1.0 PURPOSE

The purpose of this report is to provide information on the Industrial Disposal Oshawa Landfill (IDOL) site located in the Rossland Road East/Grandview Street North area.

This report was prepared pursuant to direction from the Development Services Committee on June 9, 2008, November 10, 2008 and June 2010.

Attachment No. 1 is a map showing the IDOL site.

2.0 RECOMMENDATION

That the Development Services Committee recommend to City Council:


2. That the Ministry of the Environment be provided a copy of the 2011 Golder Associates report on the IDOL site in Oshawa (Grandview Street North/Rossland Road East) and be requested to advise the City in writing of its comments on the Golder report, the individual Golder recommendations for additional work and monitoring and whether the Ministry of Environment will amend the existing certificate of approval for the IDOL site to implement the recommendations or to otherwise require the owner of the IDOL site to implement the recommendations or monitor and maintain the site.

3.0 EXECUTIVE SUMMARY

In response to concerns raised by Sarah Ross and the Lake Ontario Waterkeeper, City staff were directed to liaise with MOE and CLOCA and others with respect to any potential environmental or health impacts from the privately owned IDOL site (see Attachment No. 1) which is a closed landfill site under the jurisdiction of Ministry of Environment (MOE).

In addition to liaising with other agencies, the City engaged Golder Associates to review all existing documents on the IDOL site and to provide a professional opinion on the risk to public health and safety.
The 2011 Golder report concludes that:

"On the basis of Golder’s review of the limited available historical groundwater, surface water and landfill gas monitoring data, there is no evidence that the former IDOL Site is currently causing an "adverse effect", as defined on the Ontario Environmental Protection Act, as adjudicated by the MOE.

The principal receptors of any environmental risks associated with the former IDOL Site are:

- Surface water aquatic and terrestrial flora and fauna resident within Harmony Creek, and its sediments;
- Terrestrial and aquatic animals frequenting the IDOL property, and particularly burrowing animals and aquatic birds frequenting the wetland areas south of the former fill area;
- Authorized human visitors to the Site, including Site owners, regulatory officials and other authorized visitors;
- Unauthorized human visitors to the Site, including members of the general public trespassing on the lands; and,
- Domestic animals (dogs and cats) accompanying unauthorized visitors to the Site.

The concentrations of the major landfill constituents identified in the historical record by consulting firms and the MOE have not included acutely toxic substances in the normal course or in the concentrations observed to date. MOE has opined in writing that known discharges from the Site are not creating an adverse effect at this time, although MOE continues to inspect the Site on a regular basis. In Golder’s opinion, material adverse effects to any of these classes of receptors with occasion to visit the former IDOL property are very low."

It is recommended that the City formally request that the MOE provide comment on the 2011 Golder report and Golder’s recommendations for additional monitoring and other works at the site.

4.0 INPUT FROM OTHER SOURCES

4.1 General

- Golder Associates Ltd.
- Ministry of Environment (MOE)
- Environmental Commissioner of Ontario

4.2 Auditor General

- The Auditor General’s comments appear as Attachment No. 2.
5.0 ANALYSIS

5.1 Previous Committee Direction

- In June 2008 Sarah Ross wrote and appeared before the Development Services Committee regarding leachate at the IDOL Site.
- In response, the Development Services Committee requested that staff get an update from MOE and CLOCA and report back.
- On October 27, 2008 the MOE provided the City an update on the IDOL Site (see Attachment No. 3).
- On November 10, 2008 the Development Services Committee, in response to the MOE update, adopted the resolution which appears as Attachment No. 4.
- On June 28, 2010, Council received for information Report DS-10-140 dated June 9, 2010 (see Attachment No. 5) and directed that staff provide further updates as appropriate.

5.2 Application for Investigation to ECO

- On October 27, 2008 Ms. Ross and the Lake Ontario Waterkeeper submitted an Application for Investigation of the IDOL Site to the Environmental Commissioner of Ontario (ECO).
- On January 3, 2009 the ECO issued an interim review of the investigation and stated that the MOE would report back to the applicants by July 2009.
- A report on the IDOL matter was included in the ECO’s 2009-2010 Report (see Attachment No. 6).

5.3 Relevant Master's Thesis

- In 2010 Carrie Ginou, a Master's of Applied Bioscience candidate at UOIT, assessed potential impacts of leachate from the IDOL site on aquatic organisms in Harmony Creek and concluded that: metals and organic compounds present did not indicate that the downstream site was more impacted than the upstream site; although some components appeared to be leaching from Harmony Creek into adjacent waters, the levels of potential toxins was low; although some morphological and reproductive toxicity was observed, the majority of leachate samples were demonstrated to be non-toxic to hydra; and leachate present in the Harmony Creek does not pose a significant environmental risk to the aquatic life of the Harmony Creek.
5.4 Golder Study

- In May 2010 Golder Associates was retained to assist the City in consolidating and interpreting data regarding the IDOL site.

- Golder’s assistance was intended to help “get to the bottom of things” in a timely fashion using a professional, experienced and scientific resource.

- Further, Golder has a “history” with the IDOL site (having been involved in giving expert testimony at an OMB hearing for lands adjacent to the site) and carried out its assignment for $1,500 which represents good value.

- The Golder report was finalized in April 2011 and the main text appears as Attachment No. 7. The full report is quite lengthy and is available for viewing on the 8th Floor, Rundle Tower, City Hall, c/o Suzanne Elston, Senior Environmental Coordinator.

- Golder concludes that:

  “On the basis of Golder’s review of the limited available historical groundwater, surface water and landfill gas monitoring data, there is no evidence that the former IDOL Site is currently causing an “adverse effect”, as defined on the Ontario Environmental Protection Act, as adjudicated by the MOE.

  The principal receptors of any environmental risks associated with the former IDOL Site are:

  - Surface water aquatic and terrestrial flora and fauna resident within Harmony Creek, and its sediments;
  - Terrestrial and aquatic animals frequenting the IDOL property, and particularly burrowing animals and aquatic birds frequenting the wetland areas south of the former fill area;
  - Authorized human visitors to the Site, including Site owners, regulatory officials and other authorized visitors;
  - Unauthorized human visitors to the Site, including members of the general public trespassing on the lands; and,
  - Domestic animals (dogs and cats) accompanying unauthorized visitors to the Site.

  The concentrations of the major landfill constituents identified in the historical record by consulting firms and the MOE have not included acutely toxic substances in the normal course or in the concentrations observed to date. MOE has opined in writing that known discharges from the Site are not creating an adverse effect at this time, although MOE continues to inspect the Site on a regular basis. In Golder’s opinion, material adverse effects to any of these classes of receptors with occasion to visit the former IDOL property are very low.”
Golder recommends that additional monitoring, assessment, surveying and other work should be done at the site notwithstanding its opinion that no material adverse impacts are occurring at this time.

Given that the IDOL Site is privately owned and under the jurisdiction of the MOE with a Certificate of Approval that contains no provisions or requirements for ongoing monitoring, it is recommended that MOE be requested to advise the City of its position on the Golder report and recommendations.

6.0 FINANCIAL IMPLICATIONS

- The Golder Study cost $1,500.

7.0 RESPONSE TO THE COMMUNITY STRATEGIC PLAN

- Continuing to work the Ministry of the Environment to monitor the IDOL site responds to Goal B (A Green and Sustainable Community) of the City’s Community Strategic Plan by being a cleaner, greener city and using land wisely.

Suzanne Elston
Senior Environmental Coordinator
Office of the Senior Environmental Coordinator

Thomas B. Hodgins, B.E.S., M.A., RPP, Commissioner
Development Services Department

SE/c
Attachments
NOT TO SCALE
ALL LOCATIONS ARE APPROXIMATE

LEGEND

- APPROXIMATE PROPERTY BOUNDARY

MONITORING WELL LOCATION IN PLAN

SURFACE WATER MONITORING STATION

Source: Golder
June 2, 2011

To: Members of the Development Services and Committee

From: Ron Foster
Auditor General

I have read report DS-11-217 "Industrial Disposal Oshawa Landfill (IDOL) – Rossland Road East and Grandview Street North Area" and have reviewed the recent report by Golder Associates. I agree with the recommendations of staff.

 Ron Foster
Auditor General
Former Industrial Disposal (Oshawa) Landfill

The Industrial Disposal (Oshawa) Landfill (IDOL) site is located in east section of Lot 3, Concessions 2 and 3, in the City of Oshawa. The landfill site is located in the north half of the property. The site is bounded on the south and east by the Harmony Valley Conservation Area (Central Lake Ontario Conservation Authority - CLOCA). The properties to the north and west of the site have been developed for residential use. The site is fenced on the north and west sides of the site. The site is not fenced on the south or east. This permits unauthorized access from residents visiting the Harmony Valley Conservation Area which is adjacent to the east border of the site.

Industrial Disposal sold the site to Philip Services Inc. in 1999. In December 2003 the property was sold again to the current owner Rossland Acres Inc. Mr. Jim Sinclair is an officer of the company.

The original certificate of approval was issued to Industrial Disposal Oshawa Limited to landfill approximately 14 hectares of the north section of the site. Approximately, 1,000,000 tonnes of industrial waste was landfilled in the site between 1957 and 1980 over 9 hectares of the site before it closed. The primary sources of waste received at this site were from General Motors operations in Oshawa. The property was used as a former sand and gravel pit.

In 1979, an amended Certificate of Approval was issued to Industrial Disposal and restricted waste types and quantities, included significant changes to the leachate control system, installation of gas control and the submission of a closure plan. Additionally, ground and surface water monitoring requirements were imposed.

The leachate collection tile drains were initially installed along the east and south perimeter of the site. The leachate collection system was discharged to a lagoon located in the southwest corner of the site. The system was connected to the sanitary sewer in 1980. In 1986, the system was extended along the west side of the site.

The gas control system at the site currently consists of six passive gas vents located on the top of the site. Historically, landfill gas monitoring has not identified significant potential for off-site impacts.

Buffer zones have been established adjacent to the landfill site property to the north and west. The buffer zones are a requirement of the Plan of Subdivision for adjacent residential areas. The development plans for the residential area to the west of the site require the monitoring of landfill gas and groundwater along the west buffer zone. The City of Oshawa conducted monitoring on the west side of the landfill in 2005. The ministry has not been notified of any concerns.
regarding groundwater contamination or gas migration from the landfill. The next scheduled monitoring by the City of Oshawa is to occur in 2010.

In 1985 an amended Certificate was issued to formalize the closure of the site and did not contain conditions that required ongoing monitoring of groundwater or surface water.

The most recent assessments of site hydrogeology, landfill gas, ground and surface water quality are contained in reports from 2001 and 2002 prepared by the adjacent property owner to assess the potential for off-site impacts to proposed residential development. The reports do not identify the potential for significant impacts to residential properties located to the north or west.

Past monitoring has identified on-site impacts to ground and surface water from landfill leachate to the south of the waste footprint but has not identified significant potential for off-site impacts.

The ministry is aware of the onsite iron staining from the seepage in the south section of the site. Ministry staff have met onsite with Mr. Sinclair on several occasions to discuss required work to remediate the seepage and direct it into the onsite perimeter leachate collection system.

The company made repairs to the area of seepage in mid-July 2008. During subsequent inspections by ministry staff iron staining and seepage was again observed.

On October 24, ministry staff again attended the site with Mr. Sinclair and his consultant. A draft Provincial Officers Order was provided to Mr. Sinclair that outlined requirements to repair the seepage and erect fencing to restrict unauthorized access onto the site. The company also committed to prepare a plan for the site that will include ground and surface water monitoring.
5. Phil Dunn, Ministry of Environment – Summary of Former Industrial Disposal (Oshawa) Landfill (DS-08-489) (All Wards)

1. That a letter be sent to Phillip Dunn and Sandra Thomas, Acting District Supervisor, Ministry of Environment, stating that the City of Oshawa finds the summary regarding the former Industrial Disposal (Oshawa) landfill unacceptable and requests that further investigation be conducted and that a more aggressive remedial plan be implemented to prevent further contamination; and

2. That staff of the Development Services Department continue to monitor the situation and report back when appropriate.

ATTENTION: Development Services Department
ACTION TAKEN: CARRIED – DSC – Nov 10/08
1.0 PURPOSE

The purpose of this report is to provide information on matters related to the Industrial Disposal Oshawa Limited (IDOL) site located in the Rossland Road East/Grandview Street North area.

This status report is pursuant to direction from the Development Services Committee on June 9, 2008 and November 10, 2008.

Attachment No. 1 is a map showing the IDOL site.

Attachment No. 2 is a copy of correspondence from Sara Ross (Item No. DS-08-238) which initiated this matter.

Attachment Nos. 3 and 4 are the previous Committee directions.

Attachment No. 5 is a copy of the Ministry of the Environment’s October 2008 summary.

Attachment No. 6 is a copy of the Environmental Commissioner of Ontario’s interim review of Application 12008011: Alleged Contraventions of the Environmental Protection Act at the Oshawa Landfill/Application for Investigation of Rossland Acres Inc. (Investigation Undertaken by Ministry of the Environment).

2.0 RECOMMENDATION

That the Development Services Committee recommend to City Council:

That Report DS-10-140, dated June 9, 2010, be received for information and that staff provide further updates as appropriate.

3.0 EXECUTIVE SUMMARY

Staff have been trying to get additional detail on the condition of the private IDOL site. Testing is underway but current lab results are not yet available from MOE.
Additional information from the Environmental Commissioner of Ontario and a UOIT graduate student will be available in the Fall.

Given the lack of data, Golder was recently engaged ($1,500) to help staff consolidate a history of the IDOL site and previous data results. The intent is to build a strong, consolidated and comprehensive foundation of information. The Golder study will be available in the Fall.

4.0 INPUT FROM OTHER SOURCES

4.1 General

➢ Golder Associates Ltd.

➢ Central Lake Ontario Conservation Authority

➢ Environmental Commissioner of Ontario

➢ Ministry of Environment

4.2 Auditor General

➢ The Auditor General has no comment.

5.0 ANALYSIS

5.1 Previous Committee Direction

➢ On June 4, 2008 Sarah Ross wrote to the Development Services Committee regarding leachate at the IDOL site. (See Attachment No. 2)

➢ On June 9, 2008 Ms. Ross appeared before the Development Services Committee to express her concerns. In response, the Development Services Committee requested that staff get an update from MOE and CLOCA and report back (see Attachment No. 3).

➢ On November 10, 2008 the Development Services Committee approved the Direction in Attachment No. 4 in response to an MOE update. The MOE update appears as Attachment No. 5.

5.2 Application for Investigation to ECO

➢ On October 27, 2008 Ms. Ross and the Lake Ontario Waterkeeper submitted an Application for Investigation of the IDOL site to the Environmental Commissioner of Ontario (ECO).
On January 3, 2009 the ECO issued an interim review of the investigation and stated that the MOE would report back to the applicants by July 2009. (Attachment No. 6)

The ECO has advised staff that a report on the IDOL matter will be included in the ECO's 2009-2010 Report which will be issued in Fall 2010.

5.3 MOE Testing

To the best of staff's knowledge, the MOE has been undertaking testing in and around the IDOL site as recently as May, 2010.

Current lab testing results from MOE are not yet available.

Staff have requested that MOE expedite the analysis of the tests and the provision of data to the City.

5.4 UOIT Graduate Student

Carrie Ginou, a UOIT graduate student, has also been collecting data samples associated with the IDOL site for the past two years and is in the process of finalizing her findings. It is anticipated that her thesis will be completed by September 2010.

Ms. Ginou has agreed to present her findings to the Development Services Committee when available in Fall 2010.

5.5 Golder Study

As a result of the ongoing lack of data from MOE and to consolidate existing data and further the City's knowledge of the IDOL site and establish a good foundation of information, Golder Associates Limited was retained ($1,500) in May 2010 to:

- Conduct a review of all existing documents related to the IDOL site; and
- To provide a professional opinion with respect to the current degree of relative environmental risk to public health and safety, including any particular risks to dogs; the extent of environmental site remediation required (if any); an assessment regarding potential future uses of the site.

The Golder report will be finalized in September 2010.

6.0 FINANCIAL IMPLICATIONS

The cost to retain Golder for the study was $1,500 and was paid for from the Department's operating budget.
7.0 RESPONSE TO THE COMMUNITY STRATEGIC PLAN

- Responding to a citizen's concerns and investigating the IDOL site advances to Goal B (A Green and Sustainable Community) and Goal C (A Caring and Responsive Community) of the Community Strategic Plan by ensuring accountability, promoting effective City management and managing lands in an environmentally responsible manner.

Suzanne Elston, Senior Environmental Coordinator  
Environment and Energy Management

Thomas B. Hodgins, B.Eng., M.A., RPP, Commissioner  
Development Services Department

SE/c  
Attachments
Attachment No. 1

Item No.: DS-10-140
Subject: Industrial Disposal Oshawa Limited (IDOL)
Address: Rossland Road East/Grandview Street North Area
Good morning,
I am a resident of Oshawa and would like to attend the next meetings of the Development Services Committee and Oshawa’s Environmental Advisory Committee. Councillor April Cullen told me to send you an e-mail regarding this. I notice that the DSC meeting is this coming Monday with the one following not until September - I would like to be able to attend the one on June 9th. As for the OEAC, I cannot find information about when they meet. I am not sure what the process is for getting on the agenda, but I could like to address these Committees regarding leachate at the Harmony Creek landfill.
I look forward to hearing from you regarding this matter.
Sincerely,
Sarah Ross
CARRIED

DS-08-238  Sarah Ross – Requesting to Address Committee Regarding Leachate at Harmony Creek Landfill (All Wards)

That Correspondence DS-08-238 dated June 4, 2008 from Sarah Ross expressing concern about the leachate at the Harmony Creek Landfill be referred to staff to obtain an update from the Ministry of Environment and to work with other agencies, including the Central Lake Ontario Conservation Authority, and to report back to Committee and that Ms. Ross be advised of the results.

Melissa Pringle
Committee Co-ordinator
5. Phil Dunn, Ministry of Environment – Summary of Former Industrial Disposal (Oshawa) Landfill (DS-08-489) (All Wards)

1. That a letter be sent to Phillip Dunn and Sandra Thomas, Acting District Supervisor, Ministry of Environment, stating that the City of Oshawa finds the summary regarding the former Industrial Disposal (Oshawa) landfill unacceptable and requests that further investigation be conducted and that a more aggressive remedial plan be implemented to prevent further contamination; and

2. That staff of the Development Services Department continue to monitor the situation and report back when appropriate.

ATTENTION: Development Services Department
ACTION TAKEN: CARRIED – DSC – Nov 10/08
This is it. Thanks.

Hi Paul,

Sorry for the delay – attached is the summary. Any questions please call or email.

Thank you, Phil

(905)427-5627
(905)424-2808
Former Industrial Disposal (Oshawa) Landfill

The Industrial Disposal (Oshawa) Landfill (IDOL) site is located in east section of Lot 3, Concessions 2 and 3, in the City of Oshawa. The landfill site is located in the north half of the property. The site is bounded on the south and east by the Harmony Valley Conservation Area (Central Lake Ontario Conservation Authority - CLOCA). The properties to the north and west of the site have been developed for residential use. The site is fenced on the north and west sides of the site. The site is not fenced on the south or east. This permits unauthorized access from residents visiting the Harmony Valley Conservation Area which is adjacent to the east border of the site.

Industrial Disposal sold the site to Philip Services Inc. in 1999. In December 2003 the property was sold again to the current owner Rossland Acres Inc. Mr. Jim Sinclair is an officer of the company.

The original certificate of approval was issued to Industrial Disposal Oshawa Limited to landfill approximately 14 hectares of the north section of the site. Approximately, 1,000,000 tonnes of industrial waste was landfilled in the site between 1957 and 1980 over 9 hectares of the site before it closed. The primary sources of waste received at this site were from General Motors operations in Oshawa. The property was used as a former sand and gravel pit.

In 1979, an amended Certificate of Approval was issued to Industrial Disposal and restricted waste types and quantities, included significant changes to the leachate control system, installation of gas control and the submission of a closure plan. Additionally, ground and surface water monitoring requirements were imposed.

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Buffer zones have been established adjacent to the landfill site property to the north and west. The buffer zones are a requirement of the Plan of Subdivision for adjacent residential areas. The development plans for the residential area to the west of the site require the monitoring of landfill gas and groundwater along the west buffer zone. The City of Oshawa conducted monitoring on the west side of the landfill in 2005. The ministry has not been notified of any concerns.
regarding groundwater contamination or gas migration from the landfill. The next scheduled monitoring by the City of Oshawa is to occur in 2010.

In 1985 an amended Certificate was issued to formalize the closure of the site and did not contain conditions that required ongoing monitoring of groundwater or surface water.

The most recent assessments of site hydrogeology, landfill gas, ground and surface water quality are contained in reports from 2001 and 2002 prepared by the adjacent property owner to assess the potential for off-site impacts to proposed residential development. The reports do not identify the potential for significant impacts to residential properties located to the north or west.

Past monitoring has identified on-site impacts to ground and surface water from landfill leachate to the south of the waste footprint but has not identified significant potential for off-site impacts.

The ministry is aware of the onsite iron staining from the seepage in the south section of the site. Ministry staff have met onsite with Mr. Sinclair on several occasions to discuss required work to remediate the seepage and direct it into the onsite perimeter leachate collection system.

The company made repairs to the area of seepage in mid-July 2008. During subsequent inspections by ministry staff iron staining and seepage was again observed.

On October 24, ministry staff again attended the site with Mr. Sinclair and his consultant. A draft Provincial Officers Order was provided to Mr. Sinclair that outlined requirements to repair the seepage and erect fencing to restrict unauthorized access onto the site. The company also committed to prepare a plan for the site that will include ground and surface water monitoring.
Review of Application 2008011: Alleged Contraventions of the Environmental Protection Act at the Oshawa Landfill/ Application for Investigation of Rossland Acres Inc. (Investigation Undertaken by Ministry of the Environment)

Background/Summary of Issues

On October 27, 2008, the applicants requested that the Ministry of Environment (MOE) investigate a possible leachate leakage at the former Industrial Disposal (Oshawa) Limited landfill site, now owned by Rossland Acres Inc. They provided evidence in the form of photographs, showing that over the spring and summer of 2008 an orange-coloured liquid was seeping from the ground on the south-facing side of the site, which has been closed since 1985. They also provided test results for three sets of soil and water samples taken from the affected site over this period of time. The tests revealed levels of several contaminants above both national and provincial guidelines for both soil and water. The applicants argued that the discharges had impaired the quality of the natural environment and might have also rendered the property, plants and animals unfit for human use. They also pointed out that the site is in close proximity to a residential development and that many people walk their dogs in the area. The applicants alleged that the owner of the site was in contravention of the Environmental Protection Act (EPA) in two ways: first, by allowing the discharge of a substance into the environment that may be causing an adverse effect; and secondly, by failing to report this discharge to the MOE.

Ministry Response

After reviewing the application, the ministry decided on January 3, 2009, to investigate. The investigation included further testing of samples collected from the site by the owner, testing of samples taken from Harmony Creek (which flows just south of the site) by the ministry, and meetings with the owner on the site to examine the leachate discharges and discuss remediation measures. The ministry concluded that their investigation did not indicate that the discharge was causing or could cause an adverse effect and that the owner was not in contravention of the EPA, either for allowing the discharge or for failing to report it to the MOE. The ministry also stated that although no offence had been committed, it recognizes the significant concern regarding this issue and will therefore carry out the following activities: a comprehensive examination of the company’s compliance with the requirements of their provisional Certificate of Approval (C of A); surface and groundwater sampling at the site and surface sampling of Harmony Creek; and continued communication with the company to ensure that the latter takes action with respect to mitigating any risks associated with the seepage, repairing the seepage, and addressing its source.

ECO Comment

MOE has promised to report back to the applicants in three months (July, 2009) with the results of these further investigations and activities. The ECO will be monitoring this case and will review the outcome of this application for our 2009-2010 reporting year.
SECTION 6: ECO REVIEWS OF APPLICATIONS FOR INVESTIGATION

6.1 Ministry of the Environment

Review of Application 2008011:

6.1.1 Alleged EPA Contraventions at a Closed Oshawa Landfill Site
(Investigation Undertaken by MOE)

Geographic Area: City of Oshawa

Background/Summary of Issues

In an application submitted to the ECO in October 2008, Lake Ontario Waterkeeper and another applicant claimed that potentially hazardous leachate has been seeping from a closed Oshawa landfill site onto a heavily used path. Local residents, who use the path to access the Harmony Valley Conservation Area, have become alarmed that the seepage might be posing a threat to themselves, their dogs and the environment. The applicants alleged that Rossland Acres, the owner of the landfill site, had contravened the following three sections of the Environmental Protection Act (EPA):

1) Section 6, by allowing a discharge of a contaminant into the natural environment in an amount in excess of that prescribed by regulations;
2) Section 14, by allowing a discharge of a contaminant that may cause an adverse effect; and
3) Section 15, by not notifying the Ministry of the Environment (MOE) of the discharge.

The applicants explained that residents strolling along the path in the summer and fall of 2008 saw a rust-coloured material on the ground and an oily sheen on the water regularly after rainfalls. According to the applicants, landfill leachate had seeped onto the path along the south side of the landfill site and into nearby streams, which empty into Harmony Creek. The applicants noted that numerous homes have been built around the landfill in the last 30 years. Some of these homes have backyards adjacent to the site.

Background

Industrial Disposal (Oshawa) Limited began operating this landfill in 1957. It was a former sand and gravel pit, located between a residential area on the north and west sides and the Harmony Valley Conservation Area on the south and east sides. Only the north and west sides of the 35-acre site are fenced. Harmony Creek flows through the southeast corner.

According to MOE, approximately 1,000,000 tonnes of industrial waste were deposited on the north section of the site between 1957 and 1980. Most of the waste came from the General Motors plant in Oshawa. The first Provisional Certificate of Approval (C of A) for the site was issued in 1971 but was re-issued in 1976 with three significant amendments as a result of a decision by the Environmental Appeal Board, which:

1) Required closure of the site by the end of 1979;
2) Restricted the types and quantities of wastes that could be deposited at the site; and
3) Required improvements to the leachate control system, gas control and monitoring, and ground/surface water monitoring.

The C of A was amended in 1979 to allow certain wastes to be deposited until June 30, 1980. The collection tile drains along the east and south perimeter of the site discharged leachate into a lagoon until 1980. The drains were then connected to Oshawa's sanitary sewer system and the lagoon system was decommissioned. According to MOE, the site owner stopped shipping wastes to the site in 1980.

MOE issued an amended C of A in 1985 approving the site for "closure and maintenance" activities only and requiring the installation of a leachate collection system along the west side. The site was not allowed to receive wastes. Although the 1985 C of A did not require a closure plan or include specific ground and surface water monitoring, the owner was required to close the site to the satisfaction of MOE's Environmental Assessment and Approvals Branch. According to MOE, this was done. In 1986, collection tile drains were installed along the west side of the site. MOE explained that the development plans for the west side of the site included a buffer zone and required groundwater to be monitored in the buffer zone.

The current owner, Rossland Acres, purchased the site in 2003 for $100.

**Concern – Potentially Hazardous Leachate is Seeping onto a Popular Path**

The applicants provided photographs of parts of old cars, a rust-coloured material and an oily sheen along a well-worn path on the south side of the site. According to the applicants, the rust-coloured material and oily sheen were particularly evident whenever it rained in the spring, summer and fall of 2008. The applicants arranged for Maxxam Analytics to test soil and surface water samples that they had taken from the site. The applicants summarized the test results as follows:

- **Soil samples** - the levels of chromium and copper exceeded the Canadian Soil Quality Guidelines (CSoQGs) and cobalt, exceeded the Interim CSoQGs. (An interim guideline for a chemical is specified if the data is insufficient or inadequate to determine a CSoQG.)
- **Water samples** - the levels of aluminum, arsenic, cadmium, chromium, copper, iron, lead, nickel, silver, toluene and zinc significantly exceeded the Canadian Water Quality Guidelines for the Protection of Aquatic Life.
- **Water samples** - the levels of arsenic, cadmium, chromium, cobalt, copper, iron, lead, nickel, silver and zinc significantly exceeded the Ontario Provincial Water Quality Objectives (PWQOs).
- **Water samples** - the levels of aluminum, arsenic, vanadium, toluene and zirconium far exceeded the Interim PWQOs.

The applicants explained that exceedances of the PWQOs mean that the "quality of the natural environment has been and continues to be impaired;" and that exceedances of the CSoQGs indicate that "there may be a threat to human or ecological health" and that further investigation is required.

The applicants provided information obtained from a 1992 Ontario Municipal Board (OMB) decision, which listed various types of liquid waste that had been disposed at the site including: lubricating and hydraulic oils, isopropyl alcohol, trichloroethylene sludge, paint, antifreeze and paint sludge. The applicants also included an extract from MOE’s Waste Disposal Site Inventory, which was prepared in 1991, indicating that the site was classified as "A3" meaning that it is an "urban site containing municipal or domestic waste that is of the highest hazard level to humans."

The applicants provided evidence of prior concerns related to leachate and methane gas including:

- At a 1992 OMB Hearing, a hydrogeological and geological expert presented his considered opinion of what would happen if the landfill leachate collection system was not working properly. He testified that, based on the soil conditions and direction of water movement through the soil, leachate should be expected to seep from the south side of the site or to a mound within the site, eventually breaking out on the sides.
- The Official Plan for the City of Oshawa prohibits any permanent structures on the site and requires MOE approval of any development adjacent to the site due to potential methane gas migration and leachate release.
- A 2003 OMB decision on a proposed condominium development on land adjacent to the site identified landfill impacts and methane gas migration as potential threats and advised that a "more thorough review of hydrological site conditions was required" to "protect the public interest and the health and safety of all citizens."
- The 2006 Harmony Valley Park Master Plan Report indicated that remediation of the landfill site would be required before the park could expand because of safety and environmental concerns.
- The developer of the houses on the north and west sides of the landfill site installed a gas venting and barrier system in 1987.

The applicants explained that the LFS operated when landfill sites were subject to less stringent regulations and rules including rules for monitoring. They noted that the monitoring wells at the south end of the site have been inactive since the 1990s and that there is no regular monitoring of ground and surface water along the south side. The applicants were concerned that leachate may contaminate the Harmony-Farewell Iroquois Beach Wetland Complex, a provincially significant wetland, which lies immediately south of the seepage area. Harmony Creek flows through the wetland. (According to our information, the municipality has designated the wetland as "environmentally sensitive" but the Ministry of Natural Resources has designated it as a "non-provincially significant wetland.")

The applicants supported their allegations with maps, photos, sampling results and other documents. For example, they provided:

- maps showing the locations of the landfill, observed seepage, residences, Harmony Creek and the Conservation Area,
- photos of old car parts, rust-coloured seepage, surface water with a sheen, and pets and people using the path where the seepage was found,
- results of water and soil sampling that they conducted; and
- news articles describing people’s concerns.

The applicants alleged that the leachate may be harmful to people, children, pets and/or the ecosystem. The applicants explained that the discharge was "out of the normal course of events," was not authorized under any regulation or act and has "impaired the quality of the natural environment for any use that can be made of it."

Other Information

Under section 46 of the EPA, landfill sites cannot be developed for 25 years after closure of the site, which means that development would be allowed on the landfill site as of 2010. In June 2008, the owner of Rossland Acres briefly offered 20 acres of the landfill site and 50 acres of land to the south for sale with an asking price of $4,900,000. The offer was withdrawn a few days later.

The CSQGs are federal guidelines intended to protect both human health and ecological receptors on land. They are to be used as benchmarks for evaluating the need for further investigation or remediation. The Canadian Water Quality Guidelines are also federal guidelines and are intended to protect plants and animals that live in waterbodies. They are based on toxicity data for the most sensitive plants and animals found in Canadian waters. The Provincial Water Quality Objectives are provincial criteria that are "protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water." They include consideration of public health and aesthetics.

Until the early 1970s, landfill sites were regulated by the Ontario Department of Public Health and municipalities. In general, anyone could setup and operate a landfill site without having to install a liner or other leachate management system. In 1971, the Ministry of the Environment was created and the EPA was passed. Since then, increasingly more stringent requirements for managing wastes have been
passed, including O. Reg. 232/98 – Landfilling Sites, made under the EPA, which outlines the standards for the design and operation of new and expanding landfill sites. However, many of the current standards do not apply to closed landfill sites, including the Oshawa landfill, and were not in force when it operated.

On July 22, 2009, the “Oshawa This Week” newspaper reported that a dog became violently ill after he ran into orange-coloured water along the edge of the landfill site and the Harmony Valley Park. MOE advised the newspaper that in April 2009, the owner of the landfill site had excavated the seepage area, installed new drains to redirect groundwater and erected fencing along the east side in compliance with a draft Provincial Officer’s (PO) Order issued in 2008.

The owner of Rossland Acres, Mr. James Sinclair, is well-known to MOE. In December 2008, he and two of his companies, Demolition and Recycling Inc. and Bakelite Thermosets Ltd., were convicted of failing to comply with orders issued by MOE related to the former Bakelite site in Belleville. MOE had warned Mr. Sinclair in 2002 not to disturb sediments behind the Bakelite site that were contaminated with PCBs. However, he proceeded to excavate and discharge the sediments into the Bay of Quinte. Mr. Sinclair also failed to comply with orders to remediate the site and clean up the discharged sediment. He and his companies were fined a total of $659,000 plus victim surcharges and he was sentenced to four months in jail. A consulting company that he hired was fined $54,000 for submitting results to MOE that did not indicate the presence of PCBs on the property.


Ministry Response

MOE agreed to undertake the investigation. In its initial investigation (sent to the applicants in April 2009), MOE concluded that the seepage was not in violation of sections 6 and 14 of the EPA, and, since there was no violation, the owner could not be in violation of section 15 of the EPA. MOE advised that it has conducted inspections of the site since it stopped receiving waste in 1980 and has collected and analyzed surface water samples; and reviewed hydrogeology and monitoring reports for the site. MOE also advised the applicants that it continues to communicate with the site’s owner to ensure ongoing compliance.

MOE explained that no offsite impacts to the residential properties to the north and west were found when the site’s hydrogeology and surface and groundwater quality were last assessed in 2001 and 2002. However, on the south side, onsite impacts to ground and surface water; specifically chloride and iron impacts, from landfill leachate were identified in 1992. MOE concluded that iron in the landfill leachate was having a “minimal” impact on water quality in Harmony Creek. Furthermore in 2000, MOE found that iron levels were below the PWQOs for iron. During the 2007 inspection, MOE did not observe any leachate seepage.

The City of Oshawa last monitored the north and west sides in 2005 and did not report any groundwater contamination concerns. MOE advised that the City is planning to monitor the groundwater again in 2010.

MOE explained that on May 14, 2008, MOE staff confirmed a complaint that there was onsite seepage. Staff concluded that increased precipitation in late 2007 and early 2008 probably contributed to the seepage. Although the owner made repairs in July 2008, MOE again found seepage. Since then, MOE, the owner and a consultant have met several times to discuss further remediation measures. MOE noted that residents are able to access the landfill site without authorization. On October 24, 2008, MOE issued a draft PO Order requiring Rossland Acres to prepare a plan to remediate the area of seepage, install fencing and signage to control access to the site, and to monitor the groundwater. MOE assured the applicants that it would ensure the owner complied with the draft PO Order.

In November 2008, the owner completed onsite groundwater sampling. MOE reviewed the results and found “minor exceedances” of its drinking water standards for manganese, sodium, chloride and
selenium. Although the groundwater in the area is not used for drinking water purposes, MOE explained that exceedances of the drinking water standards can trigger further groundwater assessment. MOE also conducted surface water sampling in Harmony Creek upstream and downstream of the site and found no measurable impact. The results compared "favourably" to the PWQOs, which are protective of the creek ecosystem and more stringent than the drinking water standards. MOE indicated that it would continue to monitor water quality in Harmony Creek.

MOE explained that it reviewed the results of the soil sampling done by the applicants against the background and generic potable groundwater soil quality standards in its "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the EPA." For many of the parameters, the results met the background quality standards (Table 1) -- the most stringent standards -- and for the majority of the parameters, the less stringent generic quality standards (Table 2). Only the beryllium and nickel results for one sampling location exceeded the generic quality standards. MOE explained that the soil could be used as inert fill.

MOE explained that it had also reviewed the results of the water sampling done by the applicants against the Ontario Drinking Water Quality Standards for chemical parameters and the background groundwater standards in Table 1 (where applicable) in the Soil, Groundwater and Sediments Standards described above. Although the standards for some non-health-based parameters, for example, iron and aluminium, were exceeded, MOE explained that elevated iron and aluminium can be indicative of landfill leachate but that "they are also commonly elevated in natural, untreated waters across the province." MOE concluded that the leachate from the site is of weak to moderate strength, which was also the conclusion of the consultant's report prepared for the City of Oshawa in 2000.

MOE noted that the elevated level of arsenic found by the applicants at one water sampling location and lead at another are inconsistent with levels found in nearby soil and water samples. MOE explained that the elevated results were not a violation of the EPA but are sufficiently concerning to warrant further sampling.

MOE explained that the photographs provided by the applicants indicate iron and manganese oxidation and iron bacterial activity. Iron bacteria are found in most parts of the world and are not a health risk. MOE also explained that the bacteria can produce: rust-coloured deposits; a broken, oily "rainbow" sheen on the water; and a smell similar to fuel oil, cucumber or sewage. MOE advised that it had made similar observations during the 2008 inspection. Since the water sampling results supplied by the applicants did not indicate the presence of volatile organic compounds except for a trace level of xylene, MOE concluded that the sheen was not due to petroleum hydrocarbons. Water sampling conducted in 1992 and 2000 also supports this conclusion.

According to MOE, the Harmony-Farewell Iroquois Beach Wetland Complex is a "non-sensitive, unrestricted Environmentally Sensitive Area" that is designated in the Official Plan for the City of Oshawa.

MOE concluded by stating that the owner of the site was in the process of implementing the remediation plan developed under the draft PO Order and that there appears to be no offsite impacts. However, MOE agreed that the applicants' concerns were significant and committed to "undertake a comprehensive examination of compliance with the requirements of the site's Provisional C of A and conduct surface and groundwater sampling at the site and surface water from Harmony Creek by late spring 2009." Attached to MOE's reply to the applicants was a copy of the letter that MOE sent to the owner of the site explaining the outcome of the initial investigation and MOE's intention to undertake a comprehensive examination and conduct sampling. In both letters, MOE indicated that it would advise the applicants of the results of the second investigation in approximately three months.

MOE sent the results of the second investigation to the applicants on February 8, 2010 (and an updated version on April 19, 2010). In the letter, MOE explained: that the surface water results indicated no measurable impacts on the creek; and that groundwater results indicated elevated concentrations of non-health-related parameters as expected but no exceedances of the Ontario Drinking Water Standards for health-related parameters with the exception of cadmium in one sample. MOE explained that the on-site
Impacts to groundwater are consistent with historical information for this site and similar to other, smaller to medium-sized dumps and landfills in the province that were operated for the disposal of municipal waste. MOE indicated that it will continue to monitor the site to determine trends and changes in surface and groundwater quality and offered to provide the applicants with an annual update of activities.

ECO Comment

The ECO agrees with MOE's decision to undertake this investigation. The ECO is also pleased that, although its initial investigation did not reveal any potential violation of the EPA, MOE was sufficiently concerned to do a more detailed, second investigation, which confirmed the original conclusion. However, when MOE reported the results of the second investigation to the applicants, it did not include an explanation of why its results differed from theirs, which left the applicants with a new set of questions. In the future, the ECO recommends that MOE include such an explanation so that applicants can have more confidence in the results. The ECO is also pleased that MOE has committed to continue monitoring and has offered to keep the applicants informed of activities at the site.

Concerns that aging small landfill sites are posing risks to the environment and endangering human health are not new. Lax regulations when these sites operated/closed, unclear obligations of owners, and/or little or no monitoring of the sites have raised fears among the public that aging landfill sites pose a threat to neighbouring residential areas and natural areas, including surface and groundwater, which may be the source of their drinking water. In our 2005/2006 Annual Report, the ECO explained that MOE's inventory of landfill sites was 15 years old, and that municipal waste disposal sites are subject to different standards depending on their size and age. In general, small older landfill sites, including closed sites, are subject to less stringent standards. The ECO outlined concerns related to the province's approach to managing landfills, including:

- Lack of publicly accessible, up-to-date information on landfill sites;
- Lack of a comprehensive plan to update waste management Cs of A; and
- Two-tiered system standards.

The ECO urged MOE to "implement a more rigorous system for tracking all aspects of landfill status." The ECO also urged MOE to update the standards for aging, active landfill sites, both large and small, approved prior to August 1998 when the current more stringent standards came into force. In response to the ECO's comments, MOE reviewed its records and identified 2,449 active and closed landfill sites in Ontario with Cs of A. It has also created the Integrated Database System to track them. However, the system has limited capabilities and is not accessible by the public. MOE advised the ECO that it did not have the resources to create sophisticated landfill tracking and monitoring systems. For the full update on the ECO's 2005/2006 discussion on aging landfills, refer to Part 6.1 of this Annual Report.
RE: ENVIRONMENTAL STATUS UPDATE, FORMER INDUSTRIAL DISPOSAL OSHAWA LANDFILL, OSHAWA, ONTARIO

Dear Ms. Elston:

Golder Associates Ltd. ("Golder") has completed a review of existing environmental information reasonably available concerning the former Industrial Disposal Oshawa Landfill ("IDOL") property, located northeast of Rossland Road East and Grandview Street North in the City of Oshawa (the "Site"). This report provides a brief summary of the findings of previous investigations and considers the current status of the IDOL property based upon the most recent surface water and groundwater sampling data available.

Specifically, this report describes:

- the history of the IDOL Site including its current and historic ownership and uses;
- summary of local geology and hydrogeology;
- summaries of previous reports available to Golder for review;
- summaries of other information known by Golder to exist regarding the IDOL property;
- efforts to contact other public agencies;
- summaries of current understanding related to engineered containment systems;
- opinion related to current environmental risk potential of landfill; and
- opinion related to future monitoring/maintenance recommendations.

1.0 INTRODUCTION

The IDOL Site is located in east section of Lot 3, Concessions 2 and 3, in the City of Oshawa. The landfill Site is located in the north half of the property. The Site is bounded to the south and east by Harmony Creek. The Harmony Valley Park (Conservation Area) owned by the City is also located to the east of the Site. The
properties to the north and west of the Site have been developed for residential use. The properties are fenced on the north and west sides. The Site is not fenced on the south or east sides. The general location of the property is shown on Figure 1.

Because of the incomplete fencing of the IDOL property boundary, unauthorized access by the general public is possible, and in fact, the IDOL property is commonly used as a short-cut to the Harmony Valley Park, and as a dog walking park.

2.0 IDOL SITE HISTORY

Prior to 1957, the property upon which the IDOL Site was eventually developed was utilized for commercial sand and gravel extraction. The productive sand and gravel unit had been essentially fully exploited such that the underlying glacial till soils were exposed. Thereafter, the spent pit was converted to an industrial commercial landfill Site. It is not known to an absolute certainty, but strongly suspected that no base liner material (placement of clay, drainage layer, etc.) was installed prior to the commencement of landfilling in or about 1957.

The active landfill Site was operated by Intermetco Limited ("Intermetco"), as the Industrial Disposal (Oshawa) Landfill. It operated under the auspices of a Certificate of Approval issued by the Waste Management Branch of the forerunner of the Ontario Ministry of the Environment ("MOE") in September of 1971 that allowed landfilling within the northern 14 hectares of the Site. Prior to that time, waste disposal Sites were largely unregulated in Ontario. Approximately, 1,000,000 tonnes of industrial waste was landfilled in the Site between 1957 and 1980 over 9 hectares of the Site before it ceased operations in about 1980, and was formally closed in 1985. In 1985 an amended Certificate of Approval was issued by MOE to recognize the closure of the Site, but no provisions requiring ongoing monitoring of the environmental status of the Site were included.

It is again not fully clear as to what corporate entities may have contributed waste to the IDOL Site, although it is understood that General Motors of Canada utilized the Site for disposal of various waste materials generated in its Oshawa operations. The information relating to the quantities and nature of the waste placed within the IDOL Site is largely anecdotal, although it is generally accepted that, in total, approximately 1,000,000 metric tons of industrial/commercial wastes were received at the Site, reportedly including spent solvents, oils, paint sludges, resins and other solid and liquid waste.

The IDOL Site was sold by Intermetco to Phillip Services in 1999 and subsequently to Rossland Acres Inc. in 2003.

Since its closure, the IDOL Site has become increasingly used by the general public as unofficial parkland, to which access has not been granted by the current owner. Portions of the IDOL Site immediately south of the landfilled area have been actively considered by Durham Region (the "Region") for use as a future extension of Rossland Road East.

3.0 GEOLOGICAL AND HYDROGEOLOGICAL SETTING

The IDOL property lies within the western and northern slope of the Harmony Creek valley. The geology within the Site vicinity consists of dense glacial till deposits comprised mainly of silty sand, although silty clay till was also identified by some investigators. Isolated and apparently non-continuous stringers and lenses of clay and/or sand and gravel are identified by previous investigators, and this is consistent with the glacio-fluvial nature of the deposits. Prior to the operation of the historical commercial sand and gravel business, the glacial till present in the subsurface at the Site was partially over lain by glacio-fluvial channel deposits of sand and gravel. The excavated sand and gravel formerly located within the northern one third of the Site was infilled with commercial and industrial waste between the years of 1957 and 1980, creating an artificial mound that may
generally reflect the approximate surface topography prior to landfilling, but more probably represents an artificial zone of locally elevated topography relative to the pre-sand and gravel extraction period.

The Site is underlain at depth by shale and limestone bedrock.

The regional hydrogeological conditions are strongly influenced by the local topography and the creek valley influences. Groundwater flow is expected to regionally be towards the south and southeast from the Site towards natural groundwater discharge into Harmony Creek and the wetland areas immediately north of the creek. Local groundwater flow patterns may be locally influenced by variations in surface elevation associated with the landfilled area and/or by the presence of any significant groundwater mound (leachate) within the waste area itself.

The local flow is also locally influenced by the presence of man-made drainage swales, such as is present along the western boundary of the IDOL Site, and/or by buried interceptor drains/trenches that were originally designed along the east, south and west side of the landfill Site. Such features along the east and south boundaries may only accentuate the natural regional groundwater flow direction, although such structures along the west side may locally direct groundwater flow towards the west from the landfill towards interception by the trench.

Communities of hammock trees cover numerous areas of the landfill surface, which may impede efficient runoff of surface water, although the majority of rainfall and snowmelt is expected to run off to the south and east, and/or infiltrate through the landfill cover and transit through the landfill to ultimate discharge to the creek, south and southeast of the Site. Drainage from the side slopes on the north east and west is conducted to the south via drainage swales that ultimately discharge to Harmony Creek. Of course, there is evidence that some portion of the landfill leachate migrates in a westerly direction under the influence of the engineered drainage/venting/collection systems in place at the Site.

Infiltrating groundwater that becomes leachate is expected to flow in a predominantly horizontal direction through the waste to discharge either into the collector drains or as uncontrolled seepage from the side slopes and/or toe of the landfill, and predominantly along the south slope of the fill area. Little vertical or horizontal leachate migration within the native glacial till is anticipated due to the density and moderately low hydraulic conductivity of the native till unit. Of course, if a significant leachate mound exists, or was to develop in the future within the landfill mound, increased vertical hydraulic gradients would be imposed on the glacial till, that could alter the rate and direction of groundwater (and therefore leachate) migration. At present, there is reliable means of assessing the presence or characteristics of the leachate mound, if any, present within the landfill.

4.0 SUMMARIES OF PREVIOUS REPORTS AVAILABLE TO GOLDER

As part of this study, Golder was provided with a number of technical reports prepared by various hydrogeological and engineering consultants. A summary of the reports reviewed that were prepared by Conestoga-Rovers & Associates ("CRA") on behalf of the City of Oshawa (the "City") in the early 1990s, and the reports prepared by Hydrology Consultants Limited ("HCL") on behalf of Intermelco after cessation of landfilling but prior to the formal closure of the IDOL Site between 1977 and 1984 are presented in Appendix A to this report.

It is clear from our review of the CRA and HCL reports that the findings of both firms' studies agree that landfill leachate emanating from the south slope of the IDOL Site has been observable in varying quantities since before 1977.
MOE has taken an active role for some years now in monitoring shallow groundwater quality on the south slope of the IDOL Site and surface water quality in the creek itself to assess if material adverse effects are occurring in its view.

4.1 HCL Reports

Data are presented in a July 1983 annual groundwater quality monitoring report by HCL that provides a raw leachate characterization based on a sample collected directly from the leachate lagoon historically present in the southwest corner of the landfill Site prior to its closure. The results of the leachate analysis obtained between 1979 and 1983 from the lagoon allow characterization of the raw leachate immediately post closure, as follows:

- **pH**: 6.7 to 7.8
- **Hardness**: 260 to 590 ppm
- **Alkalinity**: 760 to 1300 ppm
- **Chloride**: 52.2 to 1400 ppm
- **Electrical conductivity**: 2700 to 4300 \(\mu\)S/cm
- **Iron**: 0.09 to 4.25 ppm

These concentrations of major ions are typical of many landfill Sites, although the analyses are primarily related to major inorganic ions. The variation likely reflects periods of dilution by heavy rainfall, reporting to the leachate collection system (the lower concentrations) and periods of relative drought, when less leachate dilution would be expected. Apart from iron, it appears that heavy metals (zinc, copper, lead etc.) were not routinely analysed.

Based on the HCL data, the other landfill monitoring wells installed around the north, east, west and south perimeter of the landfill contained the major leachate constituents at concentrations assumed to represent raw leachate as sampled from the lagoon. However, surface water sampled along Harmony Creek showed little impact from the landfill. Upstream and downstream samples consistently indicated chloride and electrical conductivity elevated compared to expected normal surface water and groundwater concentrations, but the presence of these concentrations in a surface water sample nearly 100 metres upstream from the east end of the landfill strongly suggests another source of chloride input, such as deicing salts.

HCL identified modest landfill gas concentrations within the landfill mound area, with methane concentrations ranging from nearly no detectable to about 35% by volume. The explosive range of methane in air is 5% to 15%, and few, if any gas measurements were in the potentially explosive/ignitable range.

4.2 CRA

In its work on behalf of the City, CRA held that the IDOL Site represented a potential threat to the adjoining properties and to the creek related to the migration of landfill leachate under certain leachate mounding conditions. CRA’s theory was based on its interpreted water balance calculation for the Site, in which if more infiltrating rain water and snow melt entered the landfill through its imperfect cover than existed the landfill via the engineered collection systems, evaporation and/or leachate seeps to the creek, then the elevation of the landfill leachate “mound” would increase, increasing vertical and horizontal hydraulic gradients. This phenomenon could cause increased likelihood of leachate migration to points beyond the capture of the existing leachate collection systems, potentially adversely affecting private neighbouring lands and/or the creek.
In response to this projection, CRA prepared an evaluation of the existing engineered systems at the IDOL Site and made recommendations for improvements as a means of precluding, or minimizing the risk of leachate "breakout".

CRA was also concerned about landfill gas migration to off-IDOL Site locations, although it may be fair to characterize CRA's concern with respect gas as somewhat less pressing than the landfill leachate migration issue.

4.3 MOE DATA

The MOE has had an interest in the IDOL Site since 1971, when its precursor issued a certificate of Approval for the operating IDOL Site, and has had a review capacity regarding operations, leachate and gas management issues and other matters since that time.

Most recently, MOE was requested by the Environmental Commissioner of Ontario to respond to a request for investigation by the Lake Ontario Waterkeeper and Ms. Sarah Ross, a citizen of Oshawa submitted as instrument EBR Application 12008011. The application alleged that release of a substance causing or likely to cause an adverse environmental effect, and the failure to report such release, constituted contraventions of the Ontario Environmental Protection Act. The applicants alleged that rusty water with an oily sheen was being actively discharged from the IDOL Site to the ground surface and potentially into Harmony Creek, and that further, at least one dog had allegedly become ill upon jumping into a pond that was possibly impacted by the alleged release.

MOE inspected the Site, and met with a representative of the current owner at the Site to visually assess the area of concern and to collect samples of the red–coloured water observed to be discharging from the south slope of the Site. MOE collected samples of groundwater and of the creek at several locations, and ultimately concluded that no adverse impact had occurred or was occurring, although it acknowledged that the discharge created an aesthetic concern and advised the owner to take corrective actions.

MOE's sampling of groundwater and surface water has continued. Appendix B contains analytical data collected by MOE in 2008 and 2009. In MOE's opinion, the chemical analytical results confirm that there are modest leachate constituent concentrations present in the shallow groundwater beneath the south slope, and that the leachate seepage observed by the applicants contains iron that oxidizes to form a rusty-coloured precipitate and may form "organic iron" that has an appearance reminiscent of an oily sheen. Neither is considered harmful to human health or the environment, including wildlife and pets, in the concentrations detected, which formed the basis for MOE's position that no adverse effect had been caused.

Nevertheless, MOE sought and reportedly obtained the cooperation of Mr. Jim Sinclair of Rossland Acres inc. in repairing the seepage spots observed on the south slope.

MOE continues to monitor the vicinity, both visually and through collection and analysis of water quality samples. In the summer of 2010, Golder staff accompanied Mr. Phil Dunn of MOE on two separate occasions when MOE was inspecting the Site. Additional areas of leachate seepage were identified along the toe of the south slope of the former landfill during the visual inspection. However, the results of surface water analyses collected from several locations along Harmony creek from upstream to downstream demonstrate that there continues to be no adverse impact to the creek related to the observed leachate seepage. These 2010 surface water sample analyses in addition to one ground water sample analysis collected in 2010 from MW7 are presented in Appendix B. This sampling included limited analysis of volatile organic compounds and polycyclic aromatic hydrocarbons from the leachate entering the sanitary sewer manhole from which the collected leachate is
ultimately discharged to the Region's sewage treatment facility. The 2010 analytical results collected by the MOE appear to be consistent with previous reports. No metals, polycyclic aromatic hydrocarbons, or volatiles were detected. However, elevated concentrations of non-health related parameters such as chloride, sodium, hardness, total dissolved solids, and dissolved organic carbon were observed, as expected. MOE has advised that it will continue to work with the owner of the Site to ensure that regular visual inspection and routine maintenance to repair these observed areas of leachate seepage as they are identified. It is Golder's expectation that unless a more formal engineered toe drain system is designed and implemented along the toe of the southern slope of the former landfill, such leachate seeps will continue to occur. Even at heavily engineered and well maintained and monitored landfill Sites (both active and closed) an ongoing inspection and maintenance program is required, as localized leachate breakthroughs can and do occur on an ongoing basis.

CRA, acting for the City compiled all chemical analytical date known to exist at the time of its April 1993 document. Golder has incorporated the unedited CRA summary as Appendix C to this report.

5.0 SUMMARY OF OTHER INFORMATION KNOWN BY GOLDER

Although Golder was not provided with the reports documenting these findings, Golder is aware of the presence of landfill gas and leachate interception systems that have been installed on private lands abutting the former IDOL landfill to the north and west.

As part of development works associated with proposed residential developments in the early 1990s, Coscan Development Corporation ("Coscan") retained the services of Marshall Macklin Monaghan ("MMM") to prepare a hydrogeological evaluation of the lands to the north and west. MMM opined that, while there was no apparent active material migration of landfill leachate or landfill gas from the IDOL Site onto the proposed development Site, some potential for such migration existed in the event that a leachate mound was to develop within the IDOL Site such that off-IDOL Site migration could occur.

As a safeguard against any such future migration, MMM proposed, and Coscan accepted that a 20 metre wide buffer strip with a leachate and gas mitigation system should be installed north and west of the IDOL Site.

These systems were installed by Coscan. The effectiveness of these systems was debated extensively before the Ontario Municipal Board in 1993. In the end, the Board held that in its view there was sufficient evidence that the migration of landfill gas and/or landfill leachate, past the interception systems and onto the proposed development lands was unlikely. Nevertheless, in ruling in favour of the developments proceeding, the Board imposed a condition that the developers of the lands undertake to monitor the ongoing effectiveness of the interceptor systems on three occasions separated by five years, such that monitoring was to occur in years 2000, 2005 and 2010.

The required monitoring was completed by MMM in 2000 and by Golder in 2005 and 2010, each time on behalf of the party responsible for the development lands at that time. In 2005, the work was commissioned by the City as the responsible party failed to proceed in a timely fashion.

The findings of these three monitoring events have confirmed that the interceptor system are effectively capturing leachate-impacted groundwater exhibiting low constituent concentrations, and no material gas concentrations have ever been detected. These results seem to confirm that the interceptors are effectively safeguarding the development lands to the north and west, but do not substantially enhance the level of knowledge regarding the IDOL Site itself.
6.0 OTHER AGENCIES

Golder has made several attempts to discuss the IDOL Site and environs with representatives of The Central Lake Ontario Conservation Authority ("CLOCA") and the Region. To date, we have been unsuccessful at obtaining relevant information from either agency.

We have been informed that CLOCA relies on MOE visual inspections and water quality monitoring and that at such time, if ever that MOE advises of an actual or potential adverse effect to the creek to the CLOCA lands, they will become engaged.

The Region, to date has not returned our phone calls. Golder is interested in interviewing the Region regarding any sanitary sewer quality monitoring that it might conduct, and especially and relevant information that the Region may have developed regarding the Environmental Assessment associated with the proposed Rossland Road East extension.

Golder will continue to attempt to contact the Region and will incorporate any relevant information obtained into the final version of this report.

7.0 ENGINEERED CONTAINMENT SYSTEMS

There are five separate engineered containment systems on, and proximal to the IDOL Site and a partial security fencing system. The construction details for some of these systems are not readily available although some information has been provided by Mr. Phil Dunn of MOE.

7.1 Landfill Cover

The first engineered system is the simple landfill cover applied to Site at the time of closure. The thickness and specific soil make-up of the cover is unknown, although it is suspected to be a single layer natural soil cover, likely about 0.6 metres in thickness. Typically, covers of this vintage are comprised of somewhat heterogeneous soil compositions, with somewhat variable effective hydraulic conductivities. The effective hydraulic conductivity may be affected significantly by the number and thickness of layers applied, the degree of compaction applied, the nature and effectiveness of topsoil and vegetation plantings (as that affects the uptake of rainfall and snow melt); the degree, if any of settlement; and the degree, if any, of desiccation of the cover material. CRA has estimated the annual rate of infiltration through the cover into the landfill at between 150 and 300 mm per year, although there was no formal basis for the estimate provided.

A visual reconnaissance of the cover conducted by Golder in June of 2010 indicates a generally well vegetated cover although some bare spots and or "pop ups" of underlying waste materials are evident in a few areas. The hydraulic effectiveness of the cover system is unknown and there are no active, accessible means of evaluating leachate mounding conditions within the landfill beneath the cover.

7.2 Passive Gas Vents on Landfill

The gas control system at the Site originally consisted of six passive gas vents located on the top of the Site, primarily near the north and west Site boundaries. These vents were apparently subject to frequent vandalism as unauthorized visitors to the Site would reportedly disturb the vent pipes. Although the original design for the system was not available to Golder for review during this assessment, it is understood that the steel vent pipes are approximately 9 metres in length and are sealed within the waste.

The elevation of the leachate mound within the waste, if any, the precise nature and composition of the waste, its moisture content, temperature and other key information are unknown at this time, so the likelihood of landfill gas
(primarily carbon dioxide and methane) generation at the Site is unknown, and it is therefore not possible to conclusively assess the current need for or importance of the passive gas venting system.

It is unlikely that this passive engineered gas management system remains fully operational at the Site as routine maintenance of such systems is normally required to ensure long-term performance as per the design, although historically, landfill gas monitoring has not identified significant potential for off-Site impacts.

7.3 Leachate Collection System on Landfill

A system of shallow buried perforated tiles is in place along the eastern, southern and western boundaries of the former landfill, as shown on Figure 2. The eastern and southern sections were reportedly installed in the 1970s, and originally discharged collected leachate to a leachate lagoon located in the southwest corner of the active landfill area. The western arm of the system was reportedly constructed of filter wrapped 200 mm perforated pipe and was connected to the previously existing system in about 1986.

At one time, leachate was re-circulated from the lagoon into the landfill as a means of managing the volume and of accelerating the degradation of the waste, however. the system was connected to the Region's sanitary sewer in 1980.

The current condition of the drainage tile system is unknown, although routine maintenance generally involving some or all of flushing, internal video inspection, repair of settled or "pinched" sections that may present flow restrictions, and repair/replacement of completely broken sections is commonly applied at both active and closed landfills incorporating leachate collection drains. Given the age of the system (approaching 35 years) the effectiveness of the system is likely suspect and inspection and repair as required is likely necessary.

This is particularly true for the eastern and southern sections that were reportedly not provided with filters, such that the likelihood of mechanical and/or biological clogging is increased in those sections. Clogging or settlement of the drainage pipe will result in reduced hydraulic capacity and efficiency at effectively collecting and draining landfill leachate.

7.4 Deep Drainage Swale West of Landfill

A drainage swale excavated to a depth likely below the elevation of the invert of the on-IDOL Site leachate collection pipe system was installed on behalf of Coscan in the 1980s. Because the base of the swale may be placed at a lower elevation than the on-IDOL Site collector, there is some potential for the swale to intercept a component of leachate from the IDOL Site that may flow beneath the IDOL collector. The swale also received groundwater discharge from the higher ground to the north and west, such that any leachate entering the swale will be somewhat diluted by the natural groundwater and surface water runoff that also reports to the swale.

The swale was apparently installed as a surface water management system within a 20 metre wide buffer strip along the east boundary of the former Coscan Site, abutting the IDOL property, and as a "second line of defence" against the potential for westward leachate migration from the IDOL Site.

The swale continues to effectively collect surface runoff and shallow groundwater discharge within its hydraulic catchment area.

7.5 Gas/Groundwater Barrier and venting System North and West of Landfill

In the mid 1980s, MMM acting for Coscan designed and supervised the installation of a combined vapour barrier/vapour venting system west of the swale within the 20 metres wide Coscan buffer zone. The system is comprised of a granular trench with two parallel perforated pipes, one placed at a lower elevation and one at a
higher elevation. The upper pipe serves as a soil vapour venting system, and the lower pipe serves as a means of extracting groundwater to lower groundwater in the event of “drowning” of the gas venting pipe. The lower groundwater extraction system is not in current use, such that no active removal of groundwater is taking place. The gas venting system remains in use as a passive venting system.

Immediately west of the trench containing the extraction systems is a HITEK® polyethylene vertical barrier wall installed to serve as a physical barrier against the potential westward migration of landfill gas generated at the adjacent IDOL Site that could, hypothetically, migrate beyond the 20 metre buffer strip on the former Coscan lands and affect residential properties further to the west.

Monitoring of gas monitoring probes installed both on the eastern side (inside) and western side (outside) of the barrier have shown through monitoring in 2000, 2005 and 2010 that no measurable landfill gas concentrations have been detected on either side of the barrier, further confirming that this off-IDOL Site barrier system may be redundant, although serving an effective purpose in terms of providing an additional level of security with respect to the hypothetical potential for both landfill gas and landfill leachate generated at the IDOL Site migrating in a westerly direction. It is unlikely that any future gas monitoring may be required based on previous monitoring results.

7.6 Fencing

The property is fenced on the north and west sides, although openings in the fence are present in several locations. Locked access gates are present. The Site is not fenced on the south or east.

8.0 GOLDER OPINION RELATED TO CURRENT ENVIRONMENTAL RISK EXPOSURES

On the basis of Golder’s review of the limited available historical groundwater, surface water and landfill gas monitoring data, there is no evidence that the former IDOL Site is currently causing an “adverse effect”, as defined in the Ontario Environmental Protection Act, as adjudicated by the MOE.

The principal receptors of any environmental risks associated with the former IDOL Site are:

- Surface water aquatic and terrestrial flora and fauna resident within Harmony Creek, and its sediments;
- Terrestrial and aquatic animals frequenting the IDOL property, and particularly burrowing animals and aquatic birds frequenting the wetland areas south of the former fill area;
- Authorized human visitors to the Site, including Site owners, regulatory officials and other authorized visitors;
- Unauthorized human visitors to the Site, including members of the general public trespassing on the lands; and,
- Domestic animals (dogs and cats) accompanying unauthorized visitors to the Site.

The concentrations of the major landfill constituents identified in the historical record by consulting firms and the MOE have not included acutely toxic substances in the normal course or in the concentrations observed to date. MOE has opined in writing that known discharges from the Site are not creating an adverse effect at this time, although MOE continues to inspect the Site on a regular basis. In Golder’s opinion, material adverse effects to any of these classes of receptors with occasion to visit the former IDOL property are very low.
We understand that a recent body of academic work completed by Ms. Carrie Ginou, a doctoral candidate at the University of Ontario Institute of Technology in Oshawa has concluded that the leachate seepage observed south of the IDOL Site is low but "...has potential to negatively affect reproduction of aquatic invertebrates". Ms. Ginou did observe that concentrations of some metals within the Harmony Creek water were modestly elevated when compared to the concentrations observed both upstream and downstream, which confirms that while some evidence of leachate contribution to the creek is apparent, the inputs are reasonably assimilated within the watershed within a short distance downstream and are causing no material adverse effects.

There are certainly ongoing aesthetic concerns at the Site related primarily to emergence of minor leachate seeps along the south slope of the landfill, particularly in the visually accessible proximity of the existing pathway that links Rossland Road East to the Harmony Valley Park, along the north shore of Harmony Creek. These seeps are visually distinctive as the leachate-impacted groundwater contains iron, manganese and sulphide constituents that are readily oxidized to orangy-red precipitates, organic iron sheen and black precipitates that create concern among the general public. It is not uncommon for these leachate seeps to be accompanied by a minor "landfill" odour as well.

MOE has been in frequent contact with the current Site owner to ensure that corrective actions are taken to minimize or eliminate the aesthetic appearance associated with these seeps, and to minimize human and wildlife exposure, largely through shallow excavation and placement of granular cover materials that will contain and direct the seeps towards discharge to Harmony Creek without causing an aesthetic concern. Nevertheless, MOE has not determined that physical removal of the leachate or prevention of its ultimate discharge to Harmony Creek as part of natural groundwater or surface water discharge is required at this time. It is likely that MOE would continue to require ongoing monitoring and aesthetic management of these seeps on an ongoing basis.

In the early years post closure of the landfill Site in 1980 to 1985, some landfill gas measurements within the main landfill mound indicated concentrations of methane as a component of the landfill gas up to about 35 percent by volume, although no material measurements of methane were identified at most such monitoring locations, and virtually no material landfill gas detections off the IDOL property have ever been observed by any investigator. The environmental risk associated with off-Site landfill gas migration is considered very low, and even the risk of material on-Site landfill gas issues is moderate to low. Management of any future landfill gas management issue arising at the IDOL Site is expected to be straightforward and relatively inexpensive.

A risk related to public perception exists to some degree. Members of the general public associate visual/aesthetic evidence of leachate seepage with adverse human, animal and ecological effects and generally unsafe conditions. It is difficult to overcome public perception, and so efforts by an owner of such a property to minimize the visual/aesthetic impacts is considered to be prudent.

The one aspect of uncertainty regarding the longer term quality of the landfill leachate resident within the former IDOL Site is the nature of the wastes received. Much of what we understand about the nature and quantities of waste received during the operation lifespan of 1957 to 1980 is anecdotal. There are indications that industrial wastes were received and that some of that waste may have included drummed materials. The anecdotal inventories suggest that wastes may have included spent solvents, resins, paint sludges and oils.

While no material evidence of large scale organic chemical constituents has been generated to date within the leachate, little such data exist. Further, if liquid organic chemicals (spent solvents, oils etc.) were deposited within the landfill in any significant quantities, and especially within "sealed" metal drums, such constituents may
one day be identified if and when such metal drums deteriorate and release their contents into the general population of the leachate.

While the probability of this scenario occurring is considered to be low, it remains as a possibility, and such possibility drives a need for diligent ongoing monitoring of leachate quality at various locations within, and down-gradient from the former landfill.

9.0 GOLDER OPINIONS

9.1 Future Land uses of IDOL Site

The potential for future land uses of the former IDOL Site may generally be characterized as parking, passive recreational uses (nature trail, dog park) and playing fields (soccer, baseball, rugby, tennis courts, etc.). It is likely possible to erect open-air or fully ventilated structures, such as pavilions, ventilated canteens etc., although in-ground structures would likely be restricted.

Buried utility trenches would likely have to include passive venting and/or water stops depending upon their depth and location, and all electrical work would likely require conformance with Electrical Safety Authority hazard zone requirements, due to the potential for landfill gas issues.

Development of recreational uses on lands currently zoned as open space hazard would likely trigger a statutory requirement for a Record of Site Condition to be filed for the Site. In that event, only a risk assessment ("RA") approach could be considered and a RA would undoubtedly be accompanied by a mandatory risk management plan ("RMP").

9.2 Recommendations Regarding Future Monitoring and Maintenance

9.2.1 Monitoring Infrastructure Development

As has been suggested in several sections of this report, there is an inadequate environmental monitoring infrastructure at the landfill Site itself, to facilitate even the most basic ongoing monitoring of environmental conditions within the landfill.

Firstly, a series of three to five groundwater monitoring wells should be installed within the main waste fill area to allow testing and monitoring of the physical and chemical characteristics of the landfill leachate mound (i.e., presence, elevation, variability, chemical composition at several locations, hydraulic conductivity, landfill gas presence and concentration).

Secondly, little is known regarding the nature and design of the final cover applied to the Site. An initial detailed visual walk-over reconnaissance of the cover and side slopes of the landfill Site should be conducted.

A series of back hoe excavations (up to ten locations) should be considered to remove the cover to the surface of the waste. Once exposed, the waste itself may be visually and/or chemically characterized; the thickness and design of the cover material can be assessed at several locations, including the collection of cover material samples for grain size distribution analysis, permeability testing and/or infiltration testing. The purpose of such testing would be to assess the physical and hydraulic characteristics of the cover, which in combination with data obtained (as per the above recommendation) relating to the presence of a leachate mound, would inform required or prudent monitoring and maintenance decisions related to the long term security of the cover system.

Finally, a proper horizontal and elevation survey of the entire property should be considered that would produce an accurate topographic map reflecting currently existing conditions, and shown the exact locations in plan of all
existing monitoring and engineered systems infrastructure. Such a survey plan is essential for properly determining the locations for recommended monitoring infrastructure and improvements to the Site.

9.2.2 Ongoing Monitoring and Maintenance Recommendations

Further, an annual monitoring program and report should be prepared for the Site that compiles, interprets and presents all data related to landfill leachate issues, landfill gas issues, operational issues (repairs, significant events, etc.). Thus an annual monitoring program would need to be implemented.

Such annual monitoring programs generally include a Site walk-over once per year in the spring after snow melt is completed to assess the cover, the slopes and the immediately surrounding areas for damage or other matters requiring repair/maintenance. During such inspections, “pop-ups” of waste materials, settlement or desiccation cracking of the cover, ravelling of side slopes and/or emergence of leachate seeps can be identified and scheduled for repair.

One or more groundwater/leachate and landfill gas monitoring events would likely be required on an ongoing annual basis.

MOE should also require an engineering evaluation of the performance of the existing leachate collection system to be completed.

Please contact the undersigned with any questions or comments related to this report.

Yours truly,

GOLDER ASSOCIATES LTD.

T.A. McLellwain, P.Eng.
Principal, Environmental Services Division

TAM/tm

Attachments: Figure 1: Key Plan
Figure 2: Site Plan
Appendix A: Summary of Previous HCL and CRA Reports
Appendix B: MOE Chemical Data
Appendix C: CRA Compilation of Chemical Data Prior to 1993