.
30 This is proposed to be done in two ways -- I don't



1 know whether anyone can really see this. Is it big
2 enough to be seen? If you envisage that this is
3 the Concession Road #7 and this is a cross-section through
4 the site -- this site could be taken through here.
5 The six foot chain link fence would be erected on
6 the south boundary and then a screen of trees would
7 be planted and the initial screen for the site,
8 these trees would be 10 to 15 foot high poplars.
9 Initially they would be smaller for a variety of
10 reasons because they wouldn't be screening any-
11 thing initially. These trees would provide fast
12 initial screening and would be replaced later with
13 some more permanent tree such as a maple.

14 --- (Laughter)

15 Behind the tree line would be installed
16 a screening berm which in this case is a 15 foot
17 high mound of / ^{earth} which again would screen all the
18 operations in the area from the roadway. The site
19 which is shown here indicates the six foot high
20 level here. If you take the line of sight over the
21 top of the berm, you can't see the operations behind
22 it.

23 Behind this berm in the plan the
24 internal roadways would be developed. These would
25 comprise paved roadways or a paved roadway coming
26 in here and coming through a properly designed access
27 gate through the berm and turning immediately to the
28 screened weigh scales located behind the screen. This
29 permanent site, there would be two weigh scales pro-
30 vided, one for the weighing of traffic coming in and



1 one for checking vehicles as they left.

2 The site is basically to be developed
3 from the east end to the west end with a progressive
4 movement of the working face so that the area behind
5 can be restored and the area ahead left undisturbed
6 as long as possible. In other words, it is not the
7 intention to take this land and dig it all up in the
8 first year. The site is for 20 years and I will
9 describe later how the site is used progressively.

10 However, going back to the initial
11 development of the site, we would then install
12 gravelled access roads at approximately 550 feet
13 from the edge of the site. And then at 1,100 foot
14 centres across the site. These give these cells
15 which can be used successively.

16 I think I forgot to mention that the
17 fill area starts 300 feet in from the south boundary
18 and 300 feet in from the west boundary of the site.
19 This is the buffer strip for the features we have
20 been talking about. Around the internal area the
21 buffer strip is only 150 feet wide.

22 Going back to this cross section again,
23 you have the concession road, chain link fence,
24 tree line, berm, screen and this strip which gives
25 you room for/working and construction of this access road.

26 The next stage is to excavate ahead
27 of any work on the site in terms of getting rid of
28 rubbish, excavate an area about 400 feet long and
29 500 wide by 80 or 90 feet deep to provide a starting
30 point for work. The material excavated, the first



1 layer excavated would be stock piled in a part of
2 these berms from which it can be drawn later for
3 re-use. The remainder of the excavation from that
4 first piece would be used to construct these first
5 pieces of the screening berms around the potential
6 working area. In excavating this area the bottom
7 of the excavated area would be sloped so that any
8 water falling on it would be sloped from north to
9 south in line with the general grade of the site.
10 At the bottom end of the slope there would be a
11 sump constructed that would collect any water getting
12 in there and this would be pumped out from it.

13 As -- also in connection or in
14 conjunction with this screen there would be little
15 berms left as we progress to the ^{top of} /this excavation
16 so that the area is divided up into different
17 cells so that rain falling on an area which has
18 garbage in it which would be confined to that area
19 and areas which have no contaminating material in
20 them would be obtaining the rain water. To protect
21 this excavation storm ditches would be constructed
22 around the perimeter of the excavation. In effect,
23 when the sum total site is finished, there is a
24 storm ditch system hooking in with each of these
25 existing swales which will go around the whole site.
26 The purpose of these storm ditches is to catch the
27 water which falls on the landfill site and doesn't
28 penetrate the cover material, but runs across the
29 surface which will be seeded or cropped, depending
30 on the area, and gets into these ditches without



1 touching the garbage. The/program previously
2 mentioned checks on this aspect to see the water
3 is clean going into these ditches and leaving the
4 site. To protect these ditches from material which
5 penetrates into the landfill it becomes contaminated
6 through contact with the garbage and because it has
7 a very low rate of egress through the bottom, it
8 has to find its way inside and would get out and
9 contaminate this.

15

10 The leachate drain would be placed
11 around the whole site and placed in granular material
12 so that the material travelling through the area
13 does not continue beyond it/and would have some good
14 effect. The majority coming in would be picked up
15 in this leachate drain. I jumped ahead a bit there,
16 but that is the overall concept. The sump ditches
17 around there to carry off clean water and the
18 leachate drain was constructed around the toe to
19 prevent contaminated water from getting at the soil.
20 The operation of the site would start by placing a
21 series of daily cells across the first major cell
22 which is cell A here.

23 Q. Could you explain what a cell is?

24 A. I am sorry. A daily cell of
25 material is that amount of waste brought in/each day. Initially
26 in 1975 this would involve an area of 100 feet by
27 60 feet by eight feet high. Each day these indi-
28 vidual cells are covered and the following day the
29 next day's cell is placed against it and it also
30 is covered at the end of the day. These are shown



1 graphically here. The blue is the refuse material
2 and the brown is the nine inches of compacted clay
3 which is placed over this refuse each day. Just to
4 go back quickly here, we placed these daily cells
5 progressively along the initial excavation to supply
6 cover material for these cells. The machinery will
7 be excavating ahead of that, so that we are pulling
8 excavation from further up in the cell to use as
9 cover material at the beginning of a cell. This is
10 shown here (indicating) where this is the bottom
11 cell and then perhaps the second one will be put in
12 and then we go back and put one above that layer
13 and this one, this one, this one and gradually
14 build up a full / ^{height} so that when the top/^{layer} is reached,
15 four tiers of material have been placed and the site
16 would be shaped like this. The front part is pro-
17 gressively being excavated as you go up the site
18 and the garbage is being placed behind it.

19 I don't know if I did a very good
20 job on that.

21 Q. That is fine. As you build
22 these cells, you also build up on top of one another
23 in a pyramid like effect?

24 A. That is what I was trying to
25 illustrate here. This is the first one and then
26 coming along in a line this would be raised so that
27 you take the blue area, this is how, stopping here,
28 how this first one would look at this stage. Say,
29 stage two, these would be added so that when you
30 reach the final height here, you are still at the



1 lowest point further up with this provision for
2 catching clean water ahead of the excavation to
3 separate from contaminated leachate which has to be
4 trucked away independently.

5 Q. You referred earlier to 550
6 feet sections. Is that correct? Would this cross
7 section here refer to basically one of those sections
8 going in? Is that the idea?

9 A. This would -- 550 feet in width
10 is the total cell. This cell A representing a total
11 year's capacity in this part of the site. The
12 individual daily cells are the small ones in there
13 which are the 100 feet by 60 feet by eight feet high.

14 For bad weather operations the end
15 cell nearest the access road would generally be
16 left open at each run there and imported granular
17 material is kept handy to make sure that you can
18 keep things going on the site.

19 Q. You are referring to the
20 leachate disposal system which surrounds each one
21 of these cells. I take it that would surround the
22 cell in question?

23 A. It would surround the whole
24 landfill site. As each cell is developed, a leachate
25 drain is put up around each part of the individual
26 cell and these are extended progressively and man-
27 holes are placed in this leachate tunnel for main-
28 tenance purposes about every 300 feet. Each low
29 point in the system from which this leachate is
30 collected and trucked away, there would be a storage



1 manhole to give some capacity for holding this
2 material in the event that the trucks were not there
3 at the particular time to pump the system down.

4 Q. And in effect you put a pump
5 in there to pump it up into the back of the truck.
6 Where does the truck take it?

7 A. To the city sewage treatment
8 plant which is being done from the present site
9 for treatment.

10 Someone asked about the smell of
11 leachate. If you get a very powerful leachate in
12 the early stages of development, it can be quite
13 odourless. It is quite important to be kept in the
14 closed system and pumped out of there initially. We
15 have considered that as we develop the site and
16 the leachate strengths we expect will drop off a
17 bit and then we will consider the use of, possibility
18 of using this leachate as part of the agricultural
19 process at a later date. However, at this time
20 provisions will be made by the city for hauling all
21 of the leachate from all of the site away for treatment.

22 Q. Having dealt with the design, is
23 there anything else you would like to comment about
24 the engineering design of this?

25 A. Do you want me to discuss the
26 finishing process?

27 Q. I was going to ask you to move to
28 the agricultural aspect if you would.

29 A. Before I do, I think everyone
30 here is aware of the problems of an old garbage dump.



1 There is paper, flies, odour, smell, fires, every-
2 thing you wouldn't want in your back yard.

3 A SPEAKER: How about the front?

4 THE WITNESS: I agree. All I can say
5 to you is that is not what is proposed here. A
6 sanitary landfill site, I gather it was introduced
7 to distinguish from a garbage dump. As was mentioned,
8 for 20 years I have been in engineering and I don't
9 know that a firm ever got involved in the design
10 of a solid waste disposal by landfill prior to a
11 report on the method in 1967. At that time someone
12 found a hole in it and got the rubbish out to the
13 site and dumped it and fires started and there was
14 pollution and all this smell. We are attempting to
15 design this to be safe and to be as convenient
16 as possible while the operation is going on. I
17 mentioned odours. I read in the paper that people
18 have complained about odours, but there is no doubt
19 that an odour exists at the working face of a land-
20 fill site. I have smelled it myself but I honestly
21 did not consider it obnoxious and I did not notice
22 it more than two or 300 feet from the area. Much
23 less than that generally. If raw sludge is being
24 brought in that has not been covered up as it should
25 have been, certainly there would be an obnoxious
26 smell from that, or if something went wrong with
27 the leachate system, it smells pretty bad. Odour
28 is controlled basically by good site operation
29 and covering of the refuse as it is brought to the
30 site. There are no regulations to my knowledge to



1 include buildings near a landfill site because of
2 odour or other problems. You get into stockyard
3 operations and so on and many zoning by-laws are
4 now introducing restrictions on how close you should
5 come because they recognize there you have a variety
6 of smells. There isn't that problem in this type of
7 operation. Litter is another potential problem. The
8 way it is generally handled is as the material is
9 dumped -- the film mentioned certain procedures to
10 be followed in dumping but the City of London has
11 followed a procedure of having a snow fence around
12 the area which catches much of the material that
13 blows away from the site. Material that gets over
14 there some days catch in the ditches, but they do
15 have people out picking this material up around the
16 site. There was an aerial photograph taken there
17 and I know it is from a long way up, but it was
18 taken without the knowledge of the operator so it
19 does show the general cleanliness of the site. Some
20 days there can be litter around but they do have
21 people delegated to pick it up. In Metro Toronto
22 they have gone to higher screening, sometimes 16
23 feet net systems around the working area to control
24 any paper blowing off the face.

25 There is also in the city by-law
26 uncovered regulations covering trucks which have been guilty
27 of spilling material out of the back. They are not
28 allowed to bring refuse to the site.

29 Q. You are referring to the standards
30 of operation?



1 A. Yes.

2 MR. PLAXTON: I wonder if we couldn't
3 just -- it is 5:05. This witness has a great deal
4 more to say on this subject. Frankly, I think it
5 is a convenient time to break because we are now
6 into a new subject with the same witness. Perhaps
7 we could lay the matter over until tomorrow morning.

8 THE CHAIRMAN: He will be quite awhile
9 yet?

10 MR. PLAXTON: At least another hour.

11 THE CHAIRMAN: We will adjourn until
12 9:30 tomorrow morning.

13
14 --- Adjournment

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