CORPORATION OF THE
TOWNSHIP OF BILLINGS

AGENDA

April 19th, 2022 7:30 p.m. **Electronic**

1. OPEN

2. APPROVAL OF AGENDA

3. DISCLOSURE OF PECUNIARY INTEREST

4. ADOPTION OF MINUTES

   a) Regular Council Minutes – April 5th, 2022

5. DELEGATIONS

6. COMMITTEE REPORTS

   a. Parks, Recreation and Wellness Committee Report – March 28th, 2022
   b. Manitoulin Phragmites Project Meeting Report – March 31st, 2022
   c. Climate Action Committee Report – April 6th, 2022
   d. Provincial Offences Act Meeting Report – April 6th, 2022
   e. Museum Committee Report – April 4th, 2022

7. OLD BUSINESS

8. NEW BUSINESS

   a) 2019-2021 Landfill Monitoring Report
   b) Longest Day of Smiles
   c) National Volunteer Week
   d) Project Lifesaver
   e) 2021-49 Vaccination Policy

f) 2022-18 Health and Safety Policy

9. CORRESPONDENCE

a) Household Hazardous Waste Day

10. INFORMATION

a) Annual Repayment Limit
b) Gravel Applications Motion
c) More Homes for Everyone Plan
d) Reopening Ontario Act
e) Emergency Management Compliance Results
f) Avian Influenza in Ontario
g) April 4, 2022 Museum Minutes

11. ACCOUNTS FOR PAYMENT

12. CLOSED SESSION

a) Labour Relations

13. CONFIRMING BY-LAW

14. ADJOURNMENT

Memorandum

To: Mayor, Council
cc: Staff, Public
From: Staff
Date: April 14th, 2022

RE: April 19th, 2022 Council Meeting

4. Minutes

a) Regular Council Meeting Minutes – April 5th, 2022

Please review the minutes for approval.

5. Delegations

None.

6. Committee Reports

a) Parks, Recreation and Wellness Committee Report – March 28th, 2022

Councillor Sharon Jackson to give report to Council.

b) Manitoulin Phragmites Project Meeting Report – March 31st, 2022

Councillor Sharon Jackson to give report to Council.

c) Climate Action Committee Report – April 6th, 2022

Councillor Bryan Barker to give report to Council.

d) Provincial Offences Act Meeting Report – April 6th, 2022

Councillor Bryan Barker to give report to Council.

e) Museum Committee Report – April 4th, 2022

Councillor Michael Hunt to give report to Council.

7. Old Business

None.

8. New Business

a) 2019-2021 Landfill Monitoring Report

Recommendation:
That Council acknowledges receipt of the 2019-2021 Triennial Monitoring Report.

Pinchin is recommending that the Township of Billings do the following:

- Continue with routine monitoring of all the available groundwater monitoring wells. It is recommended that groundwater monitoring continue to be completed during the fall to generate a baseline data set, to evaluate trends, and to determine the need and scope of a long-term monitoring program for the Kagawong Landfill;
- Monitoring and inspections of the landfill should continue to be completed to ensure regular maintenance is occurring on an as needed basis; and
- The Client should continue to ensure that the requirements as specified in the ECA and closure plan are complied with.

b) Longest Day of Smiles

Recommendation:
That Council proclaims June 19th, 2022 as the Longest Day of Smiles.

The Longest Day of SMILES® encourages community ambassadors to raise awareness and funds to help a child born with a cleft condition smile and change their life with free, safe, cleft surgery and comprehensive care. Operation Smile Canada is a volunteer-delivered global medical charity that exists to ensure everyone has access to safe, effective surgery that they need wherever they live in the world.

c) National Volunteer Week

Recommendation:
That Council proclaims April 24th – 30th, 2022 as National Volunteer Week.

d) Project Lifesaver

Recommendation:
That Council agrees to support Project Lifesaver with a payment of $1,000 to be paid to the OPP, which will be used to cover the costs of the necessary project components.

Project Lifesaver was discussed during the February 1st, 2022 Regular Council Meeting where the following resolution was passed:

> *2022-32 Jackson – Hunt*
> *BE IT RESOLVED that Council supports, in principle, the Ontario Provincial Police in bringing Project Lifesaver to Manitoulin Island with a mission to provide timely response to save lives and reduce potential injury for adults and children who wander.*

After a $15,000 donation was received for the program, the OPP is seeking $1,000 from each Municipality in order to provide this service to Manitoulin Island to cover necessary project component costs.

e) 2021-49 Vaccination Policy

Recommendation:
That Council rescind By-law 2021-49, being a by-law to establish a COVID-19 Vaccination Policy.

Memo written by Arthur Moran, Health and Safety Coordinator, on behalf of the Joint Health and Safety Committee.
Re: Rescinding Billings Township Covid Vaccination Policy

Following the Joint Health and Safety Committee (JH&SC) discussions regarding the Township Covid Vaccination Policy, Bylaw 2021-49, the Committee agreed that employees who have not provided proof of vaccination will no longer need to perform self testing and be required to submit test results.

This is a result of the provincial easing of health regulations regarding vaccination passports or proof of vaccinations and the lack of availability of free test kits from the province for the employees to continue to self administer Covid rapid antigen tests.

Secondly, an April 6, 2022, a letter received from the Ministry of Municipal Affairs and Housing has indicated that the provincial government will be lifting all remaining Covid public health measures as of April 27, 2022.

Based off of this information the JH&SC is requesting that Council rescind Billings Township Bylaw 2021-49.

The Township SOPs for Covid health and safety measures will be amended and be utilized as the guidelines for continuing measures to be followed by Township employees.

Regards,
Arthur Moran on behalf of the Billings Township JH&SC

f) 2022-18 Health and Safety Policy

Recommendation:
That Council accept By-Law 2022-18, being a by-law to establish a new health and safety policy, be given first, second and third reading and enacted.

By-Law 2022-18 will replace By-Law 2018-37; By-Law 2018-37 will be rescinded.
Several edits have been made to the existing Health and Safety Policy; therefore, a new by-law was required.

These amendments were reviewed and approved by the Township of Billings Joint Health and Safety Committee.

9. Correspondence

a) Household Hazardous Waste Day

Recommendation:
That Council agrees to participate in the Household Hazardous Waste Day scheduled for July 23rd, 2022 organized by Central Manitoulin.

The planned date for Household Hazardous Waste Day is July 23, 2022 from 1pm – 4pm in Mindemoya at 7 Lakeshore Road (municipal road shed). As stated in the correspondence received from Central Manitoulin, it is expected that all participating municipalities will send a volunteer to help with this event.

10. Information

There are a number of items attached for Council's information. Council may move any of these items to new business during the agenda approval for discussion at this meeting, or request that an item(s) be included on a future agenda for discussion.

a) Annual Repayment Limit

b) Gravel Applications Motion
c) More Homes for Everyone Plan
d) Reopening Ontario Act
e) Emergency Management Compliance Results
f) Avian Influenza in Ontario
g) April 4, 2022 Museum Minutes

12. Closed Session

There will be a closed session to discuss a matter pertaining to labour relations.

The Corporation of the
Township of Billings
Regular Council Meeting

April 5th, 2022 7:30 p.m. Electronic Meeting

Present: Mayor Anderson, Councillors Sharon Alkenbrack, Michael Hunt and Sharon Jackson, Bryan Barker
Regrets: None
Staff: Kathy McDonald, CAO/Clerk; Tiana Mills, Deputy Clerk; Todd Gordon, MPM; Arthur Moran, By Law Officer; Cheryl McCulligh, Treasurer
Media: Tom Sasvari
Members of the General Public

1. OPEN

2022-90 Barker - Hunt
BE IT RESOLVED that this regular meeting of Council be opened with a quorum present at 7:30 p.m. with Mayor Anderson presiding.

Carried

2. APPROVAL OF AGENDA

2022-91 Alkenbrack - Jackson
BE IT RESOLVED that the agenda for the April 5th, 2022 regular meeting of Council be accepted as amended.

Carried

3. DISCLOSURE OF PECUNIARY INTEREST

I, Councillor Bryan Barker, declare a potential pecuniary interest on: Agenda Item 8j, Item Title: Exception Request to 2021-31 Exotic Pets By-Law for the following reason: that I have had backyard chickens in the past and am considering getting more chickens in the near future and to avoid any perceived conflict I am declaring a conflict of interest.

4. ADOPTION OF MINUTES

a) Regular Council Minutes – February 22, 2022

2022-92 Alkenbrack - Hunt
BE IT RESOLVED that the minutes for the February 22, 2022 regular meeting of Council be accepted as presented.

Carried

b) Regular Council Minutes – March 21, 2022

2022-93 Alkenbrack - Jackson

BE IT RESOLVED that the minutes for the March 21, 2022 regular meeting of Council be accepted as presented.

Carried

5. DELEGATIONS

None.

6. COMMITTEE REPORTS

a) Climate Action Committee Report – March 8, 2022

Council received report.

b) Climate Action Committee Report – March 23, 2022

Council received report.

c) Community Policing Advisory Committee Report – March 9, 2022

Council received report.

d) Lake Kagawong Resource Committee Report – March 24, 2022

Council received report.

e) Library Board Committee Report – March 15, 2022

Council received report.

7. OLD BUSINESS

a) Fire Hall Update

2022-94 Alkenbrack - Jackson

BE IT RESOLVED that Council direct the CAO to engage Tulloch Engineering to prepare the Request for Proposals (RFP) document for engineering services for the Fire Hall Renovation Project.

Carried

8. NEW BUSINESS

a) 2022-12 Cemetery By-Law

2022-95 Barker - Hunt

BE IT RESOLVED that Council give the 2022-12 Cemetery By-Law, being a By-Law to update and consolidate cemetery regulations for the Kagawong Cedar Cemetery, first, second, third reading and enacted.

Carried

b) 2022-15 Tax Ratio By-Law

2022-96 Alkenbrack - Hunt

BE IT RESOLVED that Council give the 2022-15 Tax Ratio By-Law all three readings and enacted.

Carried

c) 2022-16 Temporary Borrowing By-Law
2022-97 Barker - Jackson
BE IT RESOLVED that By-Law 2022-16, being a by-law to allow for temporary borrowing be given all three readings and enacted.
Carried

d) Application for Consent B14-21, B15-21 and B16-21 Drainage Plan
2022-98 Alkenbrack - Barker
BE IT RESOLVED that Council accepts the Drainage Plan presented as long as additional culverts and draining ditches are installed along the deeded right of way at each lot entrance, the culvert size is changed to 15-inch diameter and the existing drainage ditch is not filled in.
Carried

e) AMO Registration
2022-99 Alkenbrack - Hunt
BE IT RESOLVED that Council direct staff to register Councillor Bryan Barker for the AMO conference in Ottawa from August 14-17, 2022.
Carried

f) Joint and Several Liability Request to the Province
2022-100 Barker - Jackson
BE IT RESOLVED that Council supports the resolution passed by the Corporation of the City of Barrie regarding the Joint and Several Liability Request.
Carried

g) Lease at 156 Main Street
2022-101 Alkenbrack - Hunt
BE IT RESOLVED that Council agrees to extend the lease at 156 Main Street for an additional 5 years to Amanda Flanagan, owner of the Kuku Hut, with a 2% increase each year plus hydro.
Carried

h) Climate Action Committee Recommendations
2022-102 Alkenbrack - Jackson
BE IT RESOLVED that Council approves the Climate Action Committee's request to allocate $1000 for Climate Action Committee business in the 2022 budget year and that Council approves an ongoing Climate Action Committee blog, content to be approved by Municipal Staff.
Carried

i) Parks, Recreation and Wellness Committee Recommendation
2022-103 Barker - Hunt

BE IT RESOLVED that Council approve the request from the Parks, Recreation and Wellness Committee for $300 to host an Easter Egg Hunt Event on April 15th, 2022 at 11am outside at the Park Centre.

Carried

j) Exemption Request to 2021-31 Exotic Pets By-Law
2022-104 Alkenbrack - Hunt
BE IT RESOLVED that Council approves Nicole Frescura's exemption request to By-Law 2021-31 allowing for the keeping and feeding of domestic fowl at their property at 41 Lilly Crescent pending a letter in support of this exception is received from the neighbouring property owners allowing for fowl, no more than 5 chickens are kept at one time, no roosters are permitted at any time, a signed agreement prepared by the Township is on file, eggs are for personal use only and a follow-up inspection is completed by the Township to ensure proper living conditions of the fowl are met.

Defeated

k) Getting Ontario Connected
2022-105 Alkenbrack - Jackson
BE IT RESOLVED that Council direct the Municipal Project Manager to email the attached text as the Township of Billing's submission in response to request for commentary on the *Getting Ontario Connected Act, 2022*, Proposal # 22-MOI001.

Carried

9. CORRESPONDANCE

None.

10. INFORMATION

a) Lake Kagawong Resource Committee Minutes – February 3, 2022
Council received report.

b) New Gravel Extraction Licensing Applications
Council received report.

c) Lake Kagawong Resource Committee Minutes – March 24, 2022
Council received report.

d) Community Policing Advisory Committee Minutes – March 9, 2022
Council received report.

e) Manitoulin Municipal Association – Resolution
Council received report.

f) Parks, Recreation and Wellness Committee Minutes – March 28, 2022
Council received report.

g) Economic Development Committee Minutes - Feb 9, 2022
Council received report.

h) Climate Action Committee Minutes – Jan 26, 2022
Council received report.

i) Climate Action Committee Minutes – Feb 23, 2022
Council received report.

j) Climate Action Committee Minutes – March 8, 2022
Council received report.

11. ACCOUNTS FOR PAYMENT

2022-106 Hunt - Alkenbrack

BE IT RESOLVED that Council authorizes the following accounts for payment:

General Accounts $129,921.35

and that cheques numbered 7187 to 7214 be authorized for signing as described in the attached register.

Carried

12. CLOSED SESSION

2022-107 Barker - Alkenbrack

BE IT RESOLVED that in accordance with Section 239(2)(b) of the *Municipal Act, 2001 S.O. Chapter 25*, this Council proceed to a Closed Session at 8:52 p.m. in order to discuss an item involving an identifiable individual, including municipal or local board employees

Carried

…

2022-111 Alkenbrack - Jackson

BE IT RESOLVED that Council moves out of the Closed Session at 10:07 p.m. and resume their regular, open meeting.

Carried

13. CONFIRMING BY-LAW

2022-112 Barker - Jackson

BE IT RESOLVED that By-law 2022-17, being a by-law to confirm the proceedings of Council be given first, second, third reading and enacted.

Carried

14. ADJOURNMENT

2022-113 Barker - Hunt

BE IT RESOLVED that this regular meeting of Council be adjourned at 10:08 p.m.

Carried

_____ _____

Ian Anderson, Mayor Kathy McDonald, CAO/Clerk

TOWNSHIP OF BILLINGS
COUNCIL COMMITTEE REPORT

Report to: Council/Staff
Report by: Sharon Jackson
Date of meeting: March 28, 2022
Committee: Parks, Recreation & Wellness

Highlights/Matters of Interest:

Outdoor Rink Season Debrief

$22,535.40 has been collected in donations and advertising. Suggestions to continue fundraising throughout the summer, included in the monthly newsletter.

19 advertisements have been purchased to date. Renewal requests will be sent out 12 months after purchase date.

Idea brought forward to engage our community by having a name for the ice resurfacer contest. Stay tuned for details.

Walking Route Signage

The plan is to have one large sign at the Park Centre parking lot showing the three routes. Tiana to work on the working and Sharon J to send details for the routes.

Easter Egg hunt event

Motion by Andrew, seconded by Catherine - That PRW requested a $300.00 budget to host an Easter egg hunt. Date Friday, April 15 at 11 am. Tiana to create a flyer to be posted around the community, Township website and social media.

Community Sign Usage review

The current Billings Community Sign Usage Agreement is dated November 2014 and needs to be reviewed and brought up to date. Sharon J to send a copy of current and draft to Tiana to be added to our April 25, 2022 agenda. Tiana to look into the sign by the new safe parking lot.

Committee member advertising

Chair reminded members that there are only 7 (seven) months left for the current four year term of Council. We are still in need of one more member to fill a vacancy for this limited time. Tiana to post on the Township website, Facebook page and monthly newsletter.

Manitoulin Streams Letter of Support

Seija requested a letter of support for the tree planting, trail improvements and garbage clean up. There is an update since our meeting - The Manitoulin Island garbage cleanup will run from April 18 to May 2.

National Volunteer Week April 24-30

Chair to send the link to Tiana re mayoral proclamation for volunteer week. Past and current volunteers to be recognized on social media during this period.

April newsletter content

Some items to be included are the Easter egg hunt, and community clean up

Recommendations to Council:

MOTION - Moved by Andrew, seconded by Catherine - THAT the PRW Committee seek Council approval for $300 to host an Easter Egg hunt event to be held Friday April 15, 2022 at 11 am at the Park Centre. Carried,

THE MANITOULIN PHRAGMITES PROJECT 2022

Eradicating and controlling invasive phragmites across Manitoulin Island
Giving everyone the knowledge and capability to control phragmites

I attended a virtual presentation by project coordinator Judith Jones on March 31, 2022 with 25 people joining in. The topic was to provide education about the potential problems associated with phragmites.

Phragmites can quickly grow into dense patches that eventually wipe out all other vegetation. It poses a serious threat to property values, recreation, tourism, wildlife and fish habitat and aesthetics. Southern Ontario has lost hectares and hectares of natural habitat to this highly invasive species. The Manitoulin Phragmites Project was started to make sure that does not happen here.

Four locations in Billings Township were identified during a work survey conducted in 2020.

(1) Hideaway Lodge shoreline which is under control as landowners are maintaining the site
(2) Maple Point Road has been eradicated - no further work needed. A Phrag Watcher is needed to check the site
(3) Mud Creek Road under control - Phrag watcher needed to maintain site
(4) 10th Concession ditches - Several patches on the roadsides - needs work.

Some of the areas that have been the focus of local phrag fighters is Providence Bay beach, Wiikwemikoong and Blue Jay Creek.

How to make Manitoulin Island phrag free:
Don't drive through phragmites. Learn to recognize it. If you do drive through it, clean machines and ATVs in the yard before going out again.
When pulling weeds off the boat prop, throw them in the boat and dispose of them on shore.

Visit The Manitoulin Phragmites Project Facebook page and follow the link to their You Tube page to view the presentation to easily identify phragmites in your area.

There are five videos available:
American vs European phragmites: how to tell them apart
The Truxor cutting program at Michael's Bay Manitoulin Island
Cutting phragmites with a gas powered brush cutter
What is phragmites? Why is it a problem and what can be done
How to control phragmites

There will be a Work Bee on July 16 to 22. If you're interested, contact Judith Jones at manitoulinphrag@yahoo.com or visit them on Facebook.com/manitoulinphrag

COMMITTEE REPORT

CLIMATE ACTION COMMITTEE

06th April 2022 7:00 pm.

VIRTUAL

Meeting was called to order by the chair at 7:04 pm. By the chair.

PRESENT: Mayor Ian Anderson, Bryan Barker (Chair), Bob Clifford, Paul Darlaston, Chris Theijsmeijer, Todd Gordon (MPM)

ABSENT: John Hoekstra (connection issues)

OLD BUSINESS

I. Spring Event

Continued discussion regarding steps in finalizing the Earth Day - Spring Event. To date the following participants have confirmed their attendance:

- Manitoulin Tree Service – Liam Campbell
- Manitoulin Streams – Maria Diebolt
- Rosewood Energy, Home Energy Audits – Marshall Kruger
- Manitoulin Off Grid – Andre Probst
- Re-Tink Green – Simon Blakeley
- Colen McKeever – Eco-Growth Environmental
- Manitoulin Consortium – Kim Neale
- Manitoulin Community Garden – Chuck/Linda Wilson
- Cultural Seeds – Celeste Smith
- Electric Vehicles – Chris Theijsmeijer

The following participants still to confirm:

- Campbell Heating
- Manitoulin Secondary School Eco-Hero Programme

The times were established for the speakers. There is a total of (4) speakers starting at 1:20 pm every (40) minutes with the last speaker at 3:20 pm. An honorarium was established for each speaker. A brief discussion on events details such refreshments, hall set up and tear, PA system and Covid protocol and clean up.

Presentations from:

- Home Energy Audits – Marshall Kruger 1:20 pm
- Manitoulin Tree Service – Liam Campbell 2:00 pm
- Electric Vehicles – Chris Theijsmeijer 2:40 pm
- Manitoulin Streams – Maria Diebolt 3:20 pm

II. CAC Budget

A report was presented to the committee regarding the 2022 CAC budget approval by council at the 05th April regular meeting of council.

III. CAC Blog

A report was presented to council regarding the approval of the CAC blog at the 05th April regular meeting of council, with the request to have, by council, to have a documented reference that all postings be approved by the CCIC or designated staff members.

CORRESPONDENCE

None

INFORMATION

None

CLOSED SESSION

None

RECOMMENDATIONS TO COUNCIL

None

NEXT MEETING

20 April 2022, 7:00 pm (virtual) a brief meeting to finalize Earth Day Event

MEETING ADJOURNED

8:38 pm.

Submitted by

Councillor Bryan Barker (Chair CAC)

COMMITTEE REPORT

POA BOARD of Management Meeting

06 April 2022 7:00 pm.

VIRTUAL (ZOOM)

Meeting was called to order by the chair at 10:00 am. with a quorum present.

PRESENT: Derek Stephens (Chair), Christianna Jones, Martin Ainslie, Jack Bould, Dan Osborne, Mike Erskine, Bryan Barker, Rick Gordon, Pam Fogal, Michael Lalonde

REGRETS: Brent St. Denis

OLD BUSINESS

I. Financial Update

Michael Lalonde (Gore Bay treasurer) presented a financial update and budget. A review by staff revealed there had been flaws in the past, of the how the budget had been prepared. There was an overestimate of revenues and errors in offsetting revenues and expenses. Outstanding unpaid fines have now been processed and an estimated $5,800.00 can now be collected.

The POA manager reported that after consulting with the Attorney General, OPP and municipal prosecutor it is in the best interest of the POA to continue with the early resolution process.

There was some discussion regarding online payment of fines and Michael Lalonde is investigating options such as Payticket and Payfines. There is however and initial set up charge of $4,200.00 for these services plus and administration fee per collection. An email has been set up by the POA to allow for E-Transfer payments. It was decided that the $4,200.00 fee plus was too much financially at this time and would continue with present collections and E-Transfers. The online payment option could be revisited in the future.

NEW BUSINESS

I. Draft Audited 2021 Financial Statement

The annual audited 2021 draft financial statement was presented to the board, no discussion ensued.

CORRESPONDENCE

None

INFORMATION

None

CLOSED SESSION

None

RECOMMENDATION TO COUNCIL

None

NEXT MEETING

21 June, 10:00 am (virtual)

MEETING ADJOURNED

10:55 am.

Submitted by

Councillor Bryan Barker

Township of Billings

Council Committee Report

Report To:

Date of Meeting: April 4th 2022

Report By: Michael Hunt

Committee: Billings Museum Committee

Highlights/Matters of Interest:

A New Donor Wall is at Beacon images and should be ready for Pick up.
The Museum will open Saturday May 21st 2022 long weekend.
New Signs have been purchased and Delivered at the Museum.
A Ship wreck sign will be put up at the Top of the Hill.
Covid 19 Update - will follow Protocalls at that time. Masks are required in the Building because we are now in the 6th Wave.
Committee is pleased that Hanako Hubbard Radulavich will be back as the Summer Student.
The Main Exhibit will again be the Empress of Ireland. More Hawberry Jelly will be purchased For the Store.
Summer Report to Council: History Day will be Aug 11th 2022 with two matinees. Guy D'Astous will present the History of the Empress of Ireland. The Salvation Army will be coming because they Suffered large Losses on the ship.
A Barbaque is planned at the Pavillion during the Jaberwakee Festival on July 16/2022.
A table will be occupied for Christmas in Kagawong Remembrance Day ceremonies held again outside.

2019-2021 Landfill Monitoring Report

Township of Billings Kagawong Landfill
Kagawong, Ontario

Prepared for:

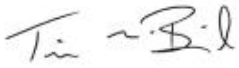
Township of Billings
15 Old Mill Road, PO Box 34
Kagawong, Ontario P0P 1J0

March 29, 2022

Pinchin File: 229152.003

Issued to:	**Township of Billings**
Issued on:	**March 29, 2022**
Pinchin file:	**229152.003**
Issuing Office:	**Sudbury, ON**
Primary Pinchin Contact:	**Tim McBride**

Author: Jennifer Porter
Project Technologist
705.521.0560
jporter@pinchin.com



Reviewer: Tim McBride, B.Sc., P. Geo., QP_{ESA}
Director, Landfill & Municipal Services
705.521.0560
tmcbride@pinchin.com

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained through an Authorization to Proceed, Limit of Liability and Terms of Engagement signed by Kathy McDonald of the Township of Billings (the Client) to prepare the 2019-2021 triennial monitoring report for the Kagawong Landfill (hereafter referred to as the Site). The following report provides a detailed evaluation and summary of the 2019-2021 monitoring data and was completed to constitute the 2019-2021 Landfill Monitoring Report. This document includes, but is not limited to, a summary of historical geochemical data, a review/evaluation of the historical and current geochemical data (as well as groundwater flow), and a summary of geochemical trends.

The purpose of completing the groundwater monitoring program was to assess the hydraulic media for contaminants of concern, for internal due diligence purposes and a compliance requirement under the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) (formerly referred to as a Certificate of Approval (CofA) Number **A550501**. A copy of the ECA is provided in Appendix II. To achieve the reporting objectives of this monitoring program, Pinchin carried out the 2019-2021 groundwater sampling at the Site in general accordance with the documents referenced within this report.

In addition to the annual monitoring analysis and summary for the Site, this document also contains the hydrogeological assessment carried out in 2018 in support of an amendment to the ECA for the Site. The purpose of the hydrogeological assessment was to provide data to supplement an ECA amendment to the MECP, which will encompass both the incorporation of the in-situ historical waste deposits (beyond the current approved footprint) within the landfill, as well as a potential landfill expansion.

1.1 Location

The Site property is located north off Highway 540, on Lot 4, Concession 9, approximately 2.7 kilometers (km) from the Town of Kagawong, Ontario. The Site location is indicated on Figure 1 (all Figures are provided in Appendix I).

The Site is located at Universal Transverse Mercator (UTM) coordinates Zone 17, 400, 100 metres (m) Easting and 5,083, 500 m Northing (North American Datum 1983). Landfill coordinates were obtained using a Global Positioning System and are accurate within approximately 10 m.

1.2 Ownership and Key Personnel

The Site is owned and operated by the Township of Billings, located in Kagawong, Ontario. The project was completed for the following representative on behalf of the Township of Billings:

Ms. Kathy McDonald: Clerk-Treasurer / CAO
Township of Billings
PO Box 34, 15 Old Mill Road, Kagawong, ON P0P 1J0

The Competent Environmental Practitioner (CEP) for the Site groundwater monitoring program was Mr. Tim McBride of Pinchin Ltd. Mr. McBride's contact information is provided below:

Mr. Tim McBride, B.Sc., P.Geo., Q.P.$_{ESA}$
Pinchin Ltd.
662 Falconbridge Road, Unit 3
Sudbury, Ontario P3A 4S4

1.3 Description and Development of the Site

The Site was formerly operated under ECA No. **A550501**, issued on March 20, 1980, and has been owned and operated by the Client since this time. Four known updates have been made to the Site ECA since 1980 as follows:

- On November 24, 1994, the ECA was revised to include up to 2,500 tonnes of non-hazardous fuel contaminated soil from UCO Bulk Fuel Facility on a one-time basis only;
- On February 13, 2002, the ECA was revised to include an in-vessel compost for the purpose of research;
- On April 21, 2015, the ECA amendment was issued to update the former CofA and provide the typical updates and requirements for operating landfill sites. A search completed by Pinchin on the MECP Access Environment website provided details pertaining to the 2002 Site CofA compost operations, as well as the 2015 ECA amendment; and
- On September 21, 2021, an application to amend the ECA was requested to attain approval to; increase the total maximum capacity from 40,000 m^3, increase the area of the waste disposal footprint from 1.0 (hectare) ha to 1.25 ha, and approve 2,550 m^3 of Fill Beyond Allowable Limits in the southeast corner to be capped and remain in-place.

The Site was developed during the 1960s and operated by a provincial ministry as a domestic landfill for solid non-hazardous waste to be utilized by residences and seasonal users of the area. The Site is approved for the use and operation of a 1.0 ha waste disposal site within a total site area of 60.2 ha having a maximum capacity of 40,000 m^3.

A map illustrating the site features is provided as Figure 2.

1.3.1. Site Document Review

Pinchin reviewed the following reports for the Site and are referenced within this document:

- Report entitled *"2016-2018 Water Quality Monitoring Assessment, Township of Billings Kagawong Landfill, Kagawong, Ontario"* completed by Pinchin, dated March 28, 2019 (2016-2018 Report);
- Report entitled "*2019 Water Quality Summary Report, Kagawong Waste Disposal Site, Kagawong, Ontario"* completed by Pinchin, dated December 19, 2020; and
- Report entitled *"2020 Water Quality Summary Report, Kagawong Waste Disposal Site, Kagawong, Ontario"* completed by Pinchin, dated December 3, 2020.

A copy of these documents can be obtained from the Client. Pinchin has relied on the information available in the previous environmental reports reviewed for the Site as part of this assessment. Information reviewed within these reports is referenced in pertinent sections throughout this document.

1.4 Monitoring and Reporting Program Objectives and Requirements

The monitoring and reporting completed by Pinchin has been generally developed based on the Ministry of Environment, Conservation and Parks (MECP) document entitled "*Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document*" dated November 2010, the Site-specific ECA, previous investigations and the Client's request for 2019-2021 monitoring reporting.

1.5 Assumptions and Limitations

Pinchin has assumed that the information generated from historical investigations is accurate and has been completed in accordance with standard engineering practices and regulations. It should be noted that the historical background information made available to Pinchin by the Client was limited, and as such, previous reports have been relied on for information where required.

The scope of the monitoring activities was limited to the parameters listed in the previous monitoring reports for groundwater and surface water and was limited to the immediate area surrounding the Site. The investigations were limited solely to the groundwater within the monitoring well installations and surface water locations for the Site. The investigation does not constitute an exhaustive investigation of the Site property or adjacent properties for potentially unknown contaminants and/or other unknown sources of environmental impact.

Pinchin's limitation of liability and scope of work is as follows:

- The work performed in this report was carried out in accordance with the Terms and Conditions made part of the contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in the contract;
- The report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of the contract and included in this report;
- The services performed and outlined in this report were based, in part, upon a previously installed monitoring network, established by others and approved by the applicable regulatory agencies. Pinchin's opinion cannot be extended to portions of the Site which were unavailable for direct observations, reasonably beyond the control of Pinchin;
- The objective of this report was to assess the water quality conditions at the Site, given the context of the contract, with respect to existing environmental regulations within the applicable jurisdiction;
- The Site history interpreted herein relies on information supplied by others, such as local, provincial, and federal agencies, as well as Site personnel. No attempt has been made to independently verify the accuracy of such information, unless specifically noted in this report;
- The conclusions of this report are based, in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the Site in locations not specifically investigated. Should such an event occur, Pinchin must be notified in order that we may determine if modifications to the conclusions presented herein are necessary;
- The utilization of Pinchin's services during future monitoring at the Site will allow Pinchin to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered; and
- Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Pinchin accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 PHYSICAL SETTING

2.1 Geology and Hydrogeology

The Kagawong Landfill is located on top of the Niagara Escarpment, approximately 15-20 m higher than the eastern topography and 10-20 m west of the crest of the cuesta. The surface of the landfill generally consists of weathered and fractured dolostone with little overburden. The Manitoulin Formation is a carbonate unit and consists of blue-grey to brown, thin-bedded, fine- to medium-crystalline dolomitic limestone and dolostone, which is locally chert-rich and where bedrock exposures of the formation are extensive. Likewise, the dolostones occur only in cliff sections. The Site is underlain by fractured and weathered crystalline dolostone of the Manitoulin Formation. Below this layer are crystalline limestone and dolostone of the Georgian Bay Formation dating from the Ordovician Epoch. The fractured surface bedrock does not provide a confining layer for groundwater movement, and surface springs are evident to the east. Groundwater movement appears to flow in an easterly direction.

Three monitoring wells (BH1, BH2 and BH3) were installed in June of 1993. Groundwater elevations were measured and groundwater samples were collected from all three monitoring wells in the summer of 1993. Results indicated that groundwater flows toward the east with an estimated lateral hydraulic gradient of 0.13 m/m. Analytical results indicated elevated levels of leachate indicator parameters (including conductivity, total dissolved solids (TDS), sulphate, sodium, chloride and iron) in BH1 relative to the other monitoring wells. BH1 is situated near the east edge of the waste fill area and is designated as a “near-source” monitor for the immediate impacts of leachate. Monitoring well BH2, which was located near the north edge of the waste fill area, was destroyed sometime after 1993, as the deposition of waste progressed. BH3 is situated near the west edge of the waste fill area and north of the segregated waste areas for appliances, wire and metals. BH3 is also designated a “near-source” monitor for landfill impacts, including impacts from segregated waste piles.

Monitoring wells BH101 through BH106 were installed in December 2010. BH101 and BH102 are located north and west of the waste fill area, respectively. These wells are interpreted to be hydraulically upgradient of the fill area and are designated as background monitoring wells at the Site. BH103, BH104, BH105 and BH106 are located east, and downgradient, of the waste fill area. These monitoring wells are designated to monitor for potential impacts from landfill leachate.

Four additional bedrock monitoring wells were installed on June 26, 2018 (BH107, BH108, BH109 and BH110) as part of a hydrogeological assessment at the Site. The purpose of the hydrogeological assessment was to provide data to supplement an ECA amendment to the MECP, which will encompass both the incorporation of the in-situ historical waste deposits (beyond the current approved footprint) within the landfill, as well as a potential landfill expansion. Monitoring wells BH107 and BH108 are located east and southeast of the fill area, respectively, and are inferred to be in the downgradient area of the

Site. Monitoring well BH109 is located downgradient of the fill area, south southeast of existing monitoring wells BH1 and BH3. Monitoring well BH110 is located west of the fill area. This monitoring well is interpreted to be hydraulically upgradient of the fill area and is situated to monitor background conditions at the Site.

The nearest potable wells are approximately 1.2 km east of the Site. These wells are shallow (6-15 m) in fractured bedrock.

2.2 Surface Water Features

The Site is positioned on a surface water drainage divide and is situated at a topographical high. Surface water drainage largely occurs in either an easterly or westerly direction. Surface water west of the landfill flows to the west where fractured dolostone is encountered. Drainage occurs through the dolostone and continues largely as groundwater to the east to northeast where it eventually discharges into a tributary (approximately 1.25 km distance) of the Kagawong River and the North Channel of Lake Huron.

Surface water east of the landfill flows to the east where fractured dolostone is encountered as well as the edge of the escarpment. Drainage occurs through the dolostone and continues largely as groundwater to the east where it discharges into a tributary (approximately 1.25 km distance) of the Kagawong River and the North Channel of Lake Huron. To the east and northeast of the Site beyond the monitoring well locations, low-lying land becomes marshy before meeting the tributary of the Kagawong River.

The surface drainage generally flows to both the east and west following the natural contours of the land. No defined water courses or drainage features are present at the landfill. Engineered ditching turns to the east and west along both sides of Highway 540, south of the landfill.

2.3 Historical Data

Pinchin reviewed the 2016-2018 Water Quality Monitoring Assessment and the 2019 and 2020 Summary Reports completed by Pinchin to evaluate historical data and groundwater quality conditions.

2.3.1 Historical Groundwater Data

According to the historical data, the results from past groundwater monitoring indicate that leachate impact (as represented by results from BH1 and BH3) was characterized by elevated levels of conductivity, hardness, TDS, chloride, sulphate, ammonia, sodium, arsenic and boron. Elevated levels of dissolved organic carbon (DOC) in background and downgradient monitoring wells suggest that the results for these parameters may be related to localized ambient groundwater conditions within the shallow bedrock. Elevated levels of leachate indicator parameters in BH103, BH104, BH105 and BH106, similar to those observed in BH1, suggest the potential for leachate impact at these downgradient and transgradient locations.

With the exception of boron (which marginally exceeded the RUC but met the Ontario Drinking Water Quality Standards (ODWQS)) in monitoring wells BH103 and BH106 in 2014), each of the parameter's conductivity, hardness, TDS, chloride, sulphates, ammonia, sodium, iron and manganese are either aesthetic objects or operational guidelines. Related to the treatment of drinking water and do not necessarily constitute a human health hazard. The above noted exceedances suggested that there was water quality impact occurring to the groundwater flow system downgradient of the landfill and that the Site was operating as a natural attenuation type facility. However, as groundwater leachate impacts are occurring within the established contaminant attenuation zone (CAZ) for the Site, and the downgradient monitoring wells do not extend out to the east property boundary and the limit of the CAZ, it was unknown if the Site is considered to be in conformance with Reasonable Use Guideline B-7. Further downgradient monitoring wells will be required at the east property boundary and limit of the CAZ to determine compliance.

3.0 METHODOLOGY

3.1 Scope of Work

The objectives of the monitoring program as requested by the Client included the following scope of work:

- Mobilization to the Site during the spring and fall of 2019, 2020 and 2021 to facilitate the collection of groundwater samples from the existing well network;
- Submission of the groundwater samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in the previous monitoring reports; and
- Preparation of a report outlining the 2019-2021 field work completed and the analytical results, an evaluation of the results and any subsequent recommendations.

The investigation methodology was also conducted in general accordance with, and reference is made to, the following regulatory and guidance documents:

- MECP document entitled "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", dated December 1996 (MECP Sampling Guideline);
- MECP document entitled "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended July 1, 2011 (Analytical Methods);
- Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002;
- MECP document entitled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003 (ODWQS Guideline);

- MECP document entitled “Incorporation of the Reasonable Use Concept into MECPE Groundwater Management Activities, Guideline B-7 (formerly 15-08)” (Guideline B-7), dated April 1994;
- MECP document entitled “Determination of Contaminant Limits and Attenuation Zones, Procedure B-7-1”, (formerly referenced by 15-08);
- Regulation 903 R.R.O. 1990 “Wells”, under the Ontario Water Resources Act; and
- MECP document entitled “Water Management Policies Guidelines Provincial Water Quality Objectives” (PWQO), dated July 1994, revised February 1999.

3.2 Groundwater Monitoring Well Locations

Seven overburden groundwater monitoring wells have historically been utilized at the Site. The locations of all the monitoring wells included in the current monitoring program are illustrated on Figure 2. The following table details the monitoring well locations with coordinates which were collected by others as well as the respective on-Site positions according to the groundwater elevation data collected to date.

Well ID	UTM Zone 17 NAD 83		Location
	Easting (m)	Northing (m)	
BH1	400,138	5,083,536	Source
BH3	400,066	5,083,552	Source
BH101	400,061	5,083,730	Upgradient
BH102	400,038	5,083,604	Background
BH103	400,280	5,083,436	Downgradient
BH104	400,266	5,083,492	Downgradient
BH105	400,281	5,083,578	Transgradient
BH106	400,318	5,083,670	Transgradient
BH107	400,527	5,083,413	Downgradient
BH108	400,525	5,083,563	Downgradient
BH109	400,167	5,083,408	Downgradient
BH110	399,961	5,083,603	Upgradient

All groundwater monitoring wells were sampled during the spring and fall sampling events of 2019, 2020, and 2021 with the exception of BH109 during 2019 due to insufficient volumes. All wells were inspected and found to be in good condition and no wells displayed evidence of a condition non-compliant with Regulation 903 with the exception of BH3 which has no well casing. A photographic log of the monitoring wells is provided in Appendix VII. The locations and elevation data for the respective monitoring wells are provided in Table 1 (all tables are provided in Appendix IV – Summary Tables).

3.2.1 Surface Water Monitoring Locations

Surface water monitoring was not completed by Pinchin during the 2019 through 2021 monitoring program as there are no surface water bodies within close proximity to the landfill suitable for sampling. Should future investigations reveal suitable locations for surface water sampling, samples will be retrieved for analysis and included as part of future comprehensive monitoring programs.

3.3 Monitoring Frequency

As per previous annual monitoring events, groundwater was sampled annually by Pinchin during 2019, 2020 and 2021, in the fall. The sampling events occurred on the following dates:

- September 11, 2019;
- October 8, 2020;
- October 19, 2021.

3.4 Groundwater Monitoring Parameters

Groundwater samples were collected from each of the monitoring wells and were submitted for laboratory analysis of the parameters listed in Column 1 of Schedule 5 of the MECP Landfill Standards. At the time of sample collection, field readings for the parameters temperature, pH, conductivity, oxidation reduction potential (ORP), total dissolved solids (TDS) and dissolved oxygen (DO) were measured and recorded. Field parameters are presented in Tables 2 through 13 as part of the groundwater quality results.

3.5 Monitoring Procedures and Methods

3.5.1 Standard Operating Procedures

The following Pinchin Standard Operating Procedures (SOPs) were followed by Pinchin field personnel for each portion of this project:

- Field Measurement of Water Quality Parameters; and
- Groundwater Sampling SOP.

All Pinchin monitoring SOPs have been developed in accordance with the MECP Sampling Document and are consistent with standard engineering practices.

3.5.2 Groundwater Monitoring Activities

To perform the groundwater monitoring activities, the following tasks were conducted:

- Pinchin notified the Client prior to field activities, and subsequently mobilized staff from the local Sudbury Office to the Site. The groundwater quality monitoring and field sampling events occurred during the fall of 2019, 2020, and 2021;
- Static groundwater levels were collected using a Solinst™ water level tape. Measurements were collected from the top of riser pipe;
- During the monitoring events, groundwater from each monitoring well was purged prior to the collection of the sample, using a moderate-flow sample methodology via high-density polyethylene (HDPE) 3/8" tubing and a Waterra™ inertial footvalve system. The HDPE system was chosen as an approved method to minimize sediment/particulate within each sample, and to minimize sample agitation and well trauma in accordance with the MECP Sampling Document. Pinchin purged a minimum of three well volumes to a maximum of six well volumes using the inertial pump system until the well volume column was representative of the surrounding formation. During purging activities, additional groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Sample residual was disposed of onto the ground surface, on-site and up-gradient within the landfill confines;
- Groundwater samples were collected using the HDPE system in accordance with the MECP Sampling Document. Dissolved metals were field-filtered using a dedicated in-line 0.45 micron disposable filter. Upon completion of field sampling and monitoring activities, all samples collected were submitted to the project laboratory, AGAT Laboratories (AGAT) in Mississauga, Ontario (for 2019-2020) and SGS Canada Inc. (SGS) in Lakefield, Ontario (for 2021). All parameters were analyzed by the project laboratory using MECP approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document;
- The groundwater samples collected were analyzed at the project laboratory for the parameters listed in the previous monitoring reports. Groundwater sample results were compared to the applicable ODWQS as applied in accordance with the ODWQS Guideline document. Groundwater sample results were also compared to the reasonable usage parameters and were assessed using Guideline B-7 to establish and determine levels of contaminant discharges to the groundwater formation, which would be considered acceptable by the MECP from naturally attenuating landfill sites, with respect to human consumption and potable considerations; and

- Pinchin collected and submitted a total of six field duplicates, two for each sampling event in 2019, 2020, 2021, for quality assurance and quality control purposes (QA/QC) from the field monitoring and sampling events.

3.5.3 Groundwater Field Measurements

Prior to sampling groundwater in the wells, Pinchin monitored groundwater depth using a Solinst™ 30-metre electronic water level meter. The water level tape is calibrated in 1.0 millimeter (mm) increments. Reproducibility of the depth measurements is generally within 2.0 mm or less.

Subsequent to groundwater depth measurement and during purging activities, additional groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Field parameters at each surface water monitoring location were also collected using the YSI-556.

The following field parameters were measured during the 2019-2021 monitoring program:

- *Dissolved Oxygen* (DO) refers to the relative quantity of oxygen molecules which are dissolved or carried within a quantity of water. Oxygen enters waters as rooted aquatic plants and algae undergo photosynthesis, and as oxygen is transferred across an air and water interface. Oxygen's solubility in water is indirectly correlated with water's temperature, salinity and pressure. DO concentrations have a significant effect on groundwater quality by regulating the valence state of trace metals and constraining the bacterial metabolism of dissolved oxygen species;
- *Conductivity* is the measurement of water's capacity to pass an electrical current. It is considered to be a reasonable indicator of ionic activity and dissolved solids concentration levels. It is affected by the presence of inorganic dissolved solids which carry a negative charge such as chloride, nitrate, sulfate and phosphate anions or a positive charge such as sodium, magnesium, calcium, iron, and aluminum cations. Organic compounds such as oil and phenol do no conduct an electrical current very well and would therefore have low conductivity in water. Conductivity is also directly correlated to the water temperature. Specific conductivity is a measurement of conductivity values which have been compensated to 25ºC;
- *pH* is a measure of water's acidic/basic properties on a logarithmic scale from 1 (strongly acidic) to 14 (strongly alkaline or basic). It determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals. For example, in addition to affecting how much and what form of phosphorus is most abundant in the water, pH also determines whether aquatic life can use it. The degree to which heavy

metals are soluble determines their toxicity. Metals tend to be more toxic at lower pH values because they are more soluble. Excessively high and low pHs can have serious environmental and health effects. A high pH may cause the release of iron, copper or lead into potable water, corrosion on water pipes and water using appliances and reduces the effectiveness of water disinfection with chlorine. Low pH values corrode substances such as metals and plastics. Fluctuations in groundwater pH values may be indicative of groundwater contamination;

- *Temperature* has a dramatic influence on water quality. The rate of chemical reactions is generally correlated to temperature, which in turn affects the biological availability of nutrients within the water. As previously mentioned, oxygen's solubility in water is indirectly correlated with its temperature. Declining concentrations of oxygen within warming water is magnified by aquatic plants increasing metabolism as water temperature increases. Low concentrations of DO weaken aquatic plants resistance to disease, parasites and other pollutants; and
- *Oxidation-reduction potential (ORP)* characterizes the oxidation-reduction state of the water on a scale from approximately -300mV (strongly reducing) up to +500mV (strongly oxidizing). The primary application of ORP is recording significant changes in the redox potential which is observed when purging a stagnant water column in piezometer and replacing it with "fresh" groundwater.

3.5.4 Record Keeping and Field Notes

Field notes were collected during the water quality monitoring events and recorded relevant observations including, but not limited to:

- Dates and time of work being completed;
- Instrumentation and instrument condition;
- Calibration methods and results;
- Field parameter measurements;
- Field personnel conducting the investigations;
- Field methods used;
- Sampling location identifications;
- Sampling equipment and condition;
- Sample identification (i.e. type, media, number of containers, etc.);
- Sample preparation methods (i.e. preservatives, filtration, etc.);

- Field QA/QC measurements;
- Field and sample identifiers;
- Anomalous conditions (i.e. damage to monitoring wells);
- Photographs of monitoring wells and monitoring stations;
- Weather conditions at the time of the monitoring events; and
- Field conditions.

All raw data and field notes are preserved and retained in Pinchin's custody.

3.6 Quality Assurance for Sampling and Analysis

Pinchin uses recognized industry standards, including the Canadian Council of Ministers of the Environment (CCME) *Subsurface Assessment Handbook for Contaminated Sites* and MECP's manual *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* for conducting environmental assessments. For quality assurance, all work is supervised and internally reviewed by senior staff members. As such, various QA/QC protocols were followed during the water quality sampling events to ensure that representative samples were obtained, and that representative analytical data were reported by the laboratory.

Field QA/QC protocols that were employed by Pinchin included the following:

- Clean, labelled, and pre-preserved (when applicable) sample containers were provided by the laboratory;
- Water quality samples were placed in laboratory-supplied sample jars;
- The monitoring wells were purged to remove stagnant water prior to sample collection so that representative groundwater samples could be obtained. Dedicated purging and sampling equipment was used for monitoring well development, purging and sampling to minimize the potential for cross-contamination;
- All water quality samples were placed in coolers on ice immediately upon collection, with appropriate sample temperatures maintained prior submission to the laboratory;
- Dedicated and disposable Nitrile™ gloves were used for all sample handling;
- All non-dedicated monitoring and sampling equipment (i.e. water level meter and YSI-556) was cleaned before initial use and between uses to minimize the potential for cross-contamination by washing with an Alconox™/potable water mixture followed by a deionized water rinse;

- Field duplicate groundwater and surface water samples were collected during the spring sampling events (1 in 10); and
- Sample collection and handling procedures were performed in general accordance with the MECP Sampling Guideline.

The AGAT and SGS laboratories have an established QA/QC program and is a member of the Canadian Association for Laboratory Accreditation (CALA) and is accredited by the Standards Council of Canada (SCC) for specified environmental analyses.

AGAT and SGS's internal laboratory QA/QC consisted of the analysis of laboratory duplicate, method blank, matrix spike and spiked blank samples, an evaluation of relative percent difference calculations for laboratory duplicate samples, and an evaluation of surrogate recoveries for the method blank, matrix spike and spiked blank samples.

3.7 Data Quality Evaluation

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the 2019 through 2021 monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document, and in most cases, exceed the minimum requirements.

Water quality samples collected by Pinchin were generated in accordance with acceptable procedures. No analytical hold times were exceeded for samples submitted for analyses and sample temperatures upon receipt at the project laboratory were below 10° Celsius.

Relative per cent difference (RPD) values (the absolute difference between two values divided by the average value and expressed as a per cent) were calculated between the parent sample and the field duplicate as part of the QA/QC program. RPD results of sample and duplicate analyses that are less than 50 percent indicate an acceptable level of analytical uncertainty. RPD values calculated for measured analyte concentrations for sample and duplicate pairs that exceed 50 per cent generally warrant discussion because they may indicate the presence of elevated analytical uncertainty and a potential for making interpretive errors based on the analysis results. Use of calculated RPD values to assess analytical uncertainty when using measured analyte concentrations for sample and sample duplicate pairs is not appropriate when either measured analyte concentration is within a multiple of 5 of the method detection limit (a value designated as the practical quantification limit (PQL)), where analytical uncertainty is typically elevated.

All field instrumentation calibration checks were completed by Pinchin field staff members prior to use on-Site. All field operations conducted by Pinchin field staff members were completed using standard

equipment decontamination and sampling procedures, and no deviations from the sampling plan were noted.

4.0 ASSESSMENT, INTERPRETATION AND DISCUSSION

4.1 Groundwater Quality Monitoring

4.1.1 The Reasonable Use Criteria Assessment (RUC)

Guideline B-7, the "reasonable use concept" (RUC) approach, is the MECP's groundwater management strategy for mitigating the effect of contamination on properties adjacent to its source. It establishes procedures for determining what constitutes the reasonable use of groundwater on a property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from landfills which have a potential to migrate hydraulically downgradient and off-site and impair the current and future groundwater use at downgradient properties.

The application of "reasonable use" is outlined in Procedure B-7-1 "*Determination of Contaminant Limits and Attenuation Zones*". The procedure determines the maximum concentration (C_m) of a particular contaminant that would be acceptable in the groundwater beneath an adjacent property and is calculated in accordance with the relationship:

$$C_m = C_b + x\ (C_r - C_b)$$

C_b – This is the background concentration of the particular groundwater contaminant in consideration before it has been affected by human activities. From this it is possible to calculate the extent of human activities impact on contaminant levels.

C_r – In accordance with the Ontario Water Management Guideline, this is the maximum concentration of a particular contaminant that should be present in the groundwater. This value is dependent on property's use of the groundwater as outlined in B-7. It also allows for the total amount of contamination. Pinchin conservatively assumes that the reasonable use of the groundwater on-site is potentially for potable drinking purposes.

x – As determined by the MECP, this constant determines the extent which the contamination has on the groundwater's use. For drinking water x is 0.5 for non-health related parameters or 0.25 for health related parameters. For other reasonable uses it is 0.5.

Contamination concentrations which exceed C_m may have an appreciable effect on the use of an adjacent property and as such the Site should be managed in a manner to minimize environmental damage, or the operation should be modified. It is acceptable to modify the operation of the disposal site to meet the specified limits. However, if these limits are exceeded, all waste disposals, except for that done in conjunction with a reasonable plan for closure or with remedial activities, should be terminated until the

specified limits have been met, or until monitoring data indicate that these limits will be met. Determination of the replacement of contaminated water supplies and the abatement of the contaminant plume must be made on a case-by-case basis in accordance with the "*Resolution of Groundwater Quality Interference Problems*", Guideline B-9. For the purpose of evaluating compliance with respect to the RUC, Pinchin has compared the calculated C_m values versus the applicable downgradient compliance monitoring wells.

4.1.2 The Ontario Drinking Water Quality Standards (ODWQS)

Through the establishment of the ODWQS, the province of Ontario has determined legally enforceable standards on contaminants in drinking water. The standards are designed to protect public health by restricting the quality of specific contaminants in drinking water. Three categories of contaminates are regulated under the Ontario Regulation 169/03 Drinking Water Standards:

- Microbiological – Originating from human and animals waste, coliforms and bacteria are common in the environment. Most are harmless however their presence may be indicative of other harmful bacteria in the water. Under the ODWQS, Escherichia coli ("E. Coli"), fecal coliforms and total coliforms must be non-detectable in drinking water;
- Chemical – ODWQS regulates maximum quantities of organic and inorganic chemicals allowed in drinking water. Industrial discharges or agricultural runoff are not necessarily removed by drinking water treatment. Consuming water exhibiting a greater concentration of these chemicals than the ODWQS may cause serious health problems; and
- Radiation – Natural and artificial radio nuclides are also regulated in the ODWQS. Standards are expressed as maximum allowable concentrations in becquerels per litre ("L"). Radiological contaminants include radio nuclides, such as radium 228, which are caused from the erosion of naturally occurring deposits, or artificial radio nuclides, such as tritium, released into the water by nuclear power plants. Radiological contaminants do not naturally occur within the study area and the disposal of radiological waste was not suspected in the Site and as a result radiation was not monitored for this study.

The ODWQS Guideline Document is the MECP technical guidance document which provides guidance on applicability of the ODWQS and also provides applicable interim guidelines where legal standards are absent. Both the ODWQS and Guideline B-7 were used in assessing the groundwater results obtained during the 2019-2021 monitoring program.

4.2 Groundwater Results

The following discussion of parameters documents the groundwater quality in comparison to the ODWQS standards and the calculated reasonable use criteria as per Guideline B-7. To implement Guideline B-7, groundwater samples collected from downgradient monitoring wells have been compared to the calculated RUC values (C_m).

The analytical data for each well in comparison to the applicable regulatory criteria for the 2019, 2020 and 2021 monitoring periods are provided in Tables 2 through 13 for the twelve overburden groundwater monitoring wells. Copies of the laboratory analytical reports are presented in Appendix V. An evaluation of the Guideline B-7 criteria in comparison to the downgradient compliance wells is provided in Tables 14 through 16. The following is a breakdown of the water quality observed the monitoring well locations with comparison to the background quality and leachate being produced on-Site.

4.2.1 Background Water Quality Evaluation

Groundwater monitoring wells BH101 and BH102 located to the north and west of the landfill area, respectively, are interpreted to be hydraulically upgradient of the fill area and have been designated as background monitoring wells at the Site. BH110, was installed to the west of the landfill area during 2018 and is also considered representative of background water quality. BH101 continues to be utilized as the source of background water quality when comparing to Guideline B-7 as the overall comparison appeared to adequately represent background conditions when compared to BH102.

Background water quality conditions at the Site is generally characterized by moderate levels of landfill indicator parameters such as conductivity, hardness, total dissolved solids (TDS), alkalinity, chloride, sodium and sulphate, exhibited since 2012. This indicates that elevated levels of the typical landfill leachate indicator parameters are naturally occurring in this area. Therefore, these concentrations at the downgradient wells must be assessed in comparison to the background concentrations to provide situational context.

Monitoring Well BH101

Groundwater monitoring well BH101 is generally characterized by moderate concentrations of chloride, sulphate and alkalinity and high concentrations of TDS, DOC, iron and total hardness. Historically, there have been exceedances of the ODWQS at BH101 for TDS, DOC, iron and total hardness concentrations, signifying that these parameters are naturally elevated in this area. No ODWQS exceedances were quantified during the 2019-2021 monitoring periods.

Monitoring Well BH102

Groundwater monitoring well BH102 is generally characterized by similar concentrations as BH101. ODWQS exceedances were quantified during the 2019-2021 monitoring periods for DOC (2020 and 2021), iron (2019) and manganese (2019). Iron and Manganese are a commonly occurring mineral observed in shallow overburden/bedrock groundwater in northern Ontario and are not expected to be indicative of landfill related impacts at this concentration. The ODWQS criteria for iron and manganese are also aesthetic objectives and are not health-based nor considered to be a significant environmental concern originating from the Site. Exceedances of iron and manganese are sporadic throughout the historic database and require additional monitoring to confirm any apparent trends.

4.2.2 Upgradient Water Quality Evaluation

Monitoring Well BH110

Groundwater monitoring well BH110 is located upgradient of the landfill area and also provides further background data for the Site. BH110 is generally characterized by moderate concentrations of alkalinity, sulphate and DOC. ODWQS exceedances were quantified during the 2019-2021 monitoring periods for TDS, chloride, sodium and manganese. Due to the limited quantity of data available for BH110, no parameter trends can be analyzed. Concentration exceedances further confirm that background conditions at this Site indicate naturally elevated levels of TDS, chloride and manganese. Sodium exceedances at this location may be attributed to naturally occurring sodium. Further monitoring is required in order to determine trends.

4.2.3 Source Water Quality Evaluation

Monitoring Well BH1

Groundwater monitoring well BH1 is generally characterized by moderate levels of DOC and iron, and elevated levels of TDS, chloride, sulphate, sodium, manganese when compared to background concentrations. ODWQS exceedances were quantified during the 2019-2021 monitoring periods for TDS, chloride, sulphate, DOC, sodium, iron and manganese. These parameters indicate temperate impacts from the landfill, which is consistent with historical observations at this location. It is expected that the groundwater at this location to be impacted with landfill leachate as this monitoring well is located adjacent to the fill area, as well as being downgradient. Concentrations of sodium exhibited at monitoring well BH1 have been consistently in exceedance of the ODWQS since 2012 (with the exception of 2017 and 2019). The elevated concentrations of sodium at this location can partially be attributed to temperate impacts from the landfill, however; it is also observed that in background locations such as BH110, concentrations are in some cases, in excess of the ODWQS. This suggests that the elevated concentrations of sodium at this location, but also at the Site as a whole, can also be attributed to

naturally occurring sodium and related parameters such as, TDS and chloride. As BH1 is considered to be a source well, Guideline B-7 maximum concentrations are not applicable as a measure of compliance, this well has been added for comparative purposes only.

Monitoring Well BH3

Groundwater monitoring well BH3 is generally characterized by moderate concentrations of alkalinity, sodium, DOC and boron and high concentrations of TDS, sulphate and chloride. ODWQS exceedances were quantified during the 2019-2021 monitoring program for TDS, chloride and sulphate. TDS and chloride are aesthetic objectives set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Intermittent ODWQS exceedances of sulphate concentrations since 2012 indicate no observed trend at this location.

4.2.4 Downgradient Water Quality Evaluation

Monitoring Well BH103

Groundwater monitoring well BH103 is generally characterized by high concentrations of conductivity, TDS, chloride, nitrate, sodium, iron and manganese, moderate concentrations of alkalinity, DOC and boron when compared to background water quality. ODWQS exceedances were quantified for TDS, chloride, sodium, arsenic (2019 only), iron and manganese. Guideline B-7 exceedances were quantified for alkalinity, chloride, sodium, boron and manganese. These concentrations could represent a concern originating from the Site and are indictive of landfill leachate impacts. These parameters are exhibiting a decreasing trend when compared to historic concentrations at this location.

Monitoring Well BH104

Groundwater monitoring well BH104 is generally characterized by high concentrations of conductivity, TDS, chloride, iron and manganese sodium and moderate levels of DOC. ODWQS exceedances were quantified for TDS, chloride, DOC (2021 only), sodium, arsenic (2019 only), iron (2019 and 2020) and manganese. Guideline B-7 exceedances were quantified during the 2019-2021 monitoring period for chloride, DOC (2021 only), sodium, manganese, iron, arsenic and boron (2019 only). These parameters observed at BH104 could represent a concern originating from the Site and are indictive of landfill leachate impacts. These parameters are exhibiting a decreasing trend, with peak concentrations occurring during the 2019 sampling event. The fall 2021 groundwater sample exhibited an ODWQS exceedance of DOC at this location. DOC concentrations were fairly consistent, exhibiting no clear increasing or decreasing trend. This parameter will be assessed closely during the next sampling event.

Monitoring Well BH105

Groundwater monitoring well BH105 is generally characterized by elevated concentrations of TDS, chloride, sodium, iron, manganese, high concentrations of arsenic, boron and low concentrations of alkalinity compared to background water quality. Guideline B-7 exceedances were quantified during the 2019-2021 monitoring period for chloride, sulphate (2021 only), arsenic (2020 only), sodium, boron, iron and manganese. Manganese is a commonly occurring mineral observed in shallow overburden groundwater in northern Ontario and is not expected to be indictive of landfill related impacts at this concentration. ODWQS criteria for TDS, chloride, sodium, iron and manganese are classified as aesthetic objectives, and are not health-based nor considered to be a significant environmental concern originating from the Site. Arsenic exceedances at this location are exhibiting no clear increasing or decreasing trend and should be assessed closely during the next sampling event.

Monitoring Well BH106

Groundwater monitoring well BH106 is generally characterized by elevated concentrations of TDS, chloride, sodium and high concentrations of conductivity, DOC, and arsenic. ODWQS exceedances were quantified during the 2019-2021 monitoring period for TDS, chloride, DOC, sodium, arsenic, iron and manganese. Guideline B-7 exceedances were quantified for chloride, DOC, sodium, boron, iron, alkalinity (2020), and lead (2020). The lead B-7 exceedance is anomalous with respect to the historic data and should be confirmed during the next scheduled monitoring event.

Monitoring Well BH107

Groundwater monitoring well BH107 is generally characterized by elevated concentrations of conductivity, TDS, chloride, sodium, arsenic, boron and manganese, moderate concentrations of DOC and low concentrations of sulphate. ODWQS exceedances were quantified during the 2019-2021 monitoring period for TDS, chloride, sodium, arsenic, boron, and manganese. Guideline B-7 exceedances were quantified for alkalinity, chloride, nitrate, sodium, boron, manganese, arsenic (2019 and 2020), barium (2019 and 2020). It is expected that the groundwater at these locations are impacted with minor amounts of landfill leachate, considering their downgradient location and the elevated levels of these parameters compared to background water quality. Arsenic and boron were beyond their respective maximum acceptable concentrations during the 2019 and 2020 events. These parameters observed at BH107 could represent a concern originating from the Site and are indictive of landfill leachate impacts.

Monitoring Well BH108

Groundwater monitoring well BH108 is generally characterized by elevated concentrations of conductivity, TDS, chloride, sodium, arsenic, boron and manganese and moderate concentrations of iron. ODWQS exceedances were quantified during the 2019-2021 monitoring period for TDS, chloride, sodium, arsenic,

boron, iron (2020 only), and manganese. Guideline B-7 exceedances were quantified for alkalinity, chloride, sodium, arsenic, barium, boron, iron and manganese. These parameters observed at BH108 could represent a concern originating from the Site and are indictive of landfill leachate impacts.

Due to the limited quantity of data available for monitoring wells BH107 and BH108 no parameter trends can be analyzed at this point and future sampling is required in order to establish any trends associated with these monitoring wells. It is important to note that these far-filed monitoring wells located at the eastern downgradient property boundary quantify the highest chloride and TDS concentrations (5 to 10 times greater than the perceived source well) and are indicative of potential interference associated with anthropogenic from the adjacent land use (winter salt storage).

Monitoring Well BH109

Groundwater monitoring well BH109 located within the downgradient flow path of the landfill area was observed to have elevated concentrations of conductivity, TDS, chloride, sulphate, sodium, arsenic, boron, iron and manganese, low concentrations of alkalinity and DOC. It should be noted that this location has not produced sufficient water therefore only two records are available (2020 and 2021). Due to the limited data available for this location, no trends can be analyzed at this point and future sampling is required in order to establish any trends associated with this monitoring well.

4.3 Groundwater Trend Analysis

A series of time versus concentration graphs were developed to evaluate the concentrations of several select landfill indicator parameters (including alkalinity, barium, boron, and DOC) at each monitoring well for the Site. Current and historical groundwater quality data was utilized to identify any apparent trends or inconsistencies in the water quality within the monitoring well network. The time versus concentration graphs are provided in Appendix VI. Further monitoring investigations are required, in order to confirm the interpreted trends observed during this monitoring period.

In general, the landfill indicator parameters are demonstrating fairly stable water quality trends, with the exception of boron, DOC with concentrations above the ODWQS criteria at most monitoring locations. All groundwater monitoring wells exhibit an elevated trend in chloride and TDS concentrations over time. Both the background and downgradient water quality has remained consistent through time. Alkalinity values appear to have consistently fluctuated at most of the groundwater monitoring locations. Chloride and TDS concentrations have been elevated across the Site but remains consistent with historic trends. DOC appears to be relatively stable, with sporadic elevated concentrations in all of the groundwater monitoring wells throughout historic records.

4.4 Groundwater Field Measurement Results

Pinchin collected groundwater monitoring parameters from each of the well locations during each of the 2019-2021 monitoring events using a YSI-556 water quality meter for measurement of field parameters. The field parameter measurements are provided in Table 2 through 13 for each monitoring well.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring events. The water quality at the Site monitoring locations did not change significantly between each of the monitoring locations and the measured field parameters were within the normal variability associated with shallow groundwater monitoring systems. Low dissolved oxygen concentrations were observed within all monitoring wells, which is an indicator of anaerobic conditions. Elevated conductivity measurements were observed at all monitoring wells, with the exception of BH101 and BH102, which is indicative of poor quality water, and typical for this type of setting.

4.5 Groundwater Flow Interpretation

Recorded static groundwater levels at the Site indicate groundwater flow to be directed towards the east. The groundwater flow direction may be influenced by seasonal variations in the amount of precipitation, by aquifer heterogeneity and the buried fill material at the Site. Groundwater measurements from the 2019 through 2021 monitoring program are consistent with the measurements observed during previous sampling events, indicating the groundwater flow direction is still following an east/southeasterly direction. The depth to groundwater measurement results are presented in Table 1.

During monitoring on October 19, 2021, the depth to groundwater was observed to range from 1.93 mbgs at BH108 to 8.57 mbgs at BH109. Groundwater elevations range from 240.11 metres relative to previously established benchmark level (mREL) at BH110 to 218.27 mREL at BH107. Groundwater measurements from the 2019 through 2021 monitoring program are consistent with the measurements observed during previous sampling events, indicating the groundwater flow direction is still following an east/southeasterly direction. While the groundwater elevations have fluctuated in each monitoring well from year to year while a monitoring program has been implemented at the Site, these fluctuations can be correlated with variations in annual precipitation quantities. Pinchin has interpreted that the landfill may have a significant influence on the groundwater flow vectors. Further to this, BH101 and BH102 are both topographically upgradient of the “near-source” monitoring wells BH1 and BH3. However, groundwater elevations in both BH101 and BH102 are below the groundwater elevations of BH1 and BH3. This suggests that localized groundwater “mounding” beneath the waste fill area may be impacting groundwater elevations in the “near-source” monitoring wells.

4.6 Leachate Characterization

The Site currently does not have a leachate collection system whereby leachate quality monitoring and characterization is being completed. Currently, groundwater monitoring well BH1, included in the existing monitoring well network at the Site is situated within the mid-site area, is considered representative of source leachate water quality.

In comparison to the background water quality, the source groundwater quality at BH1 is generally characterized by elevated concentrations of conductivity, TDS, chloride, sulphate, and sodium, when compared to background concentrations. ODWQS exceedances were quantified during the 2019-2021 monitoring periods for TDS, chloride, sulphate and sodium.

4.7 Contaminant Attenuation Zone

The Site resides on the east half of Lot 4, Concession 9, Township of Allan and has an established CAZ. The purchase of this adjacent property to the east was completed during the 1990s and measures approximately 400 m from west to east and 1000 m from north to south.

The established CAZ includes the entire south portion of the east ½ of Lot 4 and all of Lot 3, Concession 9, Township of Allan, which would provide for a CAZ of 600 m from west to east and 1,000 m from north to south and would encompass the entire Site (as depicted on Figure 2).

4.8 Adequacy of the Monitoring Program

4.8.1 Monitoring Well Network Efficiency

Pinchin concludes that the current groundwater monitoring well network is considered adequate for evaluating the WDS geological and hydrogeological characteristics southeast of the landfill (for evaluating downgradient groundwater quality migrating from the Site).

Based on a visual inspection of the monitoring well installations, Pinchin concludes that the monitoring wells are in satisfactory condition and in compliance with Regulation 903. Borehole logs should be included as an appendix in every annual monitoring report.

4.8.2 Background Monitoring Well Efficiency

Based on a review of the groundwater contaminant data from BH101, as well as the assumed groundwater flow direction, monitoring well BH101 has been identified as a best-case background location. A review of the dataset (as provided on Table 4) from BH101 did not identify elevated levels of common contaminant parameters during the 2019-2021 sampling events.

4.9 Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring

No supplemental monitoring was completed as part of the 2019-2021 monitoring programs completed by Pinchin.

4.10 Assessment of the Need for Implementation of Contingency Measures

There are currently no set trigger levels designed for the groundwater monitoring locations. Continued monitoring may indicate that trigger levels may be required in the future. At this time, Pinchin does not recommend any need or implementation for contingency measures.

4.11 Waste Disposal Site Gas Impacts

At this time no evidence has been documented to suggest that methane gas generation from the Site is a significant concern.

4.12 Effectiveness of Engineered Controls

There are no operational engineered controls in effect at the Site.

4.13 Control Systems Monitoring

Environmental control systems are designed, constructed, and utilized at some waste disposal sites to reduce or increase an environmental variable to an acceptable level, or to maintain an environmental variable within an acceptable range, in order to prevent a negative environmental outcome.

Certain environmental control systems such as a leachate collection system or a methane gas collection system can provide the basis for operator intervention to bring about or maintain a desired condition to operate the landfill. The Site does not currently require or operate any control systems; therefore, no control system monitoring was completed as part of the 2019-2021 monitoring program.

4.14 QA/QC Results

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document. Water quality samples collected by Pinchin were generated in accordance with acceptable procedures. No analytical hold times were exceeded for samples submitted for analyses and sample temperatures upon receipt at the project laboratory were below 10° Celsius.

The calculated RPDs for the original and field duplicate groundwater and surface water samples have been compared to the performance standards considered acceptable by Pinchin (i.e. 50%). Each of the calculated RPDs met the corresponding performance standard, with the exception of the following:

- The RPD values for groundwater sample pairing BH102/GWDUP1 collected on October 19, 2021, exceeded the corresponding RPD performance standard of 50% for the analytical results report for boron (RPD of 194.28%).

Upon review of the QA/QC results for the 2019-2021 sampling programs (presented in Tables 17 to 19), Pinchin has not identified any significant concerns that would warrant the invalidation of any of the field or laboratory data, and therefore considers the data generated as part of this program to be reliable.

The analytical laboratories employed to perform the laboratory analyses (AGAT and SGS) are accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999 – "*General Requirements for the Competence of Testing and Calibration Laboratories*" for the tested parameters and has met the standards for proficiency testing developed by the Standards Council of Canada for parameters set out in the Soil, Ground Water and Sediment Standards.

Sample analysis dates provided on the laboratory analytical reports issued by AGAT and SGS indicate that all sample analyses were performed within the required sample/extract hold times, as indicated by the dates presented in columns for each sample parameter on the analytical report. The laboratory minimum detection limits were reported to be at or lower than the required MECP reporting detection limits for the parameters analyzed. A comparison of the internal laboratory duplicate samples indicates that all samples and the respective duplicates are within acceptable limits.

5.0 CONCLUSIONS

Based on the work completed, the following is a summary of the activities and findings of the 2019-2021 water quality monitoring programs:

- Groundwater samples were collected from all monitoring locations at the Site on September 11, 2019, October 8, 2020, and October 19, 2021, with the exception of BH109 during the fall of 2019 which was observed to be dry at the time of the sampling. All samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports;
- The groundwater quality was assessed based on the ODWQS and Guideline B-7;
- Groundwater flow at the Site is interpreted to be directed towards the southeast;

- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective ODWQS values, with the exception of the following:
  - TDS at all locations with the exception of BH102;
  - Chloride at all locations with the exception of BH102;
  - Sulphate at BH1, BH3 and BH109;
  - DOC at BH1 (2020), BH102 (2020 and 2021), BH104 (2021) and BH106 (2020);
  - Sodium at BH1 (2020 and 2021), BH103, BH104, BH105, BH106, BH107, BH108, BH109 and BH110 (2019 and 2021);
  - Iron at BH1 (2021), BH103 (2019 and 2020), BH104 (2019 and 2020), BH105, BH106, BH108 (2020) and BH109 (2020);
  - Manganese at BH1 (2020 and 2021), BH103, BH104, BH105, BH106, BH107, BH108, BH109 and BH110;
  - Arsenic at BH103 (2019), BH104 (2019), BH105 (2019 and 2020), BH106 (2019 and 2020), BH107, BH108 and BH109; and
  - Boron at BH105, BH107, BH108 and BH109.
- All reported concentrations in the groundwater samples collected from the downgradient monitoring wells met the applicable Guideline B-7 criteria for all parameters analyzed, with the exception of the following:
  - Alkalinity at BH103 (2021), BH107 (2020 and 2021) and BH108 (2020 and 2021);
  - Chloride at all monitoring locations;
  - Nitrate at BH107 (2021);
  - Sulphate at BH105 (2021);
  - DOC at BH104 (2021) and BH106 (2020 and 2021);
  - Sodium at all monitoring locations;
  - Arsenic at all monitoring locations during 2019 and 2020 except BH104 and BH105;
  - Barium at BH107 (2019 and 2020) and BH108 (2019 and 2020);
  - Boron at all monitoring locations except BH104 (2020 and 2021);
  - Iron at all monitoring locations in 2019 and 2020 except BH107 and BH105 and BH106 in 2021;
  - Lead at BH106 in 2020; and

- Manganese at all monitoring locations except BH106.

Based on the results obtained from the groundwater monitoring wells, Pinchin has identified landfill related impacts at the Site. Elevated concentrations of conductivity, TDS, chloride, sulphate, sodium, arsenic, boron, iron, and manganese with the groundwater samples analyzed are present with the near surface bedrock on-Site. The Kagawong Landfill has been in operation for over 45 years. These results are indictive of impacts associated with leachate sourcing from waste deposits at naturally attenuating landfill site. The presence of elevated TDS and chloride concentrations at the downgradient property line in excess of 5 to 10 times that of the source wells indicates that the adjacent winter salt/sand storage operations may be resulting in confounding impacts to the Site. The incorporation of Tri-Linear Piper plots into future program may help differentiate any landfill derived impacts for other anthropogenic sources.

6.0 RECOMMENDATIONS

Based on a review of the existing dataset and regulatory requirements to date, Pinchin recommends the following:

- Continue with routine monitoring of all the available groundwater monitoring wells. It is recommended that groundwater monitoring continue to be completed during the fall to generate a baseline data set, to evaluate trends, and to determine the need and scope of a long-term monitoring program for the Kagawong Landfill;
- Monitoring and inspections of the landfill should continue to be completed to ensure regular maintenance is occurring on an as needed basis; and
- The Client should continue to ensure that the requirements as specified in the ECA and closure plan are complied with.

7.0 MONITORING AND SCREENING CHECKLIST

In accordance with the MECP Landfill Standards, the Monitoring and Screening Checklist for the Site completed by the Pinchin CEP is completed and provided in Appendix VIII.

8.0 DISCLAIMER

This Water Quality Monitoring Program was performed for the Township of Billings (Client), in order to investigate the environmental condition of the groundwater at the Kagawong Landfill Site (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property.

This Water Quality Monitoring Program does not quantify the extent of the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Water Quality Monitoring Program to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site and recognizes reasonable limits on time and cost.

This Water Quality Monitoring Program was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This report was prepared for the exclusive use of the Client, subject to the conditions and limitations contained within the duly authorized work plan. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice.

Pinchin will not be responsible for any consequential or indirect damages. Pinchin will only be held liable for damages resulting from the negligence of Pinchin. Pinchin will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered within the meaning of the Limitations Act, 2002 (Ontario), to commence legal proceedings against Pinchin to recover such losses or damage.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

APPENDIX I

Figures

PINCHIN

PROJECT NAME:	2019 - 2021 TRIENNIAL MONITORING REPORT
CLIENT NAME:	TOWNSHIP OF BILLINGS
PROJECT LOCATION:	KAGAWONG WASTE DISPOSAL SITE, KAGAWONG, ONTARIO
FIGURE NAME:	KEY MAP
FIGURE NUMBER	1

PROJECT NUMBER:	SCALE:	DRAWN BY:	REVIEWED BY:	DATE:
229152.003	1:100,000	DM	JP	MARCH 2022

LEGEND

- CURRENT LANDFILL SITE BOUNDARY
- PROPOSED LANDFILL SITE BOUNDARY
- CERTIFICATE OF APPROVAL BOUNDARY
- UAV IMAGE
- CAZ
- MONITORING WELL

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

PROJECT NAME:
2019 - 2021 TRIENNIAL MONITORING REPORT

CLIENT NAME:
TOWNSHIP OF BILLINGS

PROJECT LOCATION:
KAGAWONG WASTE DISPOSAL SITE, KAGAWONG, ONTARIO

FIGURE NAME:
SITE PLAN

PROJECT NUMBER:	SCALE:
229152.003	AS SHOWN
DRAWN BY:	REVIEWED BY:
DM	JP
DATE:	FIGURE NUMBER:
MARCH 2022	2

LEGEND

- CURRENT LANDFILL SITE BOUNDARY
- PROPOSED LANDFILL SITE BOUNDARY
- CERTIFICATE OF APPROVAL BOUNDARY
- MONITORING WELL
- 100.0 BOREHOLE ELEVATION (masl.)
- 100.0 GROUNDWATER CONTOUR ELEVATION (masl.)
- GROUNDWATER CONTOUR LINES
- FLOW GROUNDWATER FLOW DIRECTION

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

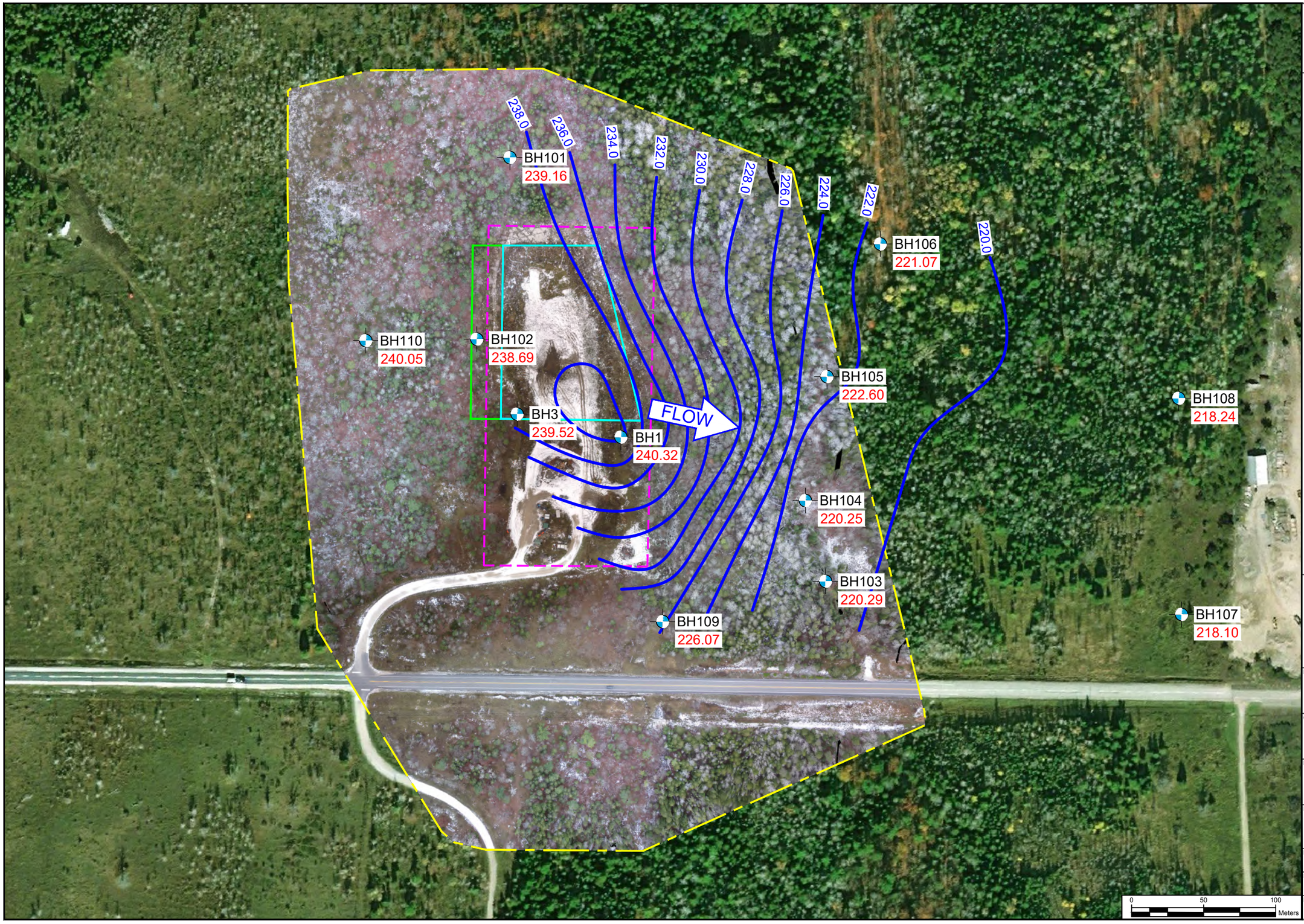
PROJECT NAME:
2019 - 2021 TRIENNIAL MONITORING REPORT

CLIENT NAME:
TOWNSHIP OF BILLINGS

PROJECT LOCATION:
KAGAWONG WASTE DISPOSAL SITE, KAGAWONG, ONTARIO

FIGURE NAME:
INFERRED GROUNDWATER CONTOUR PLAN - FALL 2019

PROJECT NUMBER:	SCALE:
229152.003	AS SHOWN
DRAWN BY:	REVIEWED BY:
DM	JP
DATE:	FIGURE NUMBER:
MARCH 2022	3



LEGEND

- CURRENT LANDFILL SITE BOUNDARY
- PROPOSED LANDFILL SITE BOUNDARY
- CERTIFICATE OF APPROVAL BOUNDARY
- MONITORING WELL
- 100.0 BOREHOLE ELEVATION (masl.)
- 100.0 GROUNDWATER CONTOUR ELEVATION (masl.)
- GROUNDWATER CONTOUR LINES
- FLOW GROUNDWATER FLOW DIRECTION

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PINCHIN

PROJECT NAME:
2019 - 2021 TRIENNIAL MONITORING REPORT

CLIENT NAME:
TOWNSHIP OF BILLINGS

PROJECT LOCATION:
KAGAWONG WASTE DISPOSAL SITE, KAGAWONG, ONTARIO

FIGURE NAME:
INFERRED GROUNDWATER CONTOUR PLAN - FALL 2020

PROJECT NUMBER:	SCALE:
229152.003	AS SHOWN
DRAWN BY:	REVIEWED BY:
DM	JP
DATE:	FIGURE NUMBER:
MARCH 2022	4

LEGEND

- CURRENT LANDFILL SITE BOUNDARY
- PROPOSED LANDFILL SITE BOUNDARY
- CERTIFICATE OF APPROVAL BOUNDARY
- MONITORING WELL
- 100.0 BOREHOLE ELEVATION (masl.)
- 100.0 GROUNDWATER CONTOUR ELEVATION (masl.)
- GROUNDWATER CONTOUR LINES
- FLOW GROUNDWATER FLOW DIRECTION

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

PROJECT NAME:
2019 - 2021 TRIENNIAL MONITORING REPORT

CLIENT NAME:
TOWNSHIP OF BILLINGS

PROJECT LOCATION:
KAGAWONG WASTE DISPOSAL SITE, KAGAWONG, ONTARIO

FIGURE NAME:
INFERRED GROUNDWATER CONTOUR PLAN - FALL 2021

PROJECT NUMBER:	SCALE:
229152.003	AS SHOWN
DRAWN BY:	REVIEWED BY:
DM	JP
DATE:	FIGURE NUMBER:
MARCH 2022	5

APPENDIX II

Environmental Compliance Approval

Ministry of the Environment
Ontario

Provisional Certificate No. A 550501

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Townships of Billings and Allan East
Kagawong, Ontario
P0P 1J0

for the use and operation of a 0.81 hectare dump site.

all in accordance with the following plans and specifications:

Located: Lot 4, Concession 9
Township of Allan
District of Manitoulin

which includes the use of the site only for the receiving and disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic and commercial

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

Dated this 20th day of March, 1980.

Director, Section 39.

Ontario

Ministry of the Environment **Ministère de l'Environnement**

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A550501
Notice No. 1

The Corporation of the Municipality of Billings
P.O. Box 34
Kagawong, Ontario
P0P 1J0

Site Location: Billing Waste Site
9490 Hwy 540, Lot 4, Concession 9
Allan Unorganized Township, District of Manitoulin

You are hereby notified that I have amended Provisional Certificate of Approval No. A550501 issued on March 20, 1980 for a waste disposal site (landfill), as follows:

I. This Certificate has been amended to allow the use of an in-vessel composter on site for the purposes of research.

II. The following Conditions are hereby added:

2. For the purpose of this Provisional Certificate of Approval and the terms and conditions specified herein, the following definitions apply:

(a) **"adequately trained"** means knowledgeable regarding the terms, conditions and requirements of this Certificate, relevant environmental legislation and regulations, and site operations;

(e) **"Compost"** means any material than has been processed in the Composter;

(d) **"Composter"** means the rotating drum in-vessel composter as described in Items 1 and 2 of Schedule "A";

(h) **"Director"** means one or more persons who from time to time are appointed under Part V of the EPA;

(i) **"District Manager"** means the District Manager, MOE Sudbury District Office;

(c) **"EPA"** means the *Environmental Protection Act*, R.S.O. 1990, c. E.19, as amended;

(c) **"Feed Material"** means any of the items listed in Condition 5;

(b) **"Guidelines"** means the Ministry document entitled *"Interim Guidelines for the Production and Use of Aerobic Compost in Ontario"* dated November 1991.

(f) **"Landfill"** means the Billing Waste Site located at 9490 Hwy 540, Lot 4, Concession 9
Allan Unorganized Township, District of Manitoulin;

(a) **"Municipality"** means the Municipality of Billings, including its officers, employees, agents or contractors;

(i) **"Regional Director"** means the Director, MOE, Northern Region;

(g) **"Site"** means the section of the Landfill shown on the General Site Plan in Item 3 of Schedule "A";

COMPOSTING OPERATIONS

3. The Composter shall not be operated more than six months from the date of issuance of this Certificate without the

express written consent of the District Manager.

4. The Municipality shall ensure that an adequately trained attendant is on-site at all times during the hours of operation. No loading or unloading of the Composter shall occur unless an adequately trained attendant is present.

5. Any of the following waste and materials, or any mixture of these, is Feed Material:

(a) biosolids;

(b) fish offals;

(c) hay;

(d) leaf and yard waste;

(e) manures;

(f) municipal sludge;

(g) paper sludge;

(h) sawdust;

(i) sawmill by-products; and

(j) soil.

6. No materials other than Feed Material shall be processed in the Composter.

7. The storage and processing of Feed Material on site is subject to the following:

(a) The Composter shall not process more than 20 tonnes per day of Feed Material; and

(b) The amount of Feed Material in storage awaiting composting shall not exceed 40 tonnes.

8. All on-site Feed Material awaiting composting shall be stored in one of the following:

(a) a covered steel container as described in Item 5 of Schedule "A"; or

(b) the Composter.

9. The storage of Compost is subject to the following:

(a) at no time shall the amount of Compost on site exceed 150 tonnes;

(b) all Compost shall be stored for at least 21 days; and

(c) Compost shall be tested daily for (as a minimum) inertness, chemical content and heavy metal content as described in the Guidelines.

10. The disposal of Compost is subject to the following:

(a) no Compost, excluding test samples, shall leave the Landfill;

(b) all Compost not taken for test samples shall either be disposed of as waste at the Landfill, or used as daily cover at the Landfill.

11. The Municipality shall ensure that no off-site impacts such as vermin, odours, and dust result from the operation of the

Site. In the event that such off-site impacts occur, the Municipality shall immediately take all remedial actions necessary to deal with them.

12. The Municipality shall maintain a written record at the Landfill containing (as a minimum) the following information:

(a) the date of record;

(b) the quantity and type of Feed Material received;

(c) the quantity and type of Feed Material processed;

(d) the quantity of Compost produced;

(e) the results of the Compost testing required under Condition 9(c) above;

(f) details on any complaints regarding composting operations, including (as a minimum) the following information:

(i) the nature of the complaint;

(ii) the date and time of the complaint;

(iii) the name, address and telephone number of the complainant; and

(iv) any resulting contacts and remedial action taken;

(g) details on all spills, fires, upsets or other problems encountered during the operation of the Site, and all actions taken to remediate the problem; and

(h) records of staff training.

13. Within sixty (60) days of the end of the pilot period, the Municipality shall submit a report to the District Manager summarizing the records required under Condition 12 above. This report shall also include (as a minimum) the following:

(a) any environmental and operational problems encountered during the operation of the Site that could negatively impact the environment, and any mitigative actions taken;

(b) a statement as to compliance with all Conditions of this Certificate and with the inspection and reporting requirements of the Conditions herein; and

(c) any recommendations to minimize environmental impacts from the operation of the site and to improve Site operations and monitoring programs in this regard.

III. The following Schedule "A" is hereby added:

SCHEDUE "A"

This Schedule "A" forms a part of this Provisional Certificate of Approval No. A550501.

1. The Application for a Provisional Certificate of Approval for a Waste Disposal Site w/attachments dated January 7, 2002, signed by Candace Tracy.

2. Drawing entitled "Prototype, Gagnon, Drum Electro" produced by M. Hamelin of IMS, dated November 14, 2001.

3. Drawing entitled "Figure 3, General Site Plan" produced by Northland Engineering Limited showing a sketch of the Composter location.

4. Report entitled "Hydrogeological Study and Operations Plan for the Township of Billings Landfill Site" produced by Northland Engineering Limited, dated March 1994.

5. Letter dated January 30, 2002 from Rick Gagnon, Gagnon Renewable Resources, to Andrew Neill, MOE, containing additional information on the project.

The reason for this amendment to the Certificate of Approval is as follows:

1. To approve the request of the Municipality to operate an in-vessel composter on site for the purposes of research.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A550501 dated March 20, 1980

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 11th day of February, 2002

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

AN/
c: District Manager, MOE Sudbury
Richard Gagnon, Gagnon RenewableResources Inc.

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A550501
Issue Date: April 21, 2015

The Corporation of the Township of Billings
15 Old Mill Rd PO Box 34, Kagawong
Billings, Ontario
P0P 1J0

Site Location: Kagawong Landfill Site
9490 Highway 540, Kagawong
Lot 4, Concession 9
Billings Township, District of Manitoulin

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a 1.0 hectare waste disposal site within a total site area of 60.2 hectares having a maximum capacity of 40,000 cubic metres.

For the purpose of this environmental compliance approval, the following definitions apply:

"*Approval*" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A".

"*Director"* means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the *EPA;*

"*District Manager"* means the District Manager of the local district office of the *Ministry* in which the *Site* is geographically located;

"*EPA*" means *Environmental Protection Act*, R.S.O. 1990, c. E. 19, as amended;

"Ministry" means the Ontario Ministry of the Environment and Climate Change;

"*NMA*" means *Nutrient Management Act*, 2002, S.O. 2002, c. 4, as amended from time to time;

"*Operator"* means any person, other than the *Owner's* employees, authorized by the *Owner* as having the charge, management or control of any aspect of the *Site* and includes its successors or assigns;

"*Owner"* means any person that is responsible for the establishment or operation of the *Site* being approved by this *Approval,* and includes The Township of Billings and its successors and assigns;

"*OWRA*" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

"*PA*" means the *Pesticides Act*, R.S.O. 1990, c. P-11, as amended from time to time;

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA* or Section 5 of the *EPA* or Section 17 of *PA* or Section 4 of *NMA* or Section 8 of *SDWA*.

"*Regional Director*" means the Regional Director of the local Regional Office of the *Ministry* in which the *Site* is located.

"*Regulation 347*" or "*Reg. 347*" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

"*SDWA"* means *Safe Drinking Water Act,* 2002, S.O. 2002, c. 32, as amended from time to time;

"*Site*" means the entire waste disposal site, including the buffer lands, and contaminant attenuation zone at 9490 Highway 540, Kagawong, Lot 4, Concession 9, Billings Township, District of Manitoulin; and

"Trained personnel" means personnel knowledgeable in the following through instruction and/or practice:

a. relevant waste management legislation, regulations and guidelines;
b. major environmental concerns pertaining to the waste to be handled;
c. occupational health and safety concerns pertaining to the processes and wastes to be handled;
d. management procedures including the use and operation of equipment for the processes and wastes to be handled;
e. emergency response procedures;
f. specific written procedures for the control of nuisance conditions;
g. specific written procedures for refusal of unacceptable waste loads; and
h. the requirements of this *Approval.*

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL

Compliance

(1) The *Owner* and *Operator* shall ensure compliance with all the conditions of this *Approval* and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Approval* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Approval.*

In Accordance

(3) Except as otherwise provided by this *Approval,* the *Site* shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

Interpretation

(4) Where there is a conflict between a provision of any document listed in Schedule "A" in this *Approval,* and the conditions of this *Approval,* the conditions in this *Approval* shall take precedence.

(5) Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.

(6) Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

(7) The conditions of this *Approval* are severable. If any condition of this *Approval,* or the application of any condition of this *Approval* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Approval* shall not be affected thereby.

Other Legal Obligations

(8) The issuance of, and compliance with, this *Approval* does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
(b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Approval*.

Adverse Effect

(9) The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site,* including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(10) Despite an *Owner, Operator* or any other person fulfilling any obligations imposed by this *Approval* the person remains responsible for any contravention of any other condition of this *Approval* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Change of Ownership

(11) The *Owner* shall notify the *Director,* in writing, and forward a copy of the notification to the *District Manager,* within 30 days of the occurrence of any changes in the following information:

(a) the ownership of the *Site;*
(b) the *Operator* of the *Site;*
(c) the address of the *Owner or Operator;* and
(d) the partners, where the *Owner or Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R. S. O. 1990, c. B.17, shall be included in the notification.

(12) No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

(13) In the event of any change in ownership of the *Site,* other than change to a successor Owner, the *Owner* shall notify the successor of and provide the successor with a copy of this *Approval,* and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director.*

Certificate of Requirement/Registration on Title

(14) The Owner shall:

(a) Within sixty (60) days of the date of the issuance of this *Approval,* submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site;* and

(b) Within 30 calendar days of receiving the Certificate of Requirement authorized by the *Director,* register the Certificate of Requirement in the appropriate Land Registry Office on title to the *Site* and submit to the *Director* and the *District Manager* the duplicate registered copy immediately following registration.

(15) Pursuant to Section 197 of the Environmental Protection Act, neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *Approval* to each person acquiring an interest in the *Site* as a result of the dealing.

Inspections by the Ministry

(16) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA, the EPA,* the *PA,* the *SDWA* or the *NMA,* of any place to which this *Approval* relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Approval* are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Approval;*
(c) to inspect the *Site,* related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this *Approval;* and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Approval* or the *EPA,* the *OWRA,* the *PA,* the *SDWA* or the *NMA.*

Information and Record Retention

(17) Any information requested, by the *Ministry,* concerning the *Site* and its operation under this *Approval,* including but not limited to any records required to be kept by this *Approval* shall be provided to the *Ministry,* upon request**,** in a timely manner. Records shall be retained for *contaminating life span* of the *Site* except for as otherwise authorized in writing by the *Director.*

(18) The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Approval* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Approval* or any statute, regulation or other legal requirement; or
(b) acceptance by the *Ministry* of the information's completeness or accuracy.

(19) The *Owner* shall ensure that a copy of this *Approval,* in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the *Site* at all times.

2. SITE OPERATION, MONITORING AND MAINTENANCE

(1) The *Site* shall be operated and maintained at all time in accordance with the *EPA, Regulation 347,* and the conditions of this *Approval.* At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

(2) Only non-hazardous solid waste may be landfilled at the site. No liquid industrial waste or hazardous waste shall be disposed of at the landfill.

(3) The Site shall only serve the Township of Billings and allow for contaminated soils that are generated within the District of Manitoulin.

(4) By August 31, 2015, the Owner shall conduct the test of the waste materials in the old waste pile and submit a summary report to the *District Manager*.

(5) If the testing shows there are materials other than concrete and/or asphalt within this old waste pile, then the Owner shall move the old waste pile from the southeast back onto the existing waste footprint at the site or submit an application to the Director for an expansion for the Site.

3. EMPLOYEE TRAINING

(1) A training plan for all employees that operate any aspect of the *Site* shall be developed and implemented by

the *Operator*. Only *Trained Personnel* shall operate any aspect of the *Site* or carry out any activity required under this *Approval*.

4. COMPLAINTS RESPONSE PROCEDURE

(1) If at any time the *Owner* receives complaints regarding the operation of the *Site,* the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
(b) The *Owner,* upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
(c) The *Owner* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

5. EMERGENCY RESPONSE

(1) Any spills, fires or other emergency situations shall be forthwith reported directly to the *Ministry's* Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.

(2) In addition, the *Owner* shall submit, to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the *Site*.

(3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *O.Reg. 347*.

(4) All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site;* and
(b) adequately maintained and kept in good repair.

(5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. RECORD KEEPING AND REPORTING

Log Book

(1) An ongoing log shall be maintained in written and/or electronic format and shall include the following information:

(a) a record of inspections; and
(b) activities with respect to installation of new or replacement wells and other maintenance activities.

(2) Any information requested, by the *Director* or a *Provincial Officer,* concerning the *Site* and its operation under this *Approval,* including but not limited to any records required to be kept by this *Approval* shall be provided to the *Ministry,* upon request.

Inspections and Log Book

(3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted monthly at a minimum is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Approval.* Any deficiencies discovered as a result of the inspection shall be remedied immediately**.**

(4) A record of the inspections shall be kept in a log book that includes:

(a) the name and signature of person that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered;
(d) the recommendations for remedial action; and
(e) the date, time and description of actions taken.

Report

(5) Commencing on March 31, 2015 and at intervals of three (3) years thereafter, the owner shall submit a written report on the development, operation and monitoring of the *Site*to the *District Manager*.

(6) The Report at a minimum shall include the following items:

(a) The results and an interpretive analysis of the results of all groundwater sampling, in accordance with the Technical Guidance Document listed in Schedule "A" and including:

i. A site description and background;
ii. A discussion of the geology and hydrogeology of the site;
iii. A description of sampling protocol and any difficulties encountered;
iv. A discussion and interpretation of the results of the groundwater sampling with comparison to the Reasonable Use Guidelines and background groundwater chemistry for the site;
v. A discussion regarding the quality assurance/quality control program and whether relative percent differences and major ion balance percentages are within acceptable limits;
vi. Conclusions and recommendations for future monitoring and/or remedial actions;
vii. A scale site plan or plans of the entire site illustrating significant site features such as surface water features, seeps, ponds, ditches, and roadways, as well as all of the sampling locations;
viii. A scale location map illustrating the site relative to nearby potentially sensitive groundwater/surface water features (i.e., lakes, streams, wells);
ix. A groundwater contour map showing the groundwater elevations for each well and the groundwater flow direction;
x. Tables summarizing all historical and current analytical results for all parameters for groundwater;
xi. Trend graphs for site-specific leachate indicator parameters;
xii. Tables summarizing all historical and current water level data;
xiii. A copy of the borehole logs for all groundwater monitoring wells; and,
xiv. A copy of the original laboratory analytical results (may be provided electronically on CD).

(b) A summary of any complaints received and the responses made;
(c) A discussion of any operational problems encountered at the *Site* and corrective action taken;
(d) any other information with respect to the *Site* which the *Regional Director* may require from time to time.

7. LANDFILL MONITORING

Landfill Gas

(1) The *Owner* shall ensure that any buildings or structures at the *Site* contain adequate ventilation systems to relieve any possible landfill gas accumulation to prevent methane concentration reaching the levels within its explosive range. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site,* especially enclosed structures which at times are occupied by people.

Compliance

(2) The *Site* shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site;* and

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives,* as amended from time to time or limits set by the *Regional Director,* for the protection of the surface water at and off the *Site.*

Surface Water and Groundwater

(3) The *Owner* shall monitor surface water and ground water in accordance with the monitoring programs outlined in documents listed in the attached Schedule "A".

(4) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Wells and Monitors

(5) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

(6) Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner,* as required.

(a) The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *Director* for abandonment, shall be decommissioned by the *Owner,* as required, in accordance with *O.Reg. 903,* that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Monitoring Report for the period during which the well was decommissioned.

Changes to the Monitoring Plan

(7) The *Owner* may request to make changes to the monitoring program(s) to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in a separate letter that shall accompany the annual report.

(8) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current ministry procedures for seeking approval for amending the *Approval.*

8. CLOSURE PLAN

(1) At least 2 years prior to the anticipated date of closure of this Site or any aspect of the operations at the site, the Owner shall submit to the Director for approval, with copies to the District Manager, a detailed site closure plan pertaining to the termination of landfilling operations and/or any aspect of the operations at this Site, post-closure inspection, maintenance and monitoring, and end use. The plan shall include but not limited to the following:

(a) a plan showing Site appearance after closure;
(b) a description of the proposed end use of the Site;
(c) a description of the procedures for closure of the Site;

(d) advance notification of the public of the landfill closure;
(e) posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;

(f) completion, inspection and maintenance of the final cover and landscaping;
(g) site security;
(h) removal of unnecessary landfill-related structures, buildings and facilities; and

(i) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
(j) a schedule indicating the time-period for implementing sub-conditions (a) to (e) above.
(k) description of the procedures for post-closure care of the Site, including operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
(l) record keeping and reporting; and
(m) complaint contact and response procedures;
(n) an assessment of the adequacy of and need to implement contingency plans for leachate and methane gas; and
(o) an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.

(2) Within ten (10) days after closure of the Site, the Owner shall notify the Director, in writing, that the Site is closed and that the Site Closure Plan has been implemented.

SCHEDULE "A"

1. Report entitled "Design & Operations Plan, Township of Billings Kagawong Landfill" including figures, prepared by Pinchin Environmental Limited, dated July 2013.

2. Memorandum dated February 25, 2014, from K.D. Hawley, Regional Hydrogeologist, Northern Region, to Steve Moggy, Senior Environmental Officer, Sudbury District Office.

3. Report entitled "2013 Water Quality Monitoring Assessment", Township of Billings Kagawong Landfill, prepared by Pinchin Environmental Limited, dated April 2014.

4. Technical Guidance Document dated November 2010, Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water, Ministry of the Environment.

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

1. The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this *Approval*.

2. The reasons for Condition 1(3) are to ensure that the *Site* is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the *Owner,* and not in a manner which the *Director* has not been asked to consider.

3. The reasons for Condition 1(11) are to ensure that the *Site* is operated under the corporate name which appears on the application form submitted for this *approval* and to ensure that the *Director* is informed of any changes.

4. The reasons for Condition 1(12) are to restrict potential transfer or encumbrance of the *Site* without the approval of the *Director* and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this *Approval*.

5. The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.

6. Conditions 1 (14) and (15) are included, pursuant to subsection 197(1) of the *EPA*, to provide that any persons having an interest in the *Site* are aware that the land has been approved and used for the purposes of waste disposal.

7. The reason for Condition 1(16) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this *Approval*. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

8. The reasons for Conditions 2(1) and 6(3) are to ensure that the *Site* is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

9. The reason for Conditions 2 (2) and 2 (3) are to ensure the site only accept the non-hazardous waste and only serve a certain area.

10. The reason for Condition 3(1) is to ensure that the *Site* is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

11. The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

12. Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

13. Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

14. The reason for Conditions 6(1) and 6(2) is to ensure that accurate records are maintained to ensure compliance with the conditions in this *Approval* (such as record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.

15. The reason for Condition 6(4) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.

16. The reasons for Conditions 6(5) and 6(6) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

17. Reasons for Condition 7(1) are to ensure that off-site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site.*

18. Conditions 7(3) and 7(4) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

19. Conditions 7(5) to 7(6) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.

20. Conditions 7(7) and 7(8) are included to streamline the approval of the changes to the monitoring plan.

21. Condition 8 is to ensure that final closure of the *Site* is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A550501 issued on March 20, 1980, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 21st day of April, 2015

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

AT/
c: District Manager, MOE Sudbury
Troy Gordon, Pinchin Environmental

APPENDIX III

Borehole Logs

BILLINGS TOWNSHIP WASTE DISPOSAL SITE
BOREHOLE RECORD FOR BH1

ELEV.	DESCRIPTION	DEPTH (m)	PIEZOMETER INSTALLATION	DEPTH (m)
240.877	BEIGE - SANDSTONE - FRACTURED		75mm EXPANDING CONCRETE GROUT	
237.577		3.30		
	GREYISH - BEIGE SANDSTONE - FRACTURED			
236.307		4.57		
	BLUISH - GREY SHALE			
235.747		5.13	50mm PVC PIPE	
	NOTE: BH WAS DRILLED BY ROTARY PERCUSSION DRILL - NO ROCK CORE.			
	IT IS ASSUMED THAT THE SUBSURFACE FRACTURED ROCK IS SIMILAR TO THAT FOUND IN BH1.			
			11.33 ▼	
			3m x 50mm DIA. # 20 SLOTTED SCREEN WITH PRE-SOCKED GEOTEXTILE	
227.377		13.5	E.B.H.	

WATER CONTENT (%)

10 20 30

2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00 18.00

▼ STATIC WATER LEVEL JULY.7/93

ELEVATIONS ARE RELATIVE TO AN ASSUMED BENCH MARK

DEPTH SCALE 1:100

N.E.L. #3826

northland engineering limited
Consulting Engineers and Planners
NORTH BAY SUDBURY

BILLINGS TOWNSHIP WASTE DISPOSAL SITE
BOREHOLE RECORD FOR BH3

ELEV.	DESCRIPTION		DEPTH (m)	PIEZOMETER INSTALLATION	DEPTH (m)	WATER CONTENT (%) 10 20 30	DEPTH (m)
242.580				75mm EXPANDING CONCRETE GROUT			
							2.00
							4.00
	NOTE: BH WAS DRILLED BY ROTARY PERCUSSION DRILL. - NO ROCK CORE			3.928 ▼			
							6.00
	IT IS ASSUMED THAT THE SUBSURFACE FRACTURED ROCK IS SIMILAR TO THAT FOUND IN BH1						
							8.00
							10.00
				3m x 50mm DIA. # 20 SLOTTED SCREEN WITH PRE-SOCKED GEOTEXTILE			
							12.00
229.080			13.5	E.B.H.			
							14.00
							16.00
							18.00

▼ STATIC WATER LEVEL JULY.7/93

ELEVATIONS ARE RELATIVE TO AN ASSUMED BENCH MARK

DEPTH SCALE 1:100

N.E.L. #3826

northland engineering limited
Consulting Engineers and Planners
NORTH BAY SUDBURY

Log of Borehole BH-101

Project No. SUEN00003042A

Figure No. 2

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

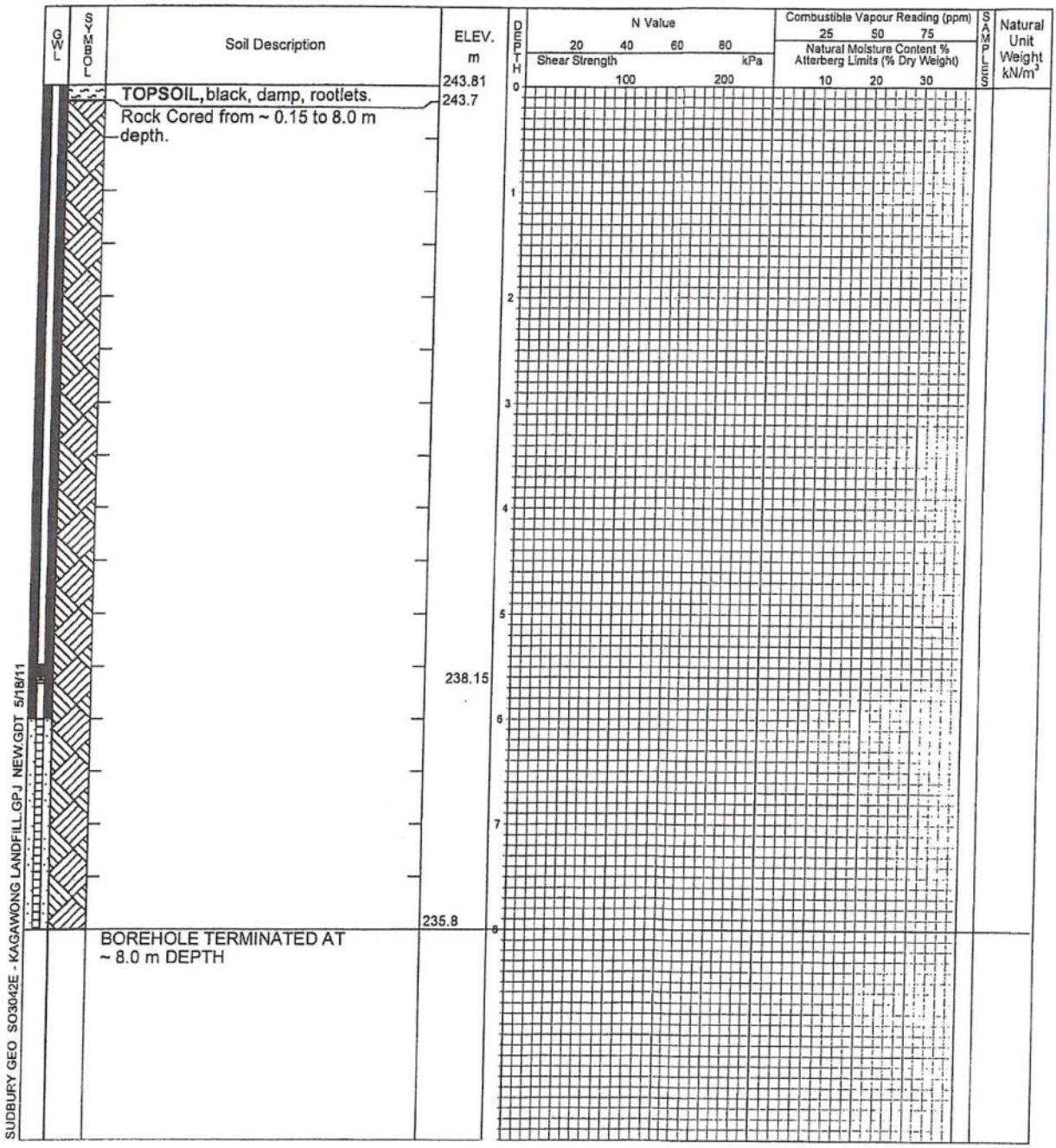
Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲



SUDBURY GEO SO3042E - KAGAWONG LANDFILL.GPJ NEW.GDT 5/18/11

exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from **exp** before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	5.66	

Log of Borehole BH-102

Project No. SUEN00003042A

Figure No. 3

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			242.89	0
		TOPSOIL, black, damp, rootlets.	242.6	
		Rock Cored from 0.25 to 7.6 m depth.		1
				2
				3
			239.12	4
				5
				6
				7
			235.3	
		BOREHOLE TERMINATED AT ~ 7.6 m DEPTH		

N Value: 20 40 60 80
Shear Strength kPa: 100 200

Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

SUDBURY GEO SO3042E - KAGAWONG LANDFILL.GPJ NEW.GDT 5/18/11

exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from exp before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	3.77	

Log of Borehole BH-103

Project No. SUEN00003042A

Figure No. 4

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

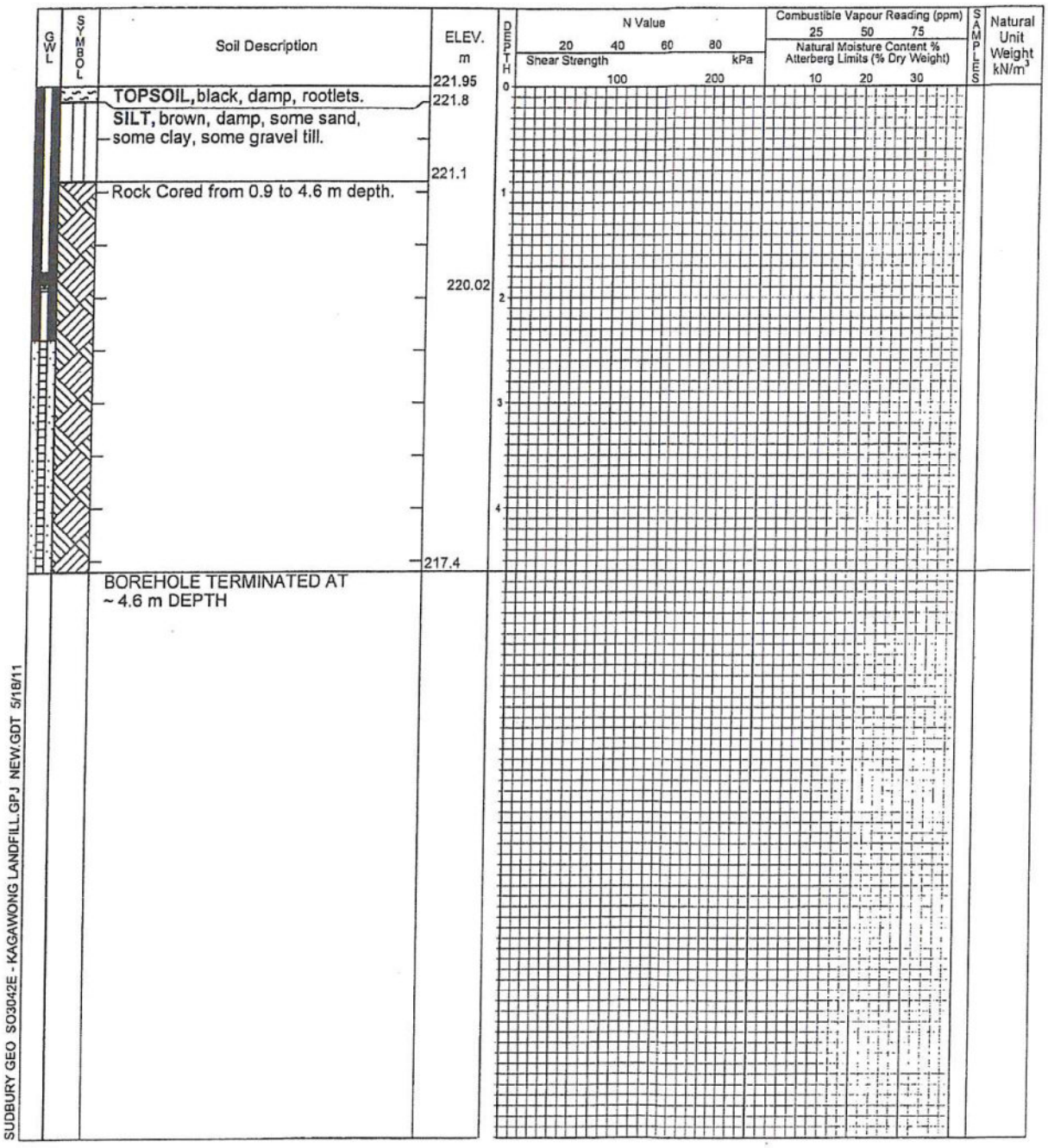
Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



SUDBURY GEO SO3042E - KAGAWONG LANDFILL.GPJ NEW.GDT 5/16/11

exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from exp before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	1.93	

Log of Borehole BH-104

Project No. SUEN00003042A

Figure No. 5

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

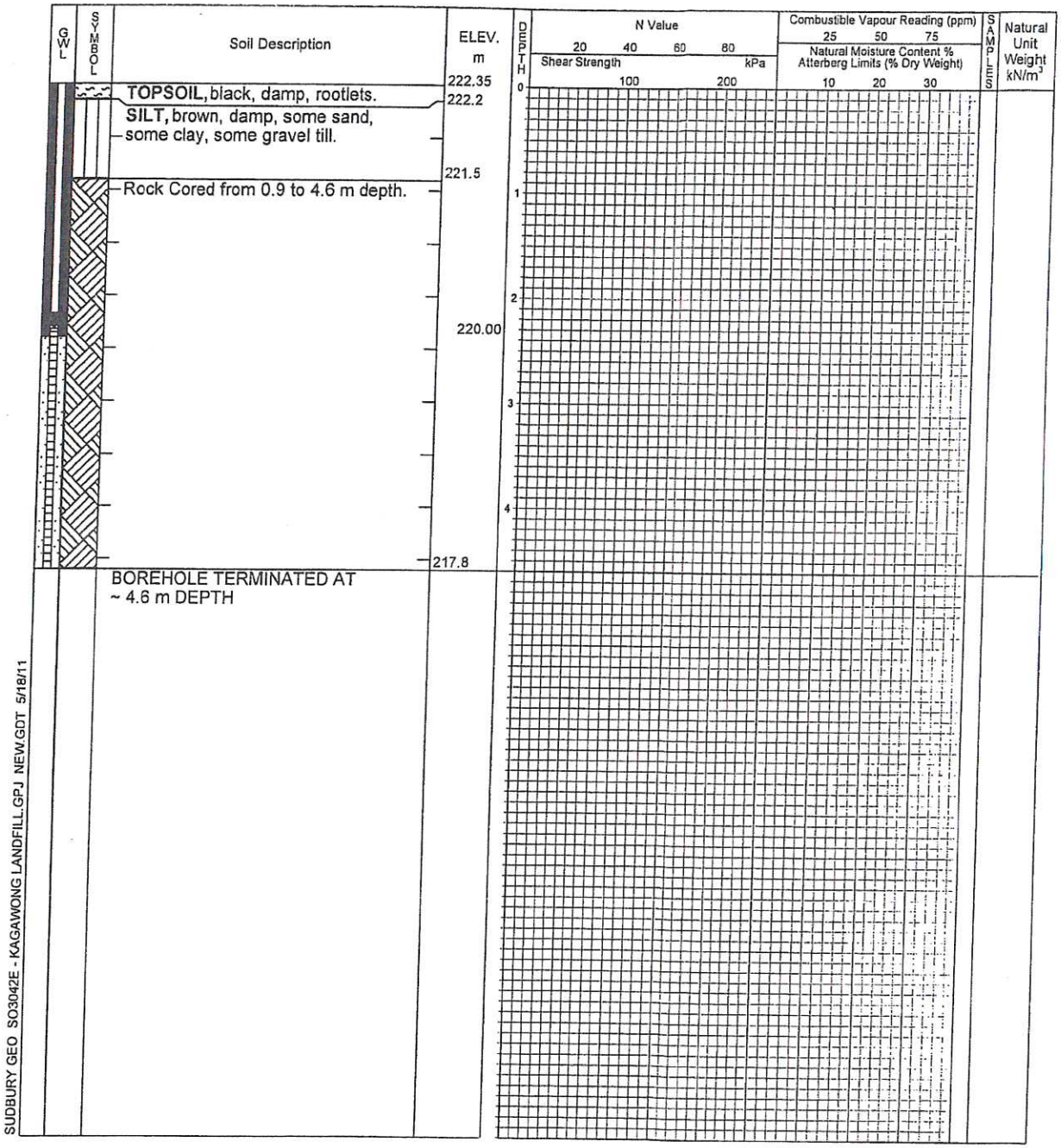
Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



SUDBURY GEO SO3042E - KAGAWONG LANDFILL.GPJ NEW.GDT 5/18/11

exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from exp before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	2.35	

Log of Borehole BH-105

Project No. SUEN00003042A

Figure No. 6

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

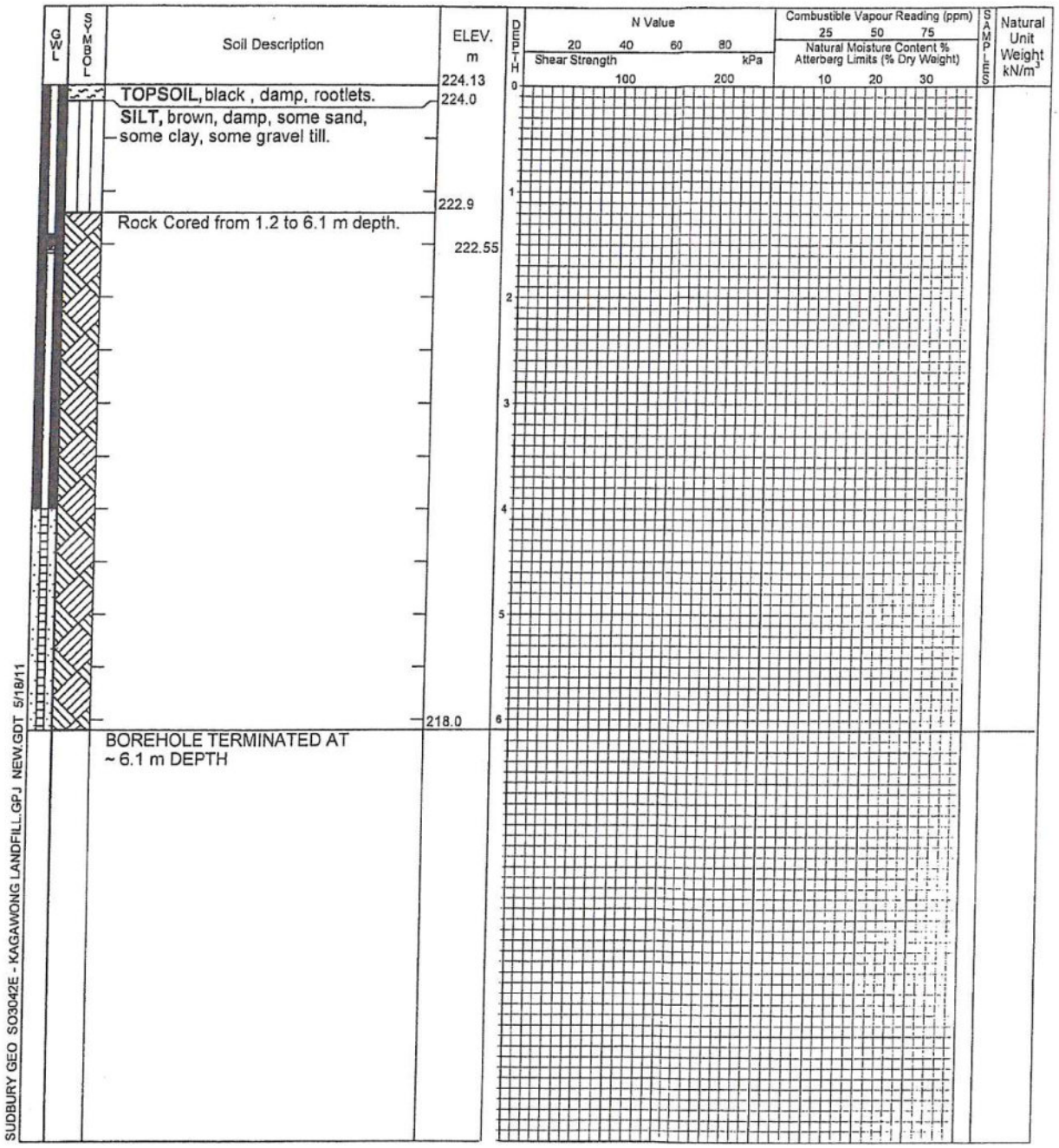
Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



SUDBURY GEO SO3042E - KAGAWONG LANDFILL.GPJ NEW.GDT 5/18/11

exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from exp before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	1.58	

Log of Borehole BH-106

Project No. SUEN00003042A

Figure No. 7

Project: Kagawong Landfill 2010 Annual Monitoring Report

Sheet No. 1 of 1

Location: Township of Billings, Kagawong, Ontario

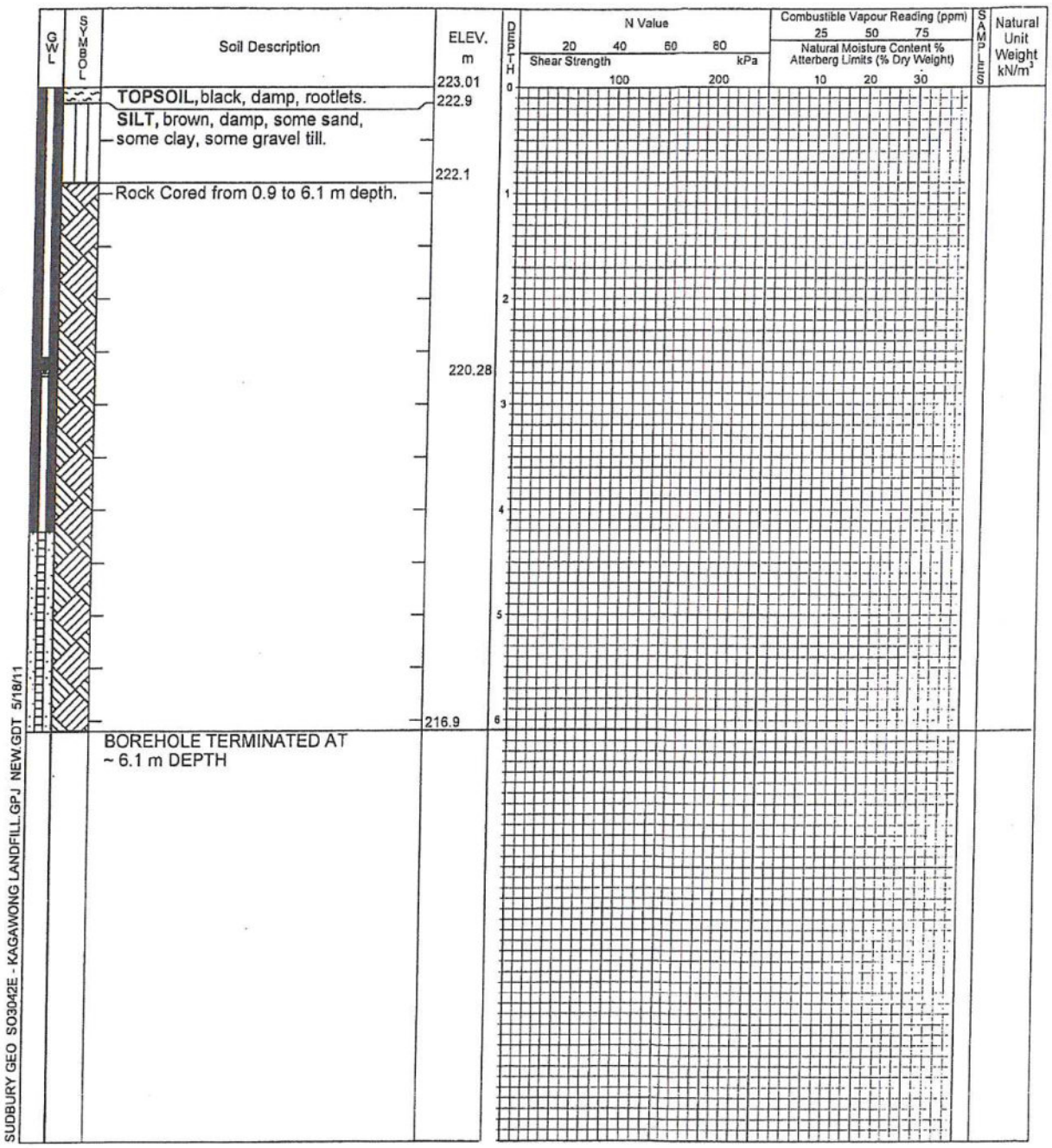
Date Drilled: November 10, 11, 15, 16, 17, 2010

Drill Type: CME 200mm Ø Hollow Stem Auger

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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exp Services Inc.
t: +1.705.674.9681
f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
CANADA

Borehole data requires interpretation assistance from exp before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
December 2, 2010	2.73	

APPENDIX IV
Summary Tables

TABLE 1
Groundwater Monitoring Location Data
Kagawong Landfill
Kagawong, Ontario

Well ID Number	Date (dd/mm/yyyy)	Ground Surface Elevation	TOC Elevation (mREL)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation	UTM Coordinates			Comments
									Zone	Easting (m)	Northing (m)	
BH1	30/10/2014	241.00	242.60	0.56	2.34	14.22	1.78	240.26	17T	400138	5083536	Bedrock well with no casing was observed to be in good condition.
	18/11/2015				2.45		1.89	240.15				
	19/10/2016				2.07		1.51	240.53				
	17/10/2017				2.41		1.85	240.19				
	04/08/2018				3.67		3.11	238.93				
	30/10/2018				2.64	14.15	2.64	239.96				
	11/09/2019				3.68	14.18	3.68	238.92				
	10/08/2020			0.52	2.28	14.23	1.76	240.32				
	19/10/2021				2.25	14.17	1.73	240.35				
BH3	30/10/2014	242.85	243.47	0.62	2.53	14.28	1.91	240.94	17T	400066	5083552	Bedrock well with no casing was observed to be in good condition.
	18/11/2015				2.98		2.36	240.49				
	19/10/2016				2.43		1.81	241.04				
	17/10/2017				3.15		2.53	240.32				
	04/08/2018			0.66	4.29	14.30	3.63	239.18				
	30/10/2018				3.50	14.25	2.84	239.97				
	11/09/2019			0.56	3.62	14.27	3.62	239.85				
	10/08/2020			0.61	3.95	14.20	3.34	239.52				
	19/10/2021			0.66	4.01	14.29	3.35	239.46				
BH101	30/10/2014	243.81	244.89	1.08	5.70	9.62	4.62	239.19	17T	400061	5083730	Bedrock well was observed to be in good condition.
	18/11/2015				5.74		4.66	239.16				
	19/10/2016				3.13		2.05	241.76				
	17/10/2017				5.69		4.61	239.20				
	04/08/2018			1.04	6.08	8.96	5.04	238.81				
	30/10/2018				5.73	8.97	4.69	239.16				
	11/09/2019			0.98	6.04		5.06	238.85				
	10/08/2020			1.07	5.73	8.93	4.66	239.16				
	10/19/2021				5.74	7.99	4.67	239.15				
BH102	30/10/2014	242.80	242.84	0.04	3.83	8.68	3.79	239.01	17T	400038	5083604	Bedrock well was observed to be in good condition.
	18/11/2015				4.02		3.98	238.82				
	19/10/2016				4.04		4.00	238.80				
	17/10/2017				3.94		3.90	238.90				
	04/08/2018			1.22	4.60	7.55	3.38	238.24				
	30/10/2018				4.12	8.54	2.90	238.72				
	11/09/2019			0.04	4.48	8.43	4.44	238.36				
	10/08/2020			0.04	4.15	8.60	4.11	238.69				
	10/19/2021			1.22	4.18	8.61	2.96	238.66				
BH103	30/10/2014	221.95	222.86	0.91	2.02	5.03	1.11	220.84	17T	400280	5083436	Bedrock well was observed to be in good condition.
	18/11/2015				1.26		0.35	221.60				
	19/10/2016				2.11		1.20	220.75				
	17/10/2017				2.20		1.29	220.66				
	04/08/2018			0.97	3.37	5.02	2.40	219.49				
	30/10/2018				2.54	4.47	1.57	220.32				
	11/09/2019			0.90	3.41	4.97	2.51	219.45				
	10/08/2020			0.97	2.57	4.97	1.60	220.29				
	10/19/2021				2.41	5.04	1.44	220.45				
BH104	30/10/2014	222.35	223.25	0.90	2.41	5.32	1.51	220.84	17T	400266	5083492	Bedrock well was observed to be in good condition.
	18/11/2015				2.60		1.70	220.65				
	19/10/2016				1.82		0.92	221.43				
	17/10/2017				2.52		1.62	220.73				
	04/08/2018			0.86	3.35	5.31	2.49	219.90				
	30/10/2018				2.87	5.22	2.01	220.38				
	11/09/2019			0.84	3.53	5.26	2.69	219.72				
	10/08/2020			0.88	3.00	5.30	2.12	220.25				
	10/19/2021				2.80	5.28	1.92	220.45				
BH105	30/10/2014	224.13	225.02	0.89	1.92	7.21	1.03	223.10	17T	400281	5083578	Bedrock well was observed to be in good condition.
	18/11/2015				2.44		1.55	222.58				
	19/10/2016				3.14		2.25	221.88				
	17/10/2017				1.90		1.01	223.12				
	04/08/2018			0.98	3.02	7.09	2.04	222.00				
	30/10/2018			0.96	2.41		1.45	222.61				

TABLE 1
Groundwater Monitoring Location Data
Kagawong Landfill
Kagawong, Ontario

Well ID Number	Date (dd/mm/yyyy)	Ground Surface Elevation	TOC Elevation (mREL)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation	UTM Coordinates			Comments
									Zone	Easting (m)	Northing (m)	
	11/09/2019			0.92	3.09	7.09	2.17	221.93				
	10/08/2020			0.95	2.42	7.2	1.47	222.60				
	10/19/2021				2.22	7.2	1.27	222.80				
	30/10/2014				2.68		1.62	221.39				
	18/11/2015			1.06	3.01	7.08	1.95	221.06				
	19/10/2016				3.74		2.68	220.33				
	17/10/2017				2.87		1.81	221.20				
BH106	04/08/2018	223.01	224.07	1.07	3.42	7.09	2.35	220.65	17T	400318	5083670	Bedrock well was observed to be in good condition.
	30/10/2018				2.98	7.02	2.98	221.09				
	11/09/2019			0.98	3.45	7.03	2.47	220.62				
	10/08/2020			1.07	3.00	7.10	1.93	221.07				
	10/19/2021				2.83	7.11	1.76	221.24				
	04/08/2018			0.94	6.36	7.38	5.42	213.21				
	10/30/2018			0.88	3.94	7.34	3.06	215.63				
BH107	11/09/2019	218.67	219.57	0.82	1.67	7.35	0.85	217.90	17T	400527	5083413	Bedrock well was observed to be in good condition.
	10/08/2020			0.91	1.47	7.37	0.56	218.10				
	10/19/2021				1.30	7.40	0.39	218.27				
	04/08/2018			0.93	2.17	7.17	1.24	217.97				
	10/30/2018			0.96	2.02	7.18	1.06	218.12				
BH108	11/09/2019	219.29	220.14	0.77	2.07	7.21	1.30	218.07	17T	400525	5083563	Bedrock well was observed to be in good condition.
	10/08/2020			0.92	1.90	7.20	0.98	218.24				
	10/19/2021				1.93	7.20	1.01	218.21				
	04/08/2018			0.82	NW	10.23	-	-				
	10/30/2018			0.83	10.06	10.20	9.23	224.24				
BH109	11/09/2019	233.43	234.30	0.78	9.23	10.26	8.45	225.07	17T	400167	5083408	Bedrock well was observed to be in good condition.
	10/08/2020			0.85	8.23	10.41	7.38	226.07				
	10/19/2021				8.57	10.24	7.72	225.73				
	04/08/2018			1.06	4.17	7.45	3.11	239.33				
	10/30/2018				3.49	7.42	2.43	240.01				
BH110	11/09/2019	242.44	243.50	0.96	4.22	7.43	3.26	239.28	17T	399961	5083603	Bedrock well was observed to be in good condition.
	10/08/2020			1.03	3.45	7.47	2.42	240.05				
	10/19/2021				3.39	7.44	2.36	240.11				

Notes:
mREL - Indicates Groundwater Elevation (metres) Relative to Site Benchmark
ND - Not Detected
mbgs - metres below ground surface
TOC - Top of Casing
NA - Not Applicable or Not Attainable
NW - No Water

TABLE 2
Groundwater Quality Results - BH1
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation										ODWQS
			Sample Collection Date (dd/mm/yyyy)										
			BH1										
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*10/30/2018*	*11/9/2019*	*10/8/2020*	*10/19/2021*	
			Downgradient										
Conductivity	uS/cm	2	4320	19800	13200	6160	11800	4090	4480	2710	3260	6220	-
pH	pH Units	-	8.02	7.70	7.77	7.88	7.56	7.91	7.91	7.82	8	7.73	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**7100**	**4800**	**2580**	**4290**	**1720**	**1540**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**3500**	**7940**	**3890**	**8770**	**7970**	**2980**	**2920**	**3340**	**5620**	**4590**	500
Alkalinity (as CaCO3)	mg/L	5	215	129	169	231	204	209	179	211	234	204	30 - 500
Chloride	mg/L	0.5	**1260**	**6150**	**4640**	**1340**	**3420**	**863**	**958**	**673**	**2260**	**2000**	250
Nitrate as N	mg/L	0.25	<0.05	<5	<10	<5	<2.5	<2.5	<1.0	3.2	<1.0	0.1	10
Nitrite as N	mg/L	0.25	<0.05	<5	<10	<5	<2.5	<2.5	<1.0	<1.0	<1.0	<0.3	1
Sulphate	mg/L	0.5	**807**	**1300**	**1440**	**1000**	**1310**	**864**	**649**	297	**1320**	**1400**	500
Ammonia as N	mg/L	0.02	6.22	10.3	12.2	15.4	15.8	7.8	3.44	7.42	13.80	10.60	-
Total Phosphorus	mg/L	0.02	0.05	0.30	0.36	17.6	0.07	0.18	0.33	<0.02	0.06	0.22	-
Total Kjeldahl Nitrogen	mg/L	0.1	7.00	9.75	11.7	0.09	15.0	8.3	4.09	7.80	14.10	8.85	-
Chemical Oxygen Demand	mg/L	5	24	44	40	76	50	48	9	12	676	46	-
Dissolved Organic Carbon	mg/L	0.5	2.9	1.5	2.2	2.2	3.1	3.8	3	3.4	**6.9**	4.0	5
Phenols	mg/L	0.001	0.016	0.051	0.013	0.082	0.012	0.003	0.002	0.003	0.045	0.009	-
Calcium	mg/L	0.05	539	1880	1320	782	1200	540	455	270	589	796	-
Magnesium	mg/L	0.05	117	583	365	153	313	91.4	98.5	60.9	117.0	134.0	-
Sodium	mg/L	0.05	**250**	**1410**	**871**	**346**	**787**	200	**231**	138	**316**	**373**	200
Potassium	mg/L	0.05	66.3	231	174	90.8	178	62.3	71.4	48.4	87.2	120.0	-
Aluminum	mg/L	0.004	0.005	<0.004	0.008	0.005	0.006	0.016	0.015	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	0.006
Arsenic	mg/L	0.003	0.003	**0.040**	<0.003	**0.011**	**0.011**	0.004	<0.003	0.010	0.005	0.001	0.01
Barium	mg/L	0.002	0.011	0.026	0.012	0.019	0.019	0.014	0.011	0.009	0.011	0.013	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	3.44	**15.9**	3.90	**10.9**	**10.1**	2.57	3.17	2.79	3.82	3.48	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	0.000006	0.005
Chromium	mg/L	0.003	0.003	0.003	<0.003	0.006	<0.003	<0.003	0.004	<0.003	<0.002	0.00021	0.05
Cobalt	mg/L	0.001	-	-	0.002	0.002	0.001	<0.001	<0.001	-	-	-	-
Copper	mg/L	0.003	<0.003	0.006	<0.003	0.010	0.005	<0.003	<0.003	<0.003	<0.001	0.0003	1
Iron	mg/L	0.01	<0.010	<0.010	0.062	0.021	0.014	0.028	0.081	0.083	0.241	**0.523**	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	0.0006	<0.00009	0.01
Manganese	mg/L	0.002	0.025	0.033	0.019	0.019	0.016	0.019	0.017	0.020	**0.055**	**0.055**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	0.005	**0.35**	**0.083**	**0.031**	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	7.13	19.6	18.4	6.0	5.89	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	0.041	0.04	0.024	0.008	0.015	-	-	-	-
Vanadium	mg/L	0.002	-	-	0.002	0.005	<0.002	<0.002	0.006	-	-	-	-
Zinc	mg/L	0.005	<0.005	0.009	<0.005	<0.005	0.005	0.007	0.048	<0.005	<0.005	0.003	5
% Difference/ Ion Balance	-	0.1	-	1.6	8.3	-	0.893	1.27	-	-	-	-	-
Field Measurements													
Temperature	°C	-	9.6	8.2	9.5	10.1	12.9	10.4	9.8	11.3	11.8	13.8	-
pH	pH Units	-	7.42	7.92	6.95	7.37	7.27	7.03	7.38	7.36	7.51	7.35	-
Conductivity	uS/cm	-	1490	1467	1116	4108	1115	9160	3564	3346	2966	5460	-
Oxidation Reduction Potential	mV	-	-34	-52	-203	-206	-91	-252	-98	-12	-105	-128	-
Dissolved Oxygen	mg/L	-	4.1	2.8	1.4	2.3	1.0	4.4	8.0	6.8	11.0	3.4	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 3
Groundwater Quality Results - BH3
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation											ODWQS
			Sample Collection Date (dd/mm/yyyy)											
			BH3											
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*30/10/2018*	*11/9/2019*	*10/8/2020 - DUP 2*	*10/8/2020*	*10/19/2021*	
			Crossgradient											
Conductivity	uS/cm	2	2240	5450	2760	3370	3850	2110	2920	1800	2220	2240	2730	-
pH	pH Units	-	8.15	7.89	7.85	7.71	7.53	8.08	8.22	7.91	8.1	8.1	7.93	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**1900**	**905**	**1340**	**1730**	**830**	**1050**	-	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**1520**	**6010**	**1420**	**3740**	**3150**	**1450**	**1800**	**1240**	**1940**	**1800**	**2050**	500
Alkalinity (as CaCO3)	mg/L	5	272	284	-	246	295	280	243	269	275	274	297	30 - 500
Chloride	mg/L	0.5	**484**	**1270**	**577**	**758**	**672**	**397**	**469**	239	**415**	**407**	**420**	250
Nitrate as N	mg/L	0.25	<0.05	<2.5	<1.0	<1.0	<1.0	0.9	<0.5	<0.25	<0.5	<0.5	0.18	10
Nitrite as N	mg/L	0.25	<0.05	<2.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.25	<0.5	<0.5	<0.03	1
Sulphate	mg/L	0.5	395	**811**	430	**481**	**954**	390	**518**	341	**726**	**719**	**700**	500
Ammonia as N	mg/L	0.02	5.68	9.5	9.6	10.2	7.18	1.6	5.19	3.78	3.78	3.49	4.05	-
Total Phosphorus	mg/L	0.02	0.15	0.80	0.18	10.3	0.22	0.42	1.96	0.04	0.30	0.22	0.15	-
Total Kjeldahl Nitrogen	mg/L	0.1	6.56	9.12	9.19	0.47	7.51	2.1	5.38	5.77	4.14	3.95	4.02	-
Chemical Oxygen Demand	mg/L	5	14	68	63	57	39	27	13	10	27	29	21	-
Dissolved Organic Carbon	mg/L	0.5	3.7	4.2	3.1	4.1	4.3	4	**6.8**	3.2	4.5	4.8	3.0	5
Phenols	mg/L	0.001	<0.001	0.070	0.070	0.031	0.018	0.002	<0.001	<0.001	0.005	0.006	<0.002	-
Calcium	mg/L	0.05	249	534	245	374	522	240	308	210	380	385	490	-
Magnesium	mg/L	0.05	68.4	137	71.2	97.7	104	56.1	68.8	47.0	68.2	69.8	72.4	-
Sodium	mg/L	0.05	119	**291**	127	188	186	98.8	128	61.5	111	113	120	200
Potassium	mg/L	0.05	43.3	82.0	45.2	62.1	68.6	41.6	53	30.7	47.6	48.3	60.2	-
Aluminum	mg/L	0.004	0.010	0.004	0.006	0.005	0.010	0.022	0.015	-	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	0.006
Arsenic	mg/L	0.003	<0.003	**0.018**	<0.003	0.004	0.004	<0.003	0.004	0.006	<0.001	<0.001	0.000	0.01
Barium	mg/L	0.002	0.020	0.030	0.021	0.018	0.023	0.017	0.013	0.015	0.020	0.021	0.019	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-
Boron	mg/L	0.01	3.68	**12.7**	**5.35**	**7.83**	**6.55**	2.28	2.31	2.39	2.29	2.34	2.16	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	<0.0001	<0.000003	0.005
Chromium	mg/L	0.003	0.003	0.004	<0.003	0.004	<0.003	<0.003	0.003	<0.003	<0.002	<0.002	0.00015	0.05
Cobalt	mg/L	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-
Copper	mg/L	0.003	<0.003	0.004	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.0002	1
Iron	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	0.229	0.078	0.100	0.015	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	0.0006	0.0006	<0.00009	0.01
Manganese	mg/L	0.002	0.031	0.012	0.011	0.008	0.012	0.012	0.022	0.043	0.033	0.040	0.031	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	0.004	-	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-
Selenium	mg/L	0.004	-	-	**0.043**	**0.191**	**0.129**	**0.017**	<0.004	-	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-
Strontium	mg/L	0.005	-	-	6.73	8.00	7.57	3.1	3.5	-	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	-	-	-	-	-
Titanium	mg/L	0.002	-	-	0.031	0.023	0.015	0.003	0.011	-	-	-	-	-
Vanadium	mg/L	0.002	-	-	0.002	0.002	0.004	<0.002	0.006	-	-	-	-	-
Zinc	mg/L	0.005	0.019	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	0.002	5
% Difference/ Ion Balance	-	0.1	-	4.5	8.3	-	0.299	6.19	-	-	-	-	-	-
Field Measurements														
Temperature	^{0}C	-	9.6	8.6	9.2	10.2	9.5	10.8	8.5	11.3		10.5	13.4	-
pH	pH Units	-	7.77	8.23	7.40	7.47	7.66	7.53	7.75	7.56		7.35	7.35	-
Conductivity	uS/cm	-	1880	1706	1359	1743	2608	2440	3129	1691		2036	2390	-
Oxidation Reduction Potential	mV	-	-51	-37	-32	-110	-188	-233	50	72		189	-146	-
Dissolved Oxygen	mg/L	-	5.2	1.9	3.1	5.7	2.0	2.3	10.7	9.2		5.7	2.5	-

Notes:

Ontario Drinking Water Quality Standards* — Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.

BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 4
Groundwater Quality Results - BH101
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation										ODWQS
			Sample Collection Date (dd/mm/yyyy)										
			BH101										
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*30/10/2018*	*11/09/2019*	10/8/2020	10/19/2021	
			Background										
Conductivity	uS/cm	2	492	602	642	1250	1550	779	1090	654	618	758	-
pH	pH Units	-	8.07	7.87	7.85	8.01	7.47	7.98	8.03	7.6	8.14	8.05	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**312**	**331**	**590**	**762**	**392**	**465**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	316	368	274	**1960**	**1170**	**548**	**562**	400	358	494	500
Alkalinity (as CaCO3)	mg/L	5	223	252	225	239	237	237	194	228	292	255	30 - 500
Chloride	mg/L	0.5	7.10	10.1	22.4	122	165	50.2	94.8	27.0	40.7	65.0	250
Nitrate as N	mg/L	0.25	<0.05	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	0.33	0.16	0.12	10
Nitrite as N	mg/L	0.25	<0.05	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.10	0.04	1
Sulphate	mg/L	0.5	54.6	59.8	86.4	258	383	131	171	73.2	92.3	93.0	500
Ammonia as N	mg/L	0.02	0.03	0.06	0.18	1.55	1.67	0.3	0.23	0.19	0.16	0.31	-
Total Phosphorus	mg/L	0.02	0.17	0.06	0.95	1.87	0.48	0.14	0.08	<0.02	0.04	0.06	-
Total Kjeldahl Nitrogen	mg/L	0.1	0.31	0.25	0.37	0.14	1.99	1.4	0.8	0.49	0.47	0.42	-
Chemical Oxygen Demand	mg/L	5	12	19	19	8	8	21	8	9	27	13	-
Dissolved Organic Carbon	mg/L	0.5	3.6	4.4	**5.5**	3.2	2.3	**6.0**	**5.1**	3.5	4.8	4.8	5
Phenols	mg/L	0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.002	-
Calcium	mg/L	0.1	66.3	73.2	79.3	161	218	100	122	76.8	96.3	95.4	-
Magnesium	mg/L	0.1	29.5	31.3	32.3	45.6	52.9	34.6	39	31.4	34.6	36.7	-
Sodium	mg/L	0.1	1.50	2.32	4.00	26.8	35.2	9.59	19.1	4.97	10.20	6.94	200
Potassium	mg/L	0.1	1.39	1.78	2.10	11.5	15.4	4.96	8.23	3.67	4.86	4.02	-
Aluminum	mg/L	0.004	0.006	0.005	<0.004	0.006	<0.004	0.013	<0.004	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	0.006
Arsenic	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	0.0011	0.01
Barium	mg/L	0.002	0.040	0.065	0.038	0.046	0.037	0.044	0.044	0.028	0.036	0.020	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	0.054	0.091	0.071	1.34	0.789	0.276	0.444	0.220	0.277	0.365	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	<0.000003	0.005
Chromium	mg/L	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.002	0.00017	0.05
Cobalt	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.002	0.0009	1
Iron	mg/L	0.01	<0.010	0.015	0.049	**1.330**	**0.791**	**0.30**	0.204	0.061	0.217	0.046	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	0.0009	<0.00009	0.01
Manganese	mg/L	0.002	0.009	0.008	0.007	0.021	0.014	0.008	0.01	0.011	0.010	0.007	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	2.21	7.37	5.08	3.7	4.26	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	0.002	0.012	0.005	<0.002	0.004	-	-	-	-
Vanadium	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Zinc	mg/L	0.005	0.015	0.011	<0.005	<0.005	0.006	0.009	0.018	0.014	0.009	0.006	5
% Difference/ Ion Balance	-	0.1	-	1.5	0.6	-	0.247	2.80	-	-	-		-
Field Measurements													
Temperature	^{o}C	-	9.6	8.8	9.2	9.9	10.9	11.6	9.8	11.2	10.1	13.3	-
pH	pH Units	-	8.06	8.31	7.30	7.45	7.08	7.39	7.56	7.44	7.48	7.33	-
Conductivity	uS/cm	-	400	413	684	761	2016	302	722	459	433	660	-
Oxidation Reduction Potential	mV	-	-65	-135	14	-194	-35	-121	2	90	-8	-31	-
Dissolved Oxygen	mg/L	-	7.7	5.1	4.3	3.9	1.8	4.5	5.4	9.1	13.8	6.3	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 5
Groundwater Quality Results - BH102
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation													ODWQS
			Sample Collection Date (dd/mm/yyyy)													
			BH102													
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*19/10/2016 - DUP*	*17/10/2017*	*30/10/2018*	*11/09/2019*	*10/8/2020 - DUP 1*	*10/8/2020*	*10/19/2021*	*2021-10-19 DUP1*	
			Background													
Conductivity	uS/cm	2	461	621	591	1140	917	953	485	512	562	540	534	706	531	-
pH	pH Units	-	7.96	7.77	7.74	8.07	7.56	7.79	8.06	7.99	7.66	8.19	8.19	7.85	7.88	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**338**	**305**	**459**	**405**	**417**	**268**	**235**	-	-	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	258	332	238	404	460	**502**	246	258	314	298	304	369	429	500
Alkalinity (as CaCO3)	mg/L	5	223	330	282	337	395	417	277	202	246	337	333	337	325	30 - 500
Chloride	mg/L	0.5	14.1	5.06	15.0	157	67.1	70.0	3.6	5.13	9.85	1.96	1.97	5.00	4.00	250
Nitrate as N	mg/L	0.05	<0.05	0.16	<0.25	<0.25	<0.25	<5	0.08	0.16	0.47	0.09	0.09	<0.06	<0.06	10
Nitrite as N	mg/L	0.05	<0.05	<0.10	<0.25	<0.25	<0.25	<5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.03	<0.03	1
Sulphate	mg/L	0.5	21.1	8.40	10.2	10.4	14.4	20.0	4.13	7.73	24.0	2.2	2.4	<2	<2	500
Ammonia as N	mg/L	0.02	<0.02	1.26	1.05	6.70	6.68	7.48	0.2	2.63	4.16	0.20	0.20	1.16	1.07	-
Total Phosphorus	mg/L	0.02	<0.05	0.61	0.44	7.96	2.17	2.72	0.84	1.25	0.05	0.20	0.21	0.18	0.19	-
Total Kjeldahl Nitrogen	mg/L	0.1	0.45	1.83	1.42	1.90	7.54	7.72	0.2	3.22	5.82	0.57	0.61	1.40	1.56	-
Chemical Oxygen Demand	mg/L	5	7	24	23	33	15	20	15	18	9	<5	25	15	17	-
Dissolved Organic Carbon	mg/L	0.5	2.6	4.2	4.0	4.6	**6.2**	**5.9**	**5.7**	**7.6**	3.0	**6.6**	**6.3**	**6.0**	**6.0**	5
Phenols	mg/L	0.001	<0.001	0.006	<0.001	0.006	0.002	<0.001	<0.001	0.007	0.006	0.006	0.003	0.007	0.004	-
Calcium	mg/L	0.05	50.0	69.9	62.1	97.7	88.9	91.7	54.6	48.4	53.8	60.4	60.7	66.4	62.6	-
Magnesium	mg/L	0.05	28.1	39.6	36.3	52.3	44.4	45.7	31.9	27.7	29.5	34.5	34.8	39.7	37.5	-
Sodium	mg/L	0.05	5.61	2.30	3.98	34.6	16.4	18.0	1.3	2.07	3.31	0.42	0.40	1.12	1.66	200
Potassium	mg/L	0.05	2.94	2.07	2.59	17.5	10.5	11.4	1.12	1.59	3.06	0.44	0.44	0.88	0.89	-
Aluminum	mg/L	0.004	0.016	0.005	<0.004	0.016	0.010	0.010	0.020	0.015	-	-	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	0.006
Arsenic	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.001	<0.001	0.0014	0.0009	0.01
Barium	mg/L	0.002	0.013	0.012	0.008	0.023	0.017	0.019	0.012	0.012	0.009	0.012	0.007	0.009	0.009	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Boron	mg/L	0.01	0.258	0.097	0.062	0.487	0.286	0.336	0.027	0.051	0.073	0.051	<0.010	0.019	1.310	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	<0.0001	<0.000003	0.000007	0.005
Chromium	mg/L	0.003	<0.003	0.004	<0.003	0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.002	<0.002	0.00037	0.00033	0.05
Cobalt	mg/L	0.001	-	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.001	0.001	0.001	0.0007	1
Iron	mg/L	0.01	<0.010	**0.609**	0.287	**2.31**	**0.871**	**0.960**	0.122	**0.622**	**0.343**	0.169	0.220	0.283	0.270	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.001	0.0006	<0.0005	<0.0009	<0.00009	0.01
Manganese	mg/L	0.002	0.007	**0.163**	**0.053**	**0.129**	**0.085**	**0.088**	0.019	**0.083**	**0.178**	0.026	0.026	0.039	0.038	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-
Selenium	mg/L	0.004	-	-	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	-	-	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
Strontium	mg/L	0.005	-	-	0.262	1.85	1.25	1.35	0.1	0.151	-	-	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.006	<0.0003	-	-	-	-	-	-
Titanium	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
Vanadium	mg/L	0.002	-	-	<0.002	<0.002	<0.002	0.004	<0.002	0.012	-	-	-	-	-	-
Zinc	mg/L	0.005	0.031	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.033	<0.005	0.005	<0.005	0.002	0.003	5
% Difference/ Ion Balance	-	0.1	-	0.4	0.9	-	2.80	3.83	2.56	-	-	-	-	-	-	-
Field Measurements																
Temperature	^{0}C	-	10.3	9.7	9.7	10.2	12.2	-	11.7	10.4	11.2	-	13.0	13.0	-	-
pH	pH Units	-	8.00	8.06	7.40	7.42	7.21	-	7.26	7.49	7.31	-	7.39	7.34	-	-
Conductivity	uS/cm	-	360	367	324	578	613	-	230	490	406	-	432	448	-	-
Oxidation Reduction Potential	mV	-	-62	-22	26	-174	-4	-	-142	21	-	-	45	-56	-	-
Dissolved Oxygen	mg/L	-	7.4	2.6	7.5	5.7	1.0	-	3.9	4.4	6.4	-	6.7	3.2	-	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 6
Groundwater Quality Results - BH103
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation											ODWQS
			Sample Collection Date (dd/mm/yyyy)											
			BH103											
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*17/10/2017 - DUP*	*30/10/2018*	*11/09/2019*	*10/8/2020*	*10/19/2021*	
			Downgradient											
Conductivity	uS/cm	2	13500	10000	2140	13000	19500	22300	21800	8340	15200	12000	12500	-
pH	pH Units	-	7.70	7.77	7.67	7.63	7.07	7.42	7.53	7.97	7.37	7.74	7.52	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**3700**	**734**	**6890**	**7540**	**9320**	**9230**	**2660**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**10600**	**6530**	**5000**	**15700**	**12200**	**14000**	**11200**	**5360**	**9270**	**8320**	**8080**	500
Alkalinity (as CaCO3)	mg/L	5	220	386	**742**	294	226	248	266	223	220	297	380	30 - 500
Chloride	mg/L	0.5	**5900**	**3010**	**433**	**6460**	**7370**	**9450**	**9280**	**2590**	**6290**	**4760**	**3900**	250
Nitrate as N	mg/L	2.5	<0.50	<5	<0.5	<10	<5	<10	<10	<2.5	<10	<5	<0.6	10
Nitrite as N	mg/L	2.5	<0.50	<5	<0.5	<10	<5	<10	<10	<2.5	<10	<5	<0.3	1
Sulphate	mg/L	0.5	270	120	46.2	192	239	239	241	111	168	143	140	500
Ammonia as N	mg/L	0.02	8.15	7.88	0.42	10.0	13.1	8.2	8.8	3.8	7.08	5.28	5.34	-
Total Phosphorus	mg/L	0.02	<0.05	2.05	1.26	11.6	0.22	0.29	0.35	0.28	<0.02	<0.02	0.13	-
Total Kjeldahl Nitrogen	mg/L	0.1	9.21	7.73	0.66	0.16	12.1	8.8	9.0	4.5	7.64	5.43	2.09	-
Chemical Oxygen Demand	mg/L	5	70	63	17	74	60	330	378	38	53	89	59	-
Dissolved Organic Carbon	mg/L	0.5	2.1	4.1	3.5	2.8	2.0	3.3	3.9	**6**	2.2	3.7	2.0	5
Phenols	mg/L	0.001	<0.001	0.074	<0.001	0.012	<0.001	<0.001	<0.001	0.003	0.032	0.003	<0.02	-
Calcium	mg/L	0.05	1220	793	166	1470	1590	2000	1980	567	1150	970	1360	-
Magnesium	mg/L	0.05	713	418	77.7	783	868	1050	1040	301	646	496	853	-
Sodium	mg/L	0.05	**933**	**564**	94.1	**1060**	**1150**	**1440**	**1440**	**462**	**942**	**694**	**950**	200
Potassium	mg/L	0.05	94.9	56.4	8.4	106	116	142	142	49.9	101	66.6	126	-
Aluminum	mg/L	0.004	0.016	<0.004	<0.004	0.005	<0.004	0.019	0.017	0.004	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	0.006
Arsenic	mg/L	0.003	0.003	**0.016**	0.003	**0.015**	**0.024**	<0.003	<0.003	<0.003	**0.079**	0.004	0.003	0.01
Barium	mg/L	0.002	0.097	0.036	0.024	0.038	0.043	0.046	0.056	0.021	0.031	0.033	0.040	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	**6.80**	2.74	1.77	**5.13**	**7.40**	2.59	3.78	2.48	4.14	4.00	4.72	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	0.000008	0.005
Chromium	mg/L	0.003	<0.003	0.004	<0.003	0.008	<0.003	<0.003	<0.003	0.007	<0.003	<0.002	0.00039	0.05
Cobalt	mg/L	0.001	-	-	0.003	0.003	0.002	0.003	0.003	<0.001	-	-	-	-
Copper	mg/L	0.003	0.003	<0.003	<0.003	0.005	0.003	0.004	0.009	0.004	<0.003	0.004	0.0008	1
Iron	mg/L	0.01	**2.08**	**0.906**	0.263	**1.24**	**1.27**	**0.55**	**0.82**	**0.474**	**0.527**	**0.327**	0.107	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0005	0.00021	0.01
Manganese	mg/L	0.002	**0.474**	**0.295**	**0.084**	**0.171**	**0.174**	**0.110**	**0.169**	**0.060**	**0.103**	**0.095**	**0.105**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	0.008	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	0.009	**0.272**	0.006	<0.004	<0.004	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	8.58	26.9	37.5	24.7	42.2	12.7	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.006	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	0.005	0.007	0.006	0.003	0.004	0.003	-	-	-	-
Vanadium	mg/L	0.002	-	-	<0.002	<0.002	0.020	<0.002	<0.002	<0.002	-	-	-	-
Zinc	mg/L	0.005	0.021	0.051	0.020	<0.005	0.008	0.012	0.014	0.017	0.007	<0.005	0.006	5
% Difference/ Ion Balance	-	0.1	-	2.7	8.7	-	3.04	4.46	4.01	-	-	-	-	-
Field Measurements														
Temperature	^{o}C	-	9.8	8.1	9.6	9.7	11.0	11.0	-	9.6	-	11.4	13.6	-
pH	pH Units	-	7.31	7.82	7.00	6.84	6.99	6.74	-	7.33	-	6.76	7.01	-
Conductivity	uS/cm	-	1148	776	3096	1359	2182	9000	-	8095	-	9324	10750	-
Oxidation Reduction Potential	mV	-	-34	-88	-5	-155	-10	-9	-	242	-	58.80	-14.90	-
Dissolved Oxygen	mg/L	-	11.9	6.3	6.4	8.1	1.7	6.2	-	9.8	-	8.95	6.64	-

Notes:

Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.

BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 7
Groundwater Quality Results - BH104
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation										ODWQS
			Sample Collection Date (dd/mm/yyyy)										
			BH104										
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*30/10/2018*	*11/09/2019*	*10/8/2020*	*10/19/2021*	
			Downgradient										
Conductivity	uS/cm	2	12100	833	1180	13000	8760	1140	4170	9710	8790	6080	-
pH	pH Units	-	7.76	7.94	7.71	7.67	7.28	8.16	7.84	7.48	7.79	7.76	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**360**	**461**	**4780**	**2890**	**488**	**1240**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**7440**	328	**710**	**4360**	**5190**	**580**	**2620**	**6610**	**5280**	**3900**	500
Alkalinity (as CaCO3)	mg/L	5	217	278	284	217	222	339	198	198	258	325	30 - 500
Chloride	mg/L	0.5	**5020**	90.1	215	**4790**	**2920**	185	**1140**	**3570**	**3380**	**3000**	250
Nitrate as N	mg/L	0.25	<0.50	<0.25	<0.25	<5	<2.5	<0.25	<1.0	<2.5	<5	<0.6	10
Nitrite as N	mg/L	0.25	<0.50	<0.25	<0.25	<5	<2.5	<0.25	<1.0	<2.5	<5	<0.3	1
Sulphate	mg/L	0.5	148	13.8	15.4	138	108	19.2	86.4	107	119	96	500
Ammonia as N	mg/L	0.02	10.9	0.09	0.28	6.73	9.26	0.3	3.55	8.58	7.81	7.32	-
Total Phosphorus	mg/L	0.05	0.66	1.79	0.72	6.77	0.78	0.12	1.78	<0.02	0.02	0.19	-
Total Kjeldahl Nitrogen	mg/L	0.1	12.3	0.47	0.82	0.27	9.25	0.6	3.83	9.65	8.29	4.31	-
Chemical Oxygen Demand	mg/L	5	40	21	25	34	56	27	40	35	74	57	-
Dissolved Organic Carbon	mg/L	0.5	1.9	**5.8**	**5.7**	3.3	2.3	**7.0**	**7.6**	2.6	3.9	**6.0**	5
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	0.007	0.012	<0.001	0.004	0.002	0.004	0.021	-
Calcium	mg/L	0.05	986	75.1	96.1	1020	613	105	266	700	752	404	-
Magnesium	mg/L	0.05	536	41.9	53.6	542	331	54.9	139	368	394	185	-
Sodium	mg/L	0.05	**936**	20.2	37.7	**860**	**540**	36.7	**223**	**632**	**682**	**279**	200
Potassium	mg/L	0.05	145	5.41	7.48	127	93.9	7.42	41.5	111	106	52.1	-
Aluminum	mg/L	0.004	0.011	0.005	<0.004	0.006	<0.004	0.010	0.009	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-		0.006
Arsenic	mg/L	0.003	**0.017**	<0.003	<0.003	0.006	0.008	<0.003	<0.003	**0.044**	<0.001	0.003	0.01
Barium	mg/L	0.002	0.050	0.011	0.014	0.030	0.040	0.016	0.026	0.031	0.037	0.011	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	4.48	0.054	0.165	2.06	2.85	0.179	1.9	2.65	3.68	1.20	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0001	<0.000003	0.005
Chromium	mg/L	0.003	<0.003	0.004	<0.003	0.006	<0.003	<0.003	0.007	0.003	<0.002	0.000	0.05
Cobalt	mg/L	0.001	-	-	<0.001	0.001	<0.001	<0.001	<0.001	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.002	0.0007	1
Iron	mg/L	0.01	**1.74**	<0.010	<0.010	**1.51**	**1.32**	<0.010	0.238	**0.830**	**0.627**	0.098	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0005	<0.00009	0.01
Manganese	mg/L	0.002	**0.148**	<0.002	**0.104**	**0.464**	**0.841**	0.024	**0.285**	**0.411**	**0.407**	**0.137**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	<0.004	**0.116**	<0.004	<0.004	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	0.598	12.4	15.1	0.9	8.55	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	<0.002	0.004	0.002	<0.002	0.003	-	-	-	-
Vanadium	mg/L	0.002	-	-	0.002	0.002	<0.002	<0.002	0.003	-	-	-	-
Zinc	mg/L	0.005	0.017	<0.005	<0.005	<0.005	0.007	<0.005	0.005	0.009	<0.005	0.006	5
% Difference/ Ion Balance	-	0.1	-	1.1	4.4	-	2.73	3.52	-	-	-	-	-
Field Measurements													
Temperature	^{o}C	-	8.6	5.9	9.0	9.2	11.6	11.4	9.3	-	11.0	13.8	-
pH	pH Units	-	7.15	7.77	7.23	7.17	7.10	7.05	7.13	-	6.77	6.98	-
Conductivity	uS/cm	-	971	346	1056	5509	4640	2440	5313	-	8212	8770	-
Oxidation Reduction Potential	mV	-	-21	-77	11	-170	9	-96	175	-	30.60	-28.50	-
Dissolved Oxygen	mg/L	-	11.9	4.8	3.1	4.0	2.2	2.9	7.9	-	8.42	6.49	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 8
Groundwater Quality Results - BH105
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation											ODWQS
			Sample Collection Date (dd/mm/yyyy)											
			BH105											
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*30/10/2018*	*30/10/2018 - DUP1*	*11/09/2019*	*10/8/2020*	*10/19/2021*	
			Transgradient											
Conductivity	uS/cm	2	1900	669	1070	38700	36200	3740	8570	9950	10100	6490	32300	-
pH	pH Units	-	8.10	8.00	7.83	7.35	6.98	8.00	7.99	8.03	7.57	7.89	7.45	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**316**	**416**	**15100**	**13000**	**1190**	**2460**	**3250**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**1740**	358	416	**9190**	**24300**	**3610**	**5030**	**6330**	**10500**	**2640**	**22100**	500
Alkalinity (as CaCO3)	mg/L	5	266	309	284	157	180	243	189	190	205	240	177	30 - 500
Chloride	mg/L	0.5	**507**	22.2	148	**16300**	**14500**	**1160**	**2720**	**3290**	**3510**	**2370**	**15000**	250
Nitrate as N	mg/L	0.25	<0.05	<0.10	<0.25	<25	<50	<1.0	<2.5	<2.5	<5	<2.5	<0.6	10
Nitrite as N	mg/L	0.25	<0.05	<0.10	<0.25	<25	<50	<1.0	<2.5	<2.5	<5	<2.5	<0.75	1
Sulphate	mg/L	0.5	87.2	18.4	33.0	332	376	48.4	88.8	120	91	72.4	340	500
Ammonia as N	mg/L	0.02	1.75	<0.02	0.46	36.3	41.2	5.3	7.51	4.84	5.00	13.00	30.60	-
Total Phosphorus	mg/L	0.02	2.85	<0.05	1.06	37.2	0.25	2.26	1.37	0.34	<0.02	<0.02	0.38	-
Total Kjeldahl Nitrogen	mg/L	0.1	1.86	0.18	0.61	1.00	42.0	6.2	8.52	4.89	5.55	13.30	4.67	-
Chemical Oxygen Demand	mg/L	5	17	19	11	170	189	57	40	45	42	122	150	-
Dissolved Organic Carbon	mg/L	0.5	3.2	2.6	2.0	2.3	2.4	4.1	**5**	**5.6**	2.4	3.2	2.0	5
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	0.036	<0.001	<0.001	0.002	0.002	<0.001	0.003	0.08	-
Calcium	mg/L	0.05	199	79.3	102	3410	2950	280	559	673	713	2560	3200	-
Magnesium	mg/L	0.05	79.3	28.7	39.2	1600	1370	120	258	381	331	1170	1250	-
Sodium	mg/L	0.05	121	18.1	36.6	**3560**	**3000**	**242**	**569**	**549**	**693**	**2710**	**2910**	200
Potassium	mg/L	0.05	20.4	3.15	9.48	429	380	40.8	86.2	58.6	97.4	330.0	583.0	-
Aluminum	mg/L	0.004	0.016	<0.004	<0.004	0.017	<0.004	0.011	0.023	<0.004	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.003	<0.003	<0.003	-	-	-	0.006
Arsenic	mg/L	0.003	<0.003	<0.003	<0.003	**0.04**	**0.052**	<0.003	0.005	<0.003	**0.122**	**0.039**	0.002	0.01
Barium	mg/L	0.002	0.013	0.010	0.013	0.213	0.205	0.019	0.037	0.022	0.146	0.174	0.139	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	0.368	0.092	0.237	**5.18**	**6.56**	0.398	1.58	3.03	**5.26**	**6.51**	**7.48**	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002	<0.004	<0.0001	0.000005	0.005
Chromium	mg/L	0.003	<0.003	0.003	<0.003	0.010	0.003	<0.003	0.007	0.006	0.008	<0.002	0.000	0.05
Cobalt	mg/L	0.001	-	-	0.001	0.007	0.005	<0.001	0.002	0.001	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	0.008	0.006	<0.003	<0.003	<0.003	<0.006	<0.001	0.0005	1
Iron	mg/L	0.01	<0.010	<0.010	**0.031**	**11.00**	**6.65**	**0.76**	**0.388**	**0.475**	**6.54**	**12.70**	**8.34**	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.001	<0.001	<0.002	0.0006	<0.00009	0.01
Manganese	mg/L	0.002	**0.122**	<0.002	**0.084**	**0.669**	**0.615**	0.045	**0.172**	**0.064**	**0.263**	**0.402**	**0.390**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.004	<0.002	<0.002	0.002	<0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.006	0.020	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	<0.004	**0.693**	**0.012**	**0.019**	<0.004	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	0.738	69.6	76.7	3.1	13.2	15.5	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	0.003	0.014	0.009	<0.002	0.004	0.004	-	-	-	-
Vanadium	mg/L	0.002	-	-	<0.002	<0.004	0.044	<0.002	0.005	0.005	-	-	-	-
Zinc	mg/L	0.005	<0.005	0.009	0.005	<0.010	0.011	0.006	0.006	<0.005	0.012	<0.005	0.004	5
% Difference/ Ion Balance	-	0.1	-	<0.1	2.8	-	2.13	3.78	-	-	-	-	-	-
Field Measurements														
Temperature	°C	-	8.7	7.8	9.2	9.9	9.9	10.9	9.7	-	14.2	10.2	10.8	-
pH	pH Units	-	7.89	7.67	7.32	7.19	6.88	7.21	7.12	-	7.20	6.73	6.88	-
Conductivity	uS/cm	-	138	450	672	7456	4181	2620	3956	-	9613	23483	20990	-
Oxidation Reduction Potential	mV	-	-56	-70	17	-133	24	-45	250	-	183	-36	-38	-
Dissolved Oxygen	mg/L	-	10.4	7.7	2.9	5.0	1.7	2.0	14.7	-	8.3	7.6	8.4	-

Notes:

Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 9
Groundwater Quality Results - BH106
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation											ODWQS
			Sample Collection Date (dd/mm/yyyy)											
			BH106											
			25/07/2012	*21/11/2013*	*30/10/2014*	*18/11/2015*	*19/10/2016*	*17/10/2017*	*30/10/2018*	*30/10/2018 - DUP 2*	*11/9/2019*	*10/8/2020*	*10/19/2021*	
			Transgradient											
Conductivity	uS/cm	2	4760	2160	5640	17500	12000	4210	3190	2660	8070	1170	6460	-
pH	pH Units	-	8.09	7.94	7.70	7.69	7.26	7.96	7.92	8.08	7.56	8.13	7.67	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	-	**760**	**1800**	**15100**	**3880**	**1370**	**924**	**770**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**3260**	**1260**	**6360**	**5490**	**8880**	**2860**	**2000**	**844**	**5820**	**2220**	**4180**	500
Alkalinity (as CaCO3)	mg/L	5	212	265	228	181	227	252	206	194	219	395	336	30 - 500
Chloride	mg/L	0.5	**1810**	**466**	**1910**	**6560**	**4190**	**1300**	**843**	**631**	**3000**	**459**	**2900**	250
Nitrate as N	mg/L	0.25	<0.05	<1.0	<2.5	<10	<2.5	<2.5	<0.5	<0.5	<2.5	<0.25	<0.6	10
Nitrite as N	mg/L	0.25	<0.05	<1.0	<2.5	<10	<2.5	<2.5	<0.5	<0.5	<2.5	<0.25	<0.3	1
Sulphate	mg/L	0.5	78.2	69.6	137	150	127	74.4	51.5	35.8	54.6	30.6	71.0	500
Ammonia as N	mg/L	0.02	14.6	1.13	5.4	20.0	19.8	3.29	2.87	0.99	10.4	0.6	9.3	-
Total Phosphorus	mg/L	0.05	1.03	0.29	0.31	21.8	0.85	1.08	1.2	0.44	<0.02	0.08	0.25	-
Total Kjeldahl Nitrogen	mg/L	0.1	15.9	1.37	5.18	0.27	19.1	4.51	3.19	2.32	10.9	1.1	5.4	-
Chemical Oxygen Demand	mg/L	5	59	21	25	95	98	45	19	19	43	34	61	-
Dissolved Organic Carbon	mg/L	0.5	3.5	3.7	2.7	3.0	**5.4**	**5.5**	**7.4**	**8.9**	4.1	**7.6**	5.0	5
Phenols	mg/L	0.001	0.001	<0.001	<0.001	0.032	0.001	<0.001	0.015	0.003	0.005	0.003	0.006	-
Calcium	mg/L	0.05	405	187	426	1330	946	341	234	193	631	696	630	-
Magnesium	mg/L	0.05	171	71.1	178	556	369	126	82.5	69.9	229	248	195	-
Sodium	mg/L	0.05	**334**	106	**335**	**1413**	**799**	**255**	179	139	**552**	**606**	**431**	200
Potassium	mg/L	0.05	64.3	26.9	77.1	260	165	56.5	42.1	36.4	127	116	104	-
Aluminum	mg/L	0.004	0.009	0.008	<0.004	0.005	0.006	0.01	<0.004	0.034	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	0.006
Arsenic	mg/L	0.003	0.003	<0.003	<0.003	**0.014**	0.009	<0.003	<0.003	0.004	**0.030**	**0.013**	0.003	0.01
Barium	mg/L	0.002	0.084	0.010	0.019	0.057	0.049	0.02	0.022	0.03	0.044	0.069	0.039	1
Beryllium	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Boron	mg/L	0.01	3.83	0.679	1.81	4.02	2.77	0.731	0.48	0.657	1.96	2.18	1.66	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.0001	<0.000003	0.005
Chromium	mg/L	0.003	<0.003	0.003	<0.003	0.005	<0.003	<0.003	0.007	0.005	<0.003	<0.002	0.00045	0.05
Cobalt	mg/L	0.001	-	-	0.002	0.002	<0.001	<0.001	<0.001	0.001	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.002	0.0004	1
Iron	mg/L	0.01	**2.24**	0.285	**1.55**	**5.22**	**4.16**	**0.884**	**0.494**	**0.579**	**1.81**	**3.45**	**3.04**	0.3
Lead	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	0.0033	0.00033	0.01
Manganese	mg/L	0.002	**0.274**	0.034	**0.097**	**0.184**	**0.155**	**0.056**	**0.082**	**0.115**	**0.085**	**0.186**	**0.256**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00001	0.001
Molybdenum	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.001	0.001	-	-	-	-
Nickel	mg/L	0.003	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-
Selenium	mg/L	0.004	-	-	0.007	**0.238**	0.005	**0.024**	<0.004	<0.004	-	-	-	0.01
Silver	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-
Strontium	mg/L	0.005	-	-	7.03	23	15.9	3.74	1.84	3.14	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	<0.006	<0.0003	<0.0003	-	-	-	-
Titanium	mg/L	0.002	-	-	0.008	0.006	0.003	<0.002	<0.002	0.003	-	-	-	-
Vanadium	mg/L	0.002	-	-	0.002	0.003	0.002	<0.002	0.005	<0.002	-	-	-	-
Zinc	mg/L	0.005	0.017	<0.005	<0.005	<0.005	0.011	0.006	0.016	0.005	0.006	0.008	0.004	5
% Difference/ Ion Balance	-	0.1	-	1.6	7.4	-	3.07	3.73	-	-	-	-	-	-
Field Measurements														
Temperature	^{o}C	-	8.3	8.4	9.6	9.8	10.3	10.9	9.6	-	-	10.58	14.00	-
pH	pH Units	-	7.52	8.24	7.01	7.11	7.00	7.18	7.66	-	-	6.99	7.07	-
Conductivity	uS/cm	-	842	1048	3154	6163	1990	2500	2383	-	-	8173	7060	-
Oxidation Reduction Potential	mV	-	-38	-113	-45	-171	22	-8	232	-	-	19.5	-61	-
Dissolved Oxygen	mg/L	-	8.5	4.1	2.1	3.3	1.9	3.3	8.6	-	-	8.31	6.34	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 10
Groundwater Quality Results - BH107
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation *Sample Collection Date (dd/mm/yyyy)* BH107					ODWQS
			04/08/2018	*30/10/2018*	*11/09/2019*	*10/8/2020*	*10/19/2021*	
			Downgradient					
Conductivity	uS/cm	2	38500	37000	32300	35400	34000	-
pH	pH Units	-	7.07	7.54	7.22	7.41	7.31	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	**13200**	**13200**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**21400**	**23400**	**22700**	**27000**	**23500**	500
Alkalinity (as CaCO3)	mg/L	5	86	87	114	118	130	30 - 500
Chloride	mg/L	50	**15300**	**14600**	**14700**	**16800**	**17000**	250
Nitrate as N	mg/L	25	<25	<50	<10	<25	8.46	10
Nitrite as N	mg/L	25	<25	<50	<10	<25	<0.75	1
Sulphate	mg/L	50	240	220	119	130	110	500
Ammonia as N	mg/L	1	35.9	39	36.2	38.9	30.7	-
Total Phosphorus	mg/L	0.2	6.3	2.38	<0.02	2.84	0.7	-
Total Kjeldahl Nitrogen	mg/L	0.5	43.2	47.8	37.6	41.0	7.6	-
Chemical Oxygen Demand	mg/L	25	169	156	103	714	113	-
Dissolved Organic Carbon	mg/L	0.5	2.3	4.7	1.9	2.1	3.0	5
Phenols	mg/L	0.005	0.017	0.011	0.014	-	<0.02	-
Calcium	mg/L	2.5	2750	2750	2520	2860	3030	-
Magnesium	mg/L	2.5	1540	1530	1370	1500	1390	-
Sodium	mg/L	2.5	**2960**	**3070**	**2710**	**3100**	**2889**	200
Potassium	mg/L	2.5	524	517	442	473	474	-
Aluminum	mg/L	0.008	0.016	0.006	-	-	-	0.1
Antimony	mg/L	0.006	<0.006	<0.003	-	-	-	0.006
Arsenic	mg/L	0.006	<0.006	**0.037**	**0.138**	**0.051**	**0.001**	0.01
Barium	mg/L	0.004	0.847	0.362	0.342	0.494	0.252	1
Beryllium	mg/L	0.002	<0.002	<0.001	-	-	-	-
Boron	mg/L	0.02	**11.1**	**13.3**	**13.7**	**19.5**	**14.6**	5
Cadmium	mg/L	0.004	<0.004	<0.002	<0.004	<0.0001	<0.00003	0.005
Chromium	mg/L	0.006	<0.006	0.005	0.007	<0.002	0.000	0.05
Cobalt	mg/L	0.002	0.069	0.05	-	-	-	-
Copper	mg/L	0.006	0.008	0.009	0.008	0.003	0.004	1
Iron	mg/L	0.02	<0.020	<0.010	0.099	0.191	0.080	0.3
Lead	mg/L	0.002	<0.002	<0.001	<0.002	0.0006	<0.00009	0.01
Manganese	mg/L	0.004	**0.738**	**0.544**	**0.384**	**0.471**	**0.396**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00001	0.001
Molybdenum	mg/L	0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.006	0.206	0.109	-	-	-	-
Selenium	mg/L	0.008	**0.012**	<0.004	-	-	-	0.01
Silver	mg/L	0.004	<0.004	<0.002	-	-	-	-
Strontium	mg/L	0.01	89.8	98.2	-	-	-	-
Thallium	mg/L	0.0006	0.0013	0.0007	-	-	-	-
Titanium	mg/L	0.004	0.009	0.011	-	-	-	-
Vanadium	mg/L	0.004	<0.004	<0.002	-	-	-	-
Zinc	mg/L	0.01	0.032	0.035	0.024	0.009	0.008	5
% Difference/ Ion Balance	-	0.1	3.53	-	-	-	-	-
Field Measurements								
Temperature	°C	-	13.8	10.4	-	-	11.9	-
pH	pH Units	-	6.38	6.18	-	-	6.88	-
Conductivity	uS/cm	-	39813	36208	-	-	26300.00	-
Oxidation Reduction Potential	mV	-	221	277	-	-	51.10	-
Dissolved Oxygen	mg/L	-	6.5	8.4	-	-	6.88	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 11
Groundwater Quality Results - BH108
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation *Sample Collection Date (dd/mm/yyyy)* BH108						ODWQS
			04/08/2018	*04/08/2018 - DUP*	*30/10/2018*	*11/9/2019*	*10/8/2020*	*10/19/2021*	
			Downgradient						
Conductivity	uS/cm	2	35200	35400	37500	39600	33400	36000	-
pH	pH Units	-	7.26	7.22	7.53	7.18	7.45	7.45	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	**12000**	**11600**	**13100**	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**20200**	**20300**	**24700**	**23600**	**27000**	**29100**	500
Alkalinity (as CaCO3)	mg/L	5	103	104	87	102	106	110	30 - 500
Chloride	mg/L	50	**13600**	**13500**	**14500**	**17700**	**15500**	**18000**	250
Nitrate as N	mg/L	25	<25	<25	<50	<50	<25	<0.6	10
Nitrite as N	mg/L	25	<25	<25	<50	<50	<25	<3	1
Sulphate	mg/L	50	<50	<50	<100	<100	<50	43	500
Ammonia as N	mg/L	0.4	30.6	30.6	36.9	36.0	36.6	35.6	-
Total Phosphorus	mg/L	0.2	7.8	7.1	2.68	<0.02	0.36	0.61	-
Total Kjeldahl Nitrogen	mg/L	0.5	35	34.8	42	38.2	37.5	6.3	-
Chemical Oxygen Demand	mg/L	10	95	95	117	101	1400	265	-
Dissolved Organic Carbon	mg/L	0.5	1.6	1.7	2.6	1.1	1.8	2.0	5
Phenols	mg/L	0.002	0.015	0.01	0.007	0.012	0.002	0.048	-
Calcium	mg/L	5	2450	2380	2690	2940	2610	3010	-
Magnesium	mg/L	5	1420	1380	1540	1640	1450	1430	-
Sodium	mg/L	5	**2580**	**2500**	**2950**	**3110**	**2800**	**2620**	200
Potassium	mg/L	5	402	388	444	453	401	445	-
Aluminum	mg/L	0.008	0.011	0.018	0.005	-	-	-	0.1
Antimony	mg/L	0.006	<0.006	<0.006	<0.003	-	-	-	0.006
Arsenic	mg/L	0.006	<0.006	<0.006	**0.05**	**0.160**	**0.062**	**0.001**	0.01
Barium	mg/L	0.004	0.625	0.65	0.449	0.327	0.313	0.210	1
Beryllium	mg/L	0.002	<0.002	<0.002	<0.001	-	-	-	-
Boron	mg/L	0.02	**7.56**	**7.48**	**11.4**	**12.5**	**15.2**	**12.6**	5
Cadmium	mg/L	0.004	<0.004	<0.004	<0.002	<0.004	<0.0001	0.00007	0.005
Chromium	mg/L	0.006	<0.006	<0.006	0.006	0.007	<0.002	<0.00008	0.05
Cobalt	mg/L	0.002	0.023	0.022	0.016	-	-	-	-
Copper	mg/L	0.006	0.008	0.008	0.008	<0.006	0.001	0.0016	1
Iron	mg/L	0.02	<0.020	<0.020	<0.010	0.269	**0.301**	0.060	0.3
Lead	mg/L	0.002	<0.002	<0.002	0.001	<0.002	0.0007	0.00021	0.01
Manganese	mg/L	0.004	**0.285**	**0.275**	**0.374**	**0.357**	**0.373**	**0.242**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.001
Molybdenum	mg/L	0.002	<0.002	<0.002	<0.001	-	-	-	-
Nickel	mg/L	0.006	0.02	0.019	0.021	-	-	-	-
Selenium	mg/L	0.008	**0.018**	0.008	<0.004	-	-	-	0.01
Silver	mg/L	0.004	<0.004	<0.004	<0.002	-	-	-	-
Strontium	mg/L	0.01	86.5	87.3	105	-	-	-	-
Thallium	mg/L	0.0006	<0.0006	<0.0006	<0.0003	-	-	-	-
Titanium	mg/L	0.004	0.008	0.008	0.007	-	-	-	-
Vanadium	mg/L	0.004	<0.004	<0.004	<0.002	-	-	-	-
Zinc	mg/L	0.01	0.024	0.028	0.023	0.014	0.008	0.004	5
% Difference/ Ion Balance	%	-	2.96	4.07	-	-	-	-	-
Field Measurements									
Temperature	°C	-	10.7	-	10.0	18.6	10.4	11.8	-
pH	pH Units	-	6.68	-	6.93	6.75	6.29	6.79	-
Conductivity	uS/cm	-	37060	-	5904	38759	26373	28670	-
Oxidation Reduction Potential	mV	-	161	-	272	295	106	36	-
Dissolved Oxygen	mg/L	-	6.2	-	12.0	7.6	7.8	3.9	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 12
Groundwater Quality Results - BH109
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation *Sample Collection Date (dd/mm/yyyy)* BH109					ODWQS
			04/08/2018	*30/10/2018*	*11/09/2019*	*10/8/2020*	*10/19/2021*	
					Downgradient			
Conductivity	uS/cm	2	DRY	DRY	DRY	66000	60000	-
pH	pH Units	-	-	-	-	7.23	7.47	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	10	-	-	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	-	-	-	**66300**	**52300**	500
Alkalinity (as CaCO3)	mg/L	5	-	-	-	94	110	30 - 500
Chloride	mg/L	0.5	-	-	-	**34100**	**32000**	250
Nitrate as N	mg/L	0.25	-	-	-	<50	<1.5	10
Nitrite as N	mg/L	0.25	-	-	-	<50	<3	1
Sulphate	mg/L	0.5	-	-	-	**1230**	**1600**	500
Ammonia as N	mg/L	0.02	-	-	-	51.7	48.6	-
Total Phosphorus	mg/L	0.05	-	-	-	1	0.93	-
Total Kjeldahl Nitrogen	mg/L	0.1	-	-	-	55	5.76	-
Chemical Oxygen Demand	mg/L	5	-	-	-	2430	148	-
Dissolved Organic Carbon	mg/L	0.5	-	-	-	2.8	-	5
Phenols	mg/L	0.001	-	-	-	0.007	<0.002	-
Calcium	mg/L	0.05	-	-	-	7780	6360	-
Magnesium	mg/L	0.05	-	-	-	2780	2060	-
Sodium	mg/L	0.05	-	-	-	**5700**	**5440**	200
Potassium	mg/L	0.05	-	-	-	580	537	-
Aluminum	mg/L	0.004	-	-	-	-	-	0.1
Antimony	mg/L	0.003	-	-	-	-	-	0.006
Arsenic	mg/L	0.003	-	-	-	**0.078**	0.0027	0.01
Barium	mg/L	0.002	-	-	-	0.391	0.149	1
Beryllium	mg/L	0.001	-	-	-	-	-	-
Boron	mg/L	0.01	-	-	-	**31**	**18.9**	5
Cadmium	mg/L	0.002	-	-	-	<0.0001	-	0.005
Chromium	mg/L	0.003	-	-	-	0.002	0.00115	0.05
Cobalt	mg/L	0.001	-	-	-	-	-	-
Copper	mg/L	0.003	-	-	-	0.009	0.0037	1
Iron	mg/L	0.01	-	-	-	**2.45**	0.04	0.3
Lead	mg/L	0.002	-	-	-	0.002	0.00067	0.01
Manganese	mg/L	0.002	-	-	-	**2.13**	**0.665**	0.05
Mercury	mg/L	0.0001	-	-	-	<0.0001	-	0.001
Molybdenum	mg/L	0.002	-	-	-	-	-	-
Nickel	mg/L	0.003	-	-	-	-	-	-
Selenium	mg/L	0.004	-	-	-	-	-	0.01
Silver	mg/L	0.002	-	-	-	-	-	-
Strontium	mg/L	0.005	-	-	-	-	-	-
Thallium	mg/L	0.006	-	-	-	-	-	-
Titanium	mg/L	0.002	-	-	-	-	-	-
Vanadium	mg/L	0.002	-	-	-	-	-	-
Zinc	mg/L	0.005	-	-	-	0.016	0.009	5
% Difference/ Ion Balance	-	0.1	-	-	-	-	-	-
Field Measurements								
Temperature	°C	-	-	-	-	-	13.00	-
pH	pH Units	-	-	-	-	-	7.05	-
Conductivity	uS/cm	-	-	-	-	-	51200	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-5.5	-
Dissolved Oxygen	mg/L	-	-	-	-	-	5.04	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 13
Groundwater Quality Results - BH110
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	Sample Designation *Sample Collection Date (dd/mm/yyyy)* BH110						ODWQS
			04/08/2018	*30/10/2018*	*11/09/2019*	*10/8/2020*	*10/19/2021*	*2021-10-19 DUP2*	
			Background						
Conductivity	uS/cm	2	2930	3210	3420	3170	3470	3480	-
pH	pH Units	-	8.13	8.31	7.9	8.03	7.82	7.84	6.5 - 8.5
Total Hardness (as CaCO3)	mg/L	0.5	**961**	**972**	-	-	-	-	80 - 100
Total Dissolved Solids	mg/L	20	**1640**	**2170**	**2160**	**2250**	**2200**	**2170**	500
Alkalinity (as CaCO3)	mg/L	5	244	185	221	227	214	213	30 - 500
Chloride	mg/L	0.5	**718**	**762**	**941**	**935**	**920**	**920**	250
Nitrate as N	mg/L	0.25	<1.0	<1.0	<1.0	<1.0	0.25	0.24	10
Nitrite as N	mg/L	0.25	<1.0	<0.5	<1.0	<1.0	<0.3	<0.3	1
Sulphate	mg/L	0.5	182	172	195	186	260	260	500
Ammonia as N	mg/L	0.02	0.74	1.67	2.14	1.81	1.95	2.02	-
Total Phosphorus	mg/L	0.02	0.79	1	<0.02	0.05	0.17	0.16	-
Total Kjeldahl Nitrogen	mg/L	0.1	1.86	2.12	2.39	2.30	1.46	1.38	-
Chemical Oxygen Demand	mg/L	5	<5	6	10	27	10	8	-
Dissolved Organic Carbon	mg/L	0.5	2.1	2.1	1.4	1.9	2.0	2.0	5
Phenols	mg/L	0.001	<0.001	<0.001	0.002	0.003	0.006	-	-
Calcium	mg/L	0.05	221	227	255	251	365	384	-
Magnesium	mg/L	0.05	99.4	98.3	105	102	110	116	-
Sodium	mg/L	0.05	141	169	174	178	189	**204**	200
Potassium	mg/L	0.05	27.9	31.2	31.1	29.7	37.5	39.4	-
Aluminum	mg/L	0.004	<0.004	0.042	-	-	-	-	0.1
Antimony	mg/L	0.003	<0.003	<0.003	-	-	-	-	0.006
Arsenic	mg/L	0.003	<0.003	0.006	0.013	0.007	0.002	0.002	0.01
Barium	mg/L	0.002	0.177	0.136	0.109	0.099	0.087	0.090	1
Beryllium	mg/L	0.001	<0.001	<0.001	-	-	-	-	-
Boron	mg/L	0.01	1.41	1.5	2.03	1.88	1.45	2.31	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.0001	0.000007	0.00001	0.005
Chromium	mg/L	0.003	0.004	0.007	<0.003	<0.002	<0.00008	0.00017	0.05
Cobalt	mg/L	0.001	0.002	0.002	-	-	-	-	-
Copper	mg/L	0.003	<0.003	<0.003	<0.003	0.001	<0.0002	0.0006	1
Iron	mg/L	0.01	<0.010	0.074	0.145	0.151	0.154	0.115	0.3
Lead	mg/L	0.002	<0.001	<0.001	<0.001	0.0007	<0.00009	<0.00009	0.01
Manganese	mg/L	0.002	**0.103**	**0.163**	**0.140**	**0.063**	**0.069**	**0.065**	0.05
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	0.001
Molybdenum	mg/L	0.002	0.004	0.003	-	-	-	-	-
Nickel	mg/L	0.003	0.008	0.007	-	-	-	-	-
Selenium	mg/L	0.004	<0.004	<0.004	-	-	-	-	0.01
Silver	mg/L	0.002	<0.002	<0.002	-	-	-	-	-
Strontium	mg/L	0.005	15.9	16.8	-	-	-	-	-
Thallium	mg/L	0.006	<0.0003	<0.0003	-	-	-	-	-
Titanium	mg/L	0.002	0.002	0.006	-	-	-	-	-
Vanadium	mg/L	0.002	<0.002	<0.002	-	-	-	-	-
Zinc	mg/L	0.005	0.009	0.007	0.005	0.012	<0.002	<0.002	5
% Difference/ Ion Balance	-	0.1	5.14	-	-	-	-	-	-
Field Measurements									
Temperature	^{o}C	-	11.1	10.0	11.5	10.8	14.5	-	-
pH	pH Units	-	7.03	7.39	7.20	7.39	7.26	-	-
Conductivity	uS/cm	-	2922	3047	2616	2400	2980	-	-
Oxidation Reduction Potential	mV	-	187	39	75	62	-45	-	-
Dissolved Oxygen	mg/L	-	2.4	11.3	6.1	9.7	4.4	-	-

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.
BOLD	Exceeds ODWQS
Lightly Shaded	RDL exceeds ODWQS
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 14
2019 Reasonable Use Criteria Assessment
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	Sample Designation						ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		Sample Collection Date (dd/mm/yyyy)										
		BH103	BH104	BH105	BH106	BH107	BH108		Cb	x	Cr	Cm
		11/09/2019	*11/09/2019*	*11/09/2019*	*11/9/2019*	*11/09/2019*	*11/9/2019*					
pH	pH Units	7.37	7.48	7.57	7.56	7.22	7.18	6.5 - 8.5	7.89	0.5	6.5 - 8.5	7.19-8.19
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	80 - 100	451.43	0.5	80 - 100	265.7-275.7
Total Dissolved Solids*	mg/L	9270	6610	10500	5820	22700	23600	500	528.61	0.5	500	514.3
Alkalinity (as CaCO3)	mg/L	220	198	205	219	**114**	**102**	30 - 500	235.08	0.5	30 - 500	132.5-367.5
Chloride	mg/L	**6290**	**3570**	**3510**	**3000**	**14700**	**17700**	250	38.10	0.5	250	144.0
Nitrate as N	mg/L	<10	<2.5	<5	<2.5	<10	<50	10	0.098	0.25	10	2.6
Nitrite as N	mg/L	<10	<2.5	<5	<2.5	<10	<50	1	0.085	0.25	1	0.3
Sulphate	mg/L	168	107	91	54.6	119	<100	500	117.35	0.5	500	308.7
Dissolved Organic Carbon	mg/L	2.2	2.6	2.4	4.10	1.9	1.1	5	4.10	0.5	5	4.6
Sodium	mg/L	**942**	**632**	**2910**	**552**	**2710**	**3110**	200	7.92	0.5	200	104.0
Aluminum	mg/L	-	-	-	-	-	-	0.1	0.0041	0.5	0.1	0.052
Antimony	mg/L	-	-	-	-	-	-	0.006	0.0015	0.25	0.006	0.003
Arsenic	mg/L	**0.0790**	**0.0440**	0.0023	**0.0300**	**0.138**	**0.16**	0.01	0.0013	0.25	0.01	0.0035
Barium	mg/L	0.031	0.031	0.146	0.04	**0.342**	**0.327**	1	0.0410	0.25	1	0.281
Boron	mg/L	**4.14**	**2.65**	**5.26**	**1.96**	**13.7**	**12.5**	5	0.2411	0.25	5	1.431
Cadmium	mg/L	<0.002	<0.002	<0.004	<0.002	<0.004	<0.004	0.005	0.0007	0.25	0.005	0.002
Chromium	mg/L	<0.003	0.003	0.008	<0.003	0.007	0.007	0.05	0.0014	0.25	0.05	0.014
Copper	mg/L	<0.003	<0.003	<0.006	<0.003	0.008	<0.006	1	0.0015	0.5	1	0.501
Iron	mg/L	**0.527**	**0.83**	**6.54**	**1.81**	0.099	**0.269**	0.3	0.113	0.5	0.3	0.207
Lead	mg/L	<0.001	<0.001	<0.002	<0.001	<0.002	<0.002	0.01	0.0008	0.25	0.01	0.003
Manganese	mg/L	**0.103**	**0.411**	**0.263**	0.030	**0.384**	**0.357**	0.05	0.0103	0.5	0.05	0.030
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	0.0001	0.25	0.001	0.0003
Selenium	mg/L	-	-	-	-	-	-	0.01	0.0020	0.25	0.01	0.004
Zinc	mg/L	0.007	0.009	0.012	0.006	0.024	0.014	5	0.0079	0.5	5	2.5

Notes:

Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.

BOLD	Exceeds RUC (Guideline B-7)
Lightly Shaded	RDL exceeds the Cm
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration
*	Non-calculable as background exceeds RU calculation, background concentration taken as Cm value.

TABLE 15
2020 Reasonable Use Criteria Assessment
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	Sample Designation						ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		Sample Collection Date (dd/mm/yyyy)										
		BH103	BH104	BH105	BH106	BH107	BH108		Cb	x	Cr	Cm
		08/10/2020	*08/10/2020*	*08/10/2020*	*08/10/2020*	*08/10/2020*	*08/10/2020*					
pH	pH Units	7.74	7.79	7.89	8.13	7.41	7.45	6.5 - 8.5	7.89	0.5	6.5 - 8.5	7.19-8.19
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	80 - 100	451.43	0.5	80 - 100	265.7-275.7
Total Dissolved Solids*	mg/L	8320	5280	2640	2220	27000	27000	500	528.61	0.5	500	514.3
Alkalinity (as CaCO3)	mg/L	297	258	240	**395**	**118**	**106**	30 - 500	235.08	0.5	30 - 500	132.5-367.5
Chloride	mg/L	**4760**	**3380**	**2370**	**459**	**16800**	**15500**	250	38.10	0.5	250	144.0
Nitrate as N	mg/L	<5	<5	<2.5	<0.25	<25	<25	10	0.098	0.25	10	2.6
Nitrite as N	mg/L	<5	<5	<2.5	<0.25	<25	<25	1	0.085	0.25	1	0.3
Sulphate	mg/L	143	119	72.4	30.6	130	<50	500	117.35	0.5	500	308.7
Dissolved Organic Carbon	mg/L	3.7	3.9	3.2	**7.60**	2.1	1.8	5	4.10	0.5	5	4.6
Sodium	mg/L	**694**	**682**	**2710**	**606**	**3100**	**2800**	200	7.92	0.5	200	104.0
Aluminum	mg/L	-	-	-	-	-	-	0.1	0.0041	0.5	0.1	0.052
Antimony	mg/L	-	-	-	-	-	-	0.006	0.0015	0.25	0.006	0.003
Arsenic	mg/L	**0.0040**	<0.001	**0.0390**	**0.0130**	**0.051**	**0.062**	0.01	0.0013	0.25	0.01	0.0035
Barium	mg/L	0.033	0.037	0.174	0.07	**0.494**	**0.313**	1	0.0410	0.25	1	0.281
Boron	mg/L	**4.00**	3.68	**6.51**	**2.18**	**19.5**	**15.2**	5	0.2411	0.25	5	1.431
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.005	0.0007	0.25	0.005	0.002
Chromium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.05	0.0014	0.25	0.05	0.014
Copper	mg/L	0.004	0.002	<0.001	0.00	0.003	0.001	1	0.0015	0.5	1	0.501
Iron	mg/L	**0.327**	**0.627**	**12.70**	**3.45**	0.191	**0.301**	0.3	0.113	0.5	0.3	0.207
Lead	mg/L	<0.0005	<0.0005	0.0006	**0.0033**	0.0006	0.0007	0.01	0.0008	0.25	0.01	0.003
Manganese	mg/L	**0.095**	**0.407**	**0.402**	0.013	**0.471**	**0.373**	0.05	0.0103	0.5	0.05	0.030
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	0.0001	0.25	0.001	0.0003
Selenium	mg/L	-	-	-	-	-	-	0.01	0.0020	0.25	0.01	0.004
Zinc	mg/L	<0.005	<0.005	<0.005	0.008	0.009	0.008	5	0.0079	0.5	5	2.5

Notes:

Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.

BOLD	Exceeds RUC (Guideline B-7)
Lightly Shaded	RDL exceeds the Cm
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration
*	Non-calculable as background exceeds RU calculation, background concentration taken as Cm value.

TABLE 16
2021 Reasonable Use Criteria Assessment
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	Sample Designation						ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		Sample Collection Date (dd/mm/yyyy)										
		BH103	BH104	BH105	BH106	BH107	BH108		Cb	x	Cr	Cm
		19/10/2021	*19/10/2021*	*19/10/2021*	*19/10/2021*	*19/10/2021*	*19/10/2021*					
pH	pH Units	7.52	7.76	7.45	7.67	7.31	7.45	6.5 - 8.5	7.89	0.5	6.5 - 8.5	7.19-8.19
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	80 - 100	451.43	0.5	80 - 100	265.7-275.7
Total Dissolved Solids*	mg/L	8080	3900	22100	4180	23500	29100	500	528.61	0.5	500	514.3
Alkalinity (as CaCO3)	mg/L	**380**	325	177	336	**130**	**110**	30 - 500	235.08	0.5	30 - 500	132.5-367.5
Chloride	mg/L	**3900**	**3000**	**15000**	**2900**	**17000**	**18000**	250	38.10	0.5	250	144.0
Nitrate as N	mg/L	<0.6	<0.6	<0.6	<0.6	**8.46**	<0.6	10	0.098	0.25	10	2.6
Nitrite as N	mg/L	<0.3	<0.3	<0.75	<0.3	<0.75	<3	1	0.085	0.25	1	0.3
Sulphate	mg/L	140	96	**340**	71.0	110	43	500	117.35	0.5	500	308.7
Dissolved Organic Carbon	mg/L	2.0	**6.0**	2.0	**5.0**	3.0	2.0	5	4.10	0.5	5	4.6
Sodium	mg/L	**950**	**279**	**2910**	**431**	**2889**	**2620**	200	7.92	0.5	200	104.0
Aluminum	mg/L	-	-	-	-	-	-	0.1	0.0041	0.5	0.1	0.052
Antimony	mg/L	-		-	-	-	-	0.006	0.0015	0.25	0.006	0.003
Arsenic	mg/L	0.0026	0.0026	0.0023	0.0029	0.0005	0.0014	0.01	0.0013	0.25	0.01	0.0035
Barium	mg/L	0.040	0.011	0.139	0.04	0.252	0.21	1	0.0410	0.25	1	0.281
Boron	mg/L	**4.72**	1.20	**7.48**	**1.66**	**14.6**	**12.6**	5	0.2411	0.25	5	1.431
Cadmium	mg/L	0.000008	<0.000003	0.000005	<0.000003	<0.00003	0.00007	0.005	0.0007	0.25	0.005	0.002
Chromium	mg/L	0.00039	0.00035	0.00041	0.00	0.00013	<0.00008	0.05	0.0014	0.25	0.05	0.014
Copper	mg/L	0.0008	0.0007	0.0005	0.00	0.0035	0.0016	1	0.0015	0.5	1	0.501
Iron	mg/L	0.107	0.098	**8.34**	**3.04**	0.08	0.06	0.3	0.113	0.5	0.3	0.207
Lead	mg/L	0.00021	<0.00009	<0.00009	0.0003	<0.00009	0.00021	0.01	0.0008	0.25	0.01	0.003
Manganese	mg/L	**0.105**	**0.137**	**0.39**	0.003	**0.396**	**0.242**	0.05	0.0103	0.5	0.05	0.030
Mercury	mg/L	<0.00001	<0.00001	<0.00001	0.00001	0.00001	<0.00001	0.001	0.0001	0.25	0.001	0.0003
Selenium	mg/L	-	-	-	-	-	-	0.01	0.0020	0.25	0.01	0.004
Zinc	mg/L	0.006	0.006	0.004	0.004	0.008	0.004	5	0.0079	0.5	5	2.5

Notes:

Ontario Drinking Water Quality Standards*	Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.
BOLD	Exceeds RUC (Guideline B-7)
Lightly Shaded	RDL exceeds the Cm
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration
*	Non-calculable as background exceeds RU calculation, background concentration taken as Cm value.

TABLE 17
Duplicate Results 2019
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	PQL	Fall 2019					
				BH106	GW DUP 1	Relative Percent Difference (%)	BH3	GW DUP 2	Relative Percent Difference (%)
Conductivity	uS/cm	2	10	8070	**NO SAMPLE**		1800	1990	10.03
pH	pH Units	-	-	7.56			7.91	7.85	0.76
Total Hardness (as CaCO3	mg/L	0.5	2.5	-			-	-	NC
Total Dissolved Solids	mg/L	20	100	5820			1240	1310	5.49
Alkalinity (as CaCO3)	mg/L	5	25	219			269	267	0.75
Chloride	mg/L	0.5	2.5	3000			239	271	12.55
Nitrate as N	mg/L	0.25	1.25	<2.5			<0.25	<0.5	NC
Nitrite as N	mg/L	0.25	1.25	<2.5			<0.25	<0.5	NC
Sulphate	mg/L	0.5	2.5	54.6			341	400	15.92
Ammonia as N	mg/L	0.02	0.1	10.4			3.78	3.89	2.87
Total Phosphorus	mg/L	0.02	0.1	<0.02			0.04	0.04	NC
Total Kjeldahl Nitrogen	mg/L	0.1	0.5	10.9			5.77	5.43	6.07
Chemical Oxygen Demand	mg/L	5	25	43			10	5	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	4.1			3.2	3	6.45
Phenols	mg/L	0.001	0.005	0.005			<0.001	<0.001	NC
Calcium	mg/L	0.05	0.25	631			210	235	11.24
Magnesium	mg/L	0.05	0.25	229			47	52.6	11.24
Sodium	mg/L	0.05	0.25	552			61.5	74	18.45
Potassium	mg/L	0.05	0.25	127			30.7	35.1	13.37
Aluminum	mg/L	0.004	0.02	-			-	-	NC
Antimony	mg/L	0.003	0.015	-			-	-	NC
Arsenic	mg/L	0.003	0.015	0.03			0.006	0.006	NC
Barium	mg/L	0.002	0.01	0.044			0.015	0.016	6.45
Beryllium	mg/L	0.001	0.005	-			-	-	NC
Boron	mg/L	0.01	0.05	1.96			2.39	2.33	2.54
Cadmium	mg/L	0.002	0.01	<0.002			<0.002	<0.002	NC
Chromium	mg/L	0.003	0.015	<0.003			<0.003	<0.003	NC
Cobalt	mg/L	0.001	0.005	-			-	-	NC
Copper	mg/L	0.003	0.015	<0.003			<0.003	<0.003	NC
Iron	mg/L	0.01	0.05	1.81			0.229	0.222	3.10
Lead	mg/L	0.002	0.01	<0.001			<0.001	<0.001	NC
Manganese	mg/L	0.002	0.01	0.085			0.043	0.044	2.30
Mercury	mg/L	0.0001	0.0005	<0.0001			<0.0001	<0.0001	NC
Molybdenum	mg/L	0.002	0.01	-			-	-	NC
Nickel	mg/L	0.003	0.015	-			-	-	NC
Selenium	mg/L	0.004	0.02	-			-	-	NC
Silver	mg/L	0.002	0.01	-			-	-	NC
Strontium	mg/L	0.005	0.025	-			-	-	NC
Thallium	mg/L	0.006	0.03	-			-	-	NC
Titanium	mg/L	0.002	0.01	-			-	-	NC
Vanadium	mg/L	0.002	0.01	-			-	-	NC
Zinc	mg/L	0.005	0.025	0.006			<0.005	<0.005	NC
% Difference/ Ion Balance	-	0.1	0.5	-			-	-	NC

Notes:

BOLD	Exceeds industry standard (50%)
Units	All Units in mg/L Unless Otherwise Noted.
RDL	Reportable Detection Limit
PQL	Practical Quantification Limit
NC	Not Calculable as one or more parameter concentrations are quantified below the RDL or PQL

TABLE 18
Duplicate Results 2020
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	PQL	Fall 2020					
				BH102	**GW DUP 1**	**Relative Percent Difference (%)**	**BH3**	**GW DUP 2**	**Relative Percent Difference (%)**
Conductivity	uS/cm	2	10	534	540	1.12	2240	2220	0.90
pH	pH Units	-	-	8.19	8.19	0.00	8.1	8.1	0.00
Total Hardness (as CaCO3	mg/L	0.5	2.5	-	-	-	-	-	-
Total Dissolved Solids	mg/L	20	100	304	298	1.99	1800	1940	7.49
Alkalinity (as CaCO3)	mg/L	5	25	333	337	1.19	274	275	0.36
Chloride	mg/L	0.5	2.5	1.97	1.96	NC	407	415	1.95
Nitrate as N	mg/L	0.25	1.25	0.09	0.09	NC	<0.5	<0.5	NC
Nitrite as N	mg/L	0.25	1.25	<0.05	<0.05	NC	<0.5	<0.5	NC
Sulphate	mg/L	0.5	2.5	2.37	2.23	NC	719	726	0.97
Ammonia as N	mg/L	0.02	0.1	0.2	0.2	0.00	3.49	3.78	7.98
Total Phosphorus	mg/L	0.02	0.1	0.21	0.2	4.88	0.22	0.3	30.77
Total Kjeldahl Nitrogen	mg/L	0.1	0.5	0.61	0.57	6.78	3.95	4.14	4.70
Chemical Oxygen Demand	mg/L	5	25	25	<5	NC	29	27	7.14
Dissolved Organic Carbon	mg/L	0.5	2.5	6.3	6.6	4.65	4.8	4.5	6.45
Phenols	mg/L	0.001	0.005	0.003	0.006	NC	0.006	0.005	18.18
Calcium	mg/L	0.05	0.25	60.7	60.4	0.50	385	380	1.31
Magnesium	mg/L	0.05	0.25	34.8	34.5	0.87	69.8	68.2	2.32
Sodium	mg/L	0.05	0.25	0.4	0.42	4.88	113	111	1.79
Potassium	mg/L	0.05	0.25	0.44	0.44	0.00	48.3	47.6	1.46
Aluminum	mg/L	0.004	0.02	-	-	-	-	-	-
Antimony	mg/L	0.003	0.015	-	-	-	-	-	-
Arsenic	mg/L	0.003	0.015	<0.001	<0.001	NC	<0.001	<0.001	NC
Barium	mg/L	0.002	0.01	0.007	0.012	NC	0.021	0.02	4.88
Beryllium	mg/L	0.001	0.005	-	-	-	-	-	-
Boron	mg/L	0.01	0.05	<0.010	0.051	NC	2.34	2.29	2.16
Cadmium	mg/L	0.002	0.01	<0.0001	<0.0001	NC	<0.0001	<0.0001	NC
Chromium	mg/L	0.003	0.015	<0.002	<0.002	NC	<0.002	<0.002	NC
Cobalt	mg/L	0.001	0.005	-	-	-	-	-	-
Copper	mg/L	0.003	0.015	0.001	0.001	NC	<0.001	<0.001	NC
Iron	mg/L	0.01	0.05	0.22	0.169	26.22	0.1	0.078	24.72
Lead	mg/L	0.002	0.01	<0.0005	0.0006	NC	0.0006	0.0006	NC
Manganese	mg/L	0.002	0.01	0.026	0.026	0.00	0.04	0.033	19.18
Mercury	mg/L	0.0001	0.0005	<0.0001	<0.0001	NC	<0.0001	<0.0001	NC
Molybdenum	mg/L	0.002	0.01	-	-	-	-	-	-
Nickel	mg/L	0.003	0.015	-	-	-	-	-	-
Selenium	mg/L	0.004	0.02	-	-	-	-	-	-
Silver	mg/L	0.002	0.01	-	-	-	-	-	-
Strontium	mg/L	0.005	0.025	-	-	-	-	-	-
Thallium	mg/L	0.006	0.03	-	-	-	-	-	-
Titanium	mg/L	0.002	0.01	-	-	-	-	-	-
Vanadium	mg/L	0.002	0.01	-	-	-	-	-	-
Zinc	mg/L	0.005	0.025	<0.005	0.005	NC	<0.005	<0.005	NC
% Difference/ Ion Balance	-	0.1	0.5	-	-	-	-	-	-

Notes:

BOLD	Exceeds industry standard (50%)
Units	All Units in mg/L Unless Otherwise Noted.
RDL	Reportable Detection Limit
PQL	Practical Quantification Limit
NC	Not Calculable as one or more parameter concentrations are quantified below the RDL or PQL

TABLE 19
Duplicate Results 2021
Kagawong Landfill
Kagawong, Ontario

Parameter	Units	RDL	PQL	Fall 2021					
				BH102	GW DUP 1	Relative Percent Difference (%)	BH110	GW DUP 2	Relative Percent Difference (%)
Conductivity	uS/cm	2	10	706	531	28.29	3470	3480	0.29
pH	pH Units	-	-	7.85	7.88	0.38	7.82	7.84	0.26
Total Hardness (as CaCO3)	mg/L	0.5	2.5	-	-	-	-	-	-
Total Dissolved Solids	mg/L	20	100	369	429	15.04	2200	2170	1.37
Alkalinity (as CaCO3)	mg/L	5	25	337	325	3.63	214	213	0.47
Chloride	mg/L	0.5	2.5	5.00	4.00	22.22	920	920	0.00
Nitrate as N	mg/L	0.25	1.25	<0.06	<0.06	NC	0.25	0.24	4.08
Nitrite as N	mg/L	0.25	1.25	<0.03	<0.03	NC	<0.3	<0.3	NC
Sulphate	mg/L	0.5	2.5	<2	<2	NC	260	260	0.00
Ammonia as N	mg/L	0.02	0.1	1.16	1.07	8.07	1.95	2.02	3.53
Total Phosphorus	mg/L	0.02	0.1	0.18	0.19	5.41	0.17	0.16	6.06
Total Kjeldahl Nitrogen	mg/L	0.1	0.5	1.40	1.56	10.81	1.46	1.38	5.63
Chemical Oxygen Demand	mg/L	5	25	15	17	12.50	10	8	22.22
Dissolved Organic Carbon	mg/L	0.5	2.5	6.0	6.0	0.00	2.0	2.0	0.00
Phenols	mg/L	0.001	0.005	0.007	0.004	NC	0.006	-	NC
Calcium	mg/L	0.05	0.25	66.4	62.6	5.89	365	384	5.07
Magnesium	mg/L	0.05	0.25	39.7	37.5	5.70	110	116	5.31
Sodium	mg/L	0.05	0.25	1.12	1.66	38.85	189	204	7.63
Potassium	mg/L	0.05	0.25	0.88	0.89	1.25	37.5	39.4	4.94
Aluminum	mg/L	0.004	0.02	-	-	-	-	-	-
Antimony	mg/L	0.003	0.015	-	-	-	-	-	-
Arsenic	mg/L	0.003	0.015	0.0014	0.0009	43.48	0.002	0.002	5.13
Barium	mg/L	0.002	0.01	0.009	0.009	2.94	0.087	0.090	3.29
Beryllium	mg/L	0.001	0.005	-	-	-	-	-	-
Boron	mg/L	0.01	0.05	0.019	1.310	**194.28**	1.45	2.31	45.74
Cadmium	mg/L	0.002	0.01	<0.000003	0.000007	NC	0.000007	0.00001	35.29
Chromium	mg/L	0.003	0.015	0.00037	0.00033	11.43	<0.00008	0.00017	NC
Cobalt	mg/L	0.001	0.005	-	-	-	-	-	-
Copper	mg/L	0.003	0.015	0.001	0.0007	35.29	<0.0002	0.0006	NC
Iron	mg/L	0.01	0.05	0.283	0.270	4.70	0.154	0.115	29.00
Lead	mg/L	0.002	0.01	<0.0009	<0.00009	NC	<0.00009	<0.00009	NC
Manganese	mg/L	0.002	0.01	0.039	0.038	2.85	0.069	0.065	7.17
Mercury	mg/L	0.0001	0.0005	<0.0001	<0.00001	NC	<0.00001	<0.00001	NC
Molybdenum	mg/L	0.002	0.01	-	-	-	-	-	-
Nickel	mg/L	0.003	0.015	-	-	-	-	-	-
Selenium	mg/L	0.004	0.02	-	-	-	-	-	-
Silver	mg/L	0.002	0.01	-	-	-	-	-	-
Strontium	mg/L	0.005	0.025	-	-	-	-	-	-
Thallium	mg/L	0.006	0.03	-	-	-	-	-	-
Titanium	mg/L	0.002	0.01	-	-	-	-	-	-
Vanadium	mg/L	0.002	0.01	-	-	-	-	-	-
Zinc	mg/L	0.005	0.025	0.002	0.003	40.000	<0.002	<0.002	NC
% Difference/ Ion Balance	-	0.1	0.5	-	-	-	-	-	-

Notes:

BOLD	Exceeds industry standard (50%)
Units	All Units in mg/L Unless Otherwise Noted.
RDL	Reportable Detection Limit
PQL	Practical Quantification Limit
NC	Not Calculable as one or more parameter concentrations are quantified below the RDL or PQL

APPENDIX V

Laboratory Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
957 CAMBRIAN HEIGHTS DRIVE, UNIT 203
SUDBURY, ON P3C 5S5
(705) 521-0560

ATTENTION TO: Tim McBride

PROJECT: 229152.001

AGAT WORK ORDER: 19U517442

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Sep 23, 2019

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial excl. TDS, DOC, Nutirents, Inorganics, Phenols)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-23

			SAMPLE DESCRIPTION:		GW Dup-1
			SAMPLE TYPE:		Water
			DATE SAMPLED:		2019-09-11
Parameter	Unit	G / S: A	G / S: B	RDL	524207
Arsenic	mg/L	0.025		0.003	0.027[>A]
Barium	mg/L	1		0.002	0.039[<A]
Boron	mg/L	5		0.010	1.76[<A]
Cadmium	mg/L	0.005		0.002	<0.002
Chromium	mg/L	0.05		0.003	<0.003
Copper	mg/L		1	0.003	<0.003
Iron	mg/L		0.3	0.010	2.03[>B]
Lead	mg/L	0.01		0.001	<0.001
Manganese	mg/L		0.05	0.002	0.081[>B]
Mercury	mg/L	0.001		0.0001	<0.0001
Zinc	mg/L		5	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248, B Refers to Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-23

			SAMPLE DESCRIPTION:		BH101		BH102		BH103		BH104
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2019-09-11		2019-09-11		2019-09-11		2019-09-11
Parameter	Unit	G / S: A	G / S: B	RDL	524151	RDL	524197	RDL	524198	RDL	524199
pH	pH Units		6.5-8.5	NA	7.60	NA	7.66	NA	7.37	NA	7.48
Alkalinity (as CaCO3)	mg/L		30-500	5	228	5	246	5	220	5	198
Electrical Conductivity	uS/cm			2	654	2	562	2	15200	2	9710
Total Dissolved Solids	mg/L		500	20	400[<B]	20	314[<B]	20	9270[>B]	20	6610[>B]
Chloride	mg/L		250	0.50	27.0[<B]	0.10	9.85[<B]	20	6290[>B]	5.0	3570[>B]
Nitrate as N	mg/L	10.0		0.25	0.33[<A]	0.05	0.47[<A]	10	<10	2.5	<2.5
Nitrite as N	mg/L	1.0		0.25	<0.25	0.05	<0.05	10	<10	2.5	<2.5
Sulphate	mg/L		500	0.50	73.2[<B]	0.10	24.0[<B]	20	168[<B]	5.0	107[<B]
Ammonia as N	mg/L			0.02	0.19	0.02	4.16	0.04	7.08	0.04	8.58
Total Kjeldahl Nitrogen	mg/L			0.10	0.49	0.10	5.82	0.10	7.64	0.50	9.65
Total Phosphorus	mg/L			0.02	<0.02	0.02	0.05	0.02	<0.02	0.02	<0.02
Chemical Oxygen Demand	mg/L			5	9	5	9	5	53	5	35
Dissolved Organic Carbon	mg/L		5	0.5	3.5[<B]	0.5	3.0[<B]	0.5	2.2[<B]	0.5	2.6[<B]
Phenols	mg/L			0.001	<0.001	0.001	0.006	0.001	0.032	0.001	0.002
Calcium	mg/L			0.05	76.8	0.05	53.8	0.05	1150	1.0	700
Magnesium	mg/L			0.05	31.4	0.05	29.5	0.05	646	1.0	368
Sodium	mg/L	20	200	0.05	4.97[<A]	0.05	3.31[<A]	0.05	942[>B]	1.0	632[>B]
Potassium	mg/L			0.05	3.67	0.05	3.06	0.05	101	1.0	111
Arsenic	mg/L	0.025		0.003	<0.003	0.003	<0.003	0.003	0.079[>A]	0.003	0.044[>A]
Barium	mg/L	1		0.002	0.028[<A]	0.002	0.009[<A]	0.002	0.031[<A]	0.002	0.031[<A]
Boron	mg/L	5		0.010	0.220[<A]	0.010	0.073[<A]	0.010	4.14[<A]	0.010	2.65[<A]
Cadmium	mg/L	0.005		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	0.003[<A]
Copper	mg/L		1	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Iron	mg/L		0.3	0.010	0.061[<B]	0.010	0.343[>B]	0.010	0.527[>B]	0.010	0.830[>B]
Lead	mg/L	0.01		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.05	0.002	0.011[<B]	0.002	0.178[>B]	0.002	0.103[>B]	0.002	0.411[>B]
Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Zinc	mg/L		5	0.005	0.014[<B]	0.005	<0.005	0.005	0.007[<B]	0.005	0.009[<B]

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-23

			SAMPLE DESCRIPTION:		BH105		BH106		BH107		BH108
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2019-09-11		2019-09-11		2019-09-11		2019-09-11
Parameter	Unit	G / S: A	G / S: B	RDL	524200	RDL	524201	RDL	524202	RDL	524203
pH	pH Units		6.5-8.5	NA	7.57	NA	7.56	NA	7.22	NA	7.18
Alkalinity (as CaCO3)	mg/L		30-500	5	205	5	219	5	114	5	102
Electrical Conductivity	uS/cm			2	10100	2	8070	2	32300	2	39600
Total Dissolved Solids	mg/L		500	20	10500[>B]	20	5820[>B]	20	22700[>B]	20	23600[>B]
Chloride	mg/L		250	10	3510[>B]	5.0	3000[>B]	20	14700[>B]	100	17700[>B]
Nitrate as N	mg/L	10.0		5	<5	2.5	<2.5	10	<10	50	<50
Nitrite as N	mg/L	1.0		5	<5	2.5	<2.5	10	<10	50	<50
Sulphate	mg/L		500	10	91[<B]	5.0	54.6[<B]	20	119[<B]	100	<100
Ammonia as N	mg/L			0.04	5.00	0.04	10.4	0.2	36.2	0.2	36.0
Total Kjeldahl Nitrogen	mg/L			0.10	5.55	0.10	10.9	1.0	37.6	0.50	38.2
Total Phosphorus	mg/L			0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Chemical Oxygen Demand	mg/L			5	42	5	43	10	103	25	101
Dissolved Organic Carbon	mg/L		5	0.5	2.4[<B]	0.5	4.1[<B]	0.5	1.9[<B]	1.0	1.1[<B]
Phenols	mg/L			0.001	<0.001	0.001	0.005	0.01	0.014	0.01	0.012
Calcium	mg/L			1.0	713	1.0	631	5.0	2520	2.5	2940
Magnesium	mg/L			1.0	331	1.0	229	5.0	1370	2.5	1640
Sodium	mg/L	20	200	1.0	693[>B]	1.0	552[>B]	5.0	2710[>B]	2.5	3110[>B]
Potassium	mg/L			1.0	97.4	1.0	127	5.0	442	2.5	453
Arsenic	mg/L	0.025		0.006	0.122[>A]	0.003	0.030[>A]	0.006	0.138[>A]	0.006	0.160[>A]
Barium	mg/L	1		0.004	0.146[<A]	0.002	0.044[<A]	0.004	0.342[<A]	0.004	0.327[<A]
Boron	mg/L	5		0.020	5.26[>A]	0.010	1.96[<A]	0.020	13.7[>A]	0.020	12.5[>A]
Cadmium	mg/L	0.005		0.004	<0.004	0.002	<0.002	0.004	<0.004	0.004	<0.004
Chromium	mg/L	0.05		0.006	0.008[<A]	0.003	<0.003	0.006	0.007[<A]	0.006	0.007[<A]
Copper	mg/L		1	0.006	<0.006	0.003	<0.003	0.006	0.008[<B]	0.006	<0.006
Iron	mg/L		0.3	0.020	6.54[>B]	0.010	1.81[>B]	0.020	0.099[<B]	0.020	0.269[<B]
Lead	mg/L	0.01		0.002	<0.002	0.001	<0.001	0.002	<0.002	0.002	<0.002
Manganese	mg/L		0.05	0.004	0.263[>B]	0.002	0.085[>B]	0.004	0.384[>B]	0.004	0.357[>B]
Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Zinc	mg/L		5	0.010	0.012[<B]	0.005	0.006[<B]	0.010	0.024[<B]	0.010	0.014[<B]

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-23

			SAMPLE DESCRIPTION:		BH110		BH1		BH3		GW Dup-2
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2019-09-11		2019-09-11		2019-09-11		2019-09-11
Parameter	Unit	G / S: A	G / S: B	RDL	524204	RDL	524205	RDL	524206	RDL	524208
pH	pH Units		6.5-8.5	NA	7.92	NA	7.82	NA	7.91	NA	7.85
Alkalinity (as CaCO3)	mg/L		30-500	5	221	5	211	5	269	5	267
Electrical Conductivity	uS/cm			2	3240	2	2710	2	1800	2	1990
Total Dissolved Solids	mg/L		500	20	2160[>B]	20	3340[>B]	20	1240[>B]	20	1310[>B]
Chloride	mg/L		250	2.0	941[>B]	2.0	673[>B]	0.50	239[<B]	1.0	271[>B]
Nitrate as N	mg/L	10.0		1.0	<1.0	1.0	3.2[<A]	0.25	<0.25	0.5	<0.5
Nitrite as N	mg/L	1.0		1.0	<1.0	1.0	<1.0	0.25	<0.25	0.5	<0.5
Sulphate	mg/L		500	2.0	195[<B]	2.0	297[<B]	0.50	341[<B]	1.0	400[<B]
Ammonia as N	mg/L			0.02	2.14	0.04	7.42	0.04	3.78	0.02	3.89
Total Kjeldahl Nitrogen	mg/L			0.10	2.39	0.10	7.80	0.10	5.77	0.10	5.43
Total Phosphorus	mg/L			0.02	<0.02	0.02	<0.02	0.02	0.04	0.02	0.04
Chemical Oxygen Demand	mg/L			5	10	5	12	5	10	5	5
Dissolved Organic Carbon	mg/L		5	0.5	1.4[<B]	0.5	3.4[<B]	0.5	3.2[<B]	0.5	3.0[<B]
Phenols	mg/L			0.001	0.002	0.001	0.003	0.001	<0.001	0.001	<0.001
Calcium	mg/L			0.25	255	0.25	270	0.25	210	0.25	235
Magnesium	mg/L			0.25	105	0.25	60.9	0.25	47.0	0.25	52.6
Sodium	mg/L	20	200	0.25	174[A-B]	0.25	138[A-B]	0.25	61.5[A-B]	0.25	74.0[A-B]
Potassium	mg/L			0.25	31.1	0.25	48.4	0.25	30.7	0.25	35.1
Arsenic	mg/L	0.025		0.003	0.013[<A]	0.003	0.010[<A]	0.003	0.006[<A]	0.003	0.006[<A]
Barium	mg/L	1		0.002	0.109[<A]	0.002	0.009[<A]	0.002	0.015[<A]	0.002	0.016[<A]
Boron	mg/L	5		0.010	2.03[<A]	0.010	2.79[<A]	0.010	2.39[<A]	0.010	2.33[<A]
Cadmium	mg/L	0.005		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Copper	mg/L		1	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Iron	mg/L		0.3	0.010	0.145[<B]	0.010	0.083[<B]	0.010	0.229[<B]	0.010	0.222[<B]
Lead	mg/L	0.01		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.05	0.002	0.140[>B]	0.002	0.020[<B]	0.002	0.043[<B]	0.002	0.044[<B]
Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Zinc	mg/L		5	0.005	0.005[<B]	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By: Iris Verástegui

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TEL (905)712-5100
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-23

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248, B Refers to Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

524151-524208 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
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Guideline Violation

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
524197	BH102	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Iron	mg/L	0.3	0.343
524197	BH102	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.178
524198	BH103	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	6290
524198	BH103	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Iron	mg/L	0.3	0.527
524198	BH103	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.103
524198	BH103	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	942
524198	BH103	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	9270
524198	BH103	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.079
524198	BH103	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	942
524199	BH104	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	3570
524199	BH104	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Iron	mg/L	0.3	0.830
524199	BH104	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.411
524199	BH104	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	632
524199	BH104	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	6610
524199	BH104	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.044
524199	BH104	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	632
524200	BH105	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	3510
524200	BH105	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Iron	mg/L	0.3	6.54
524200	BH105	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.263
524200	BH105	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	693
524200	BH105	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	10500
524200	BH105	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.122
524200	BH105	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Boron	mg/L	5	5.26
524200	BH105	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	693

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MISSISSAUGA, ONTARIO
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Guideline Violation

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
524201	BH106	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	3000
524201	BH106	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Iron	mg/L	0.3	1.81
524201	BH106	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.085
524201	BH106	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	552
524201	BH106	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	5820
524201	BH106	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.030
524201	BH106	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	552
524202	BH107	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	14700
524202	BH107	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.384
524202	BH107	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	2710
524202	BH107	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	22700
524202	BH107	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.138
524202	BH107	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Boron	mg/L	5	13.7
524202	BH107	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	2710
524203	BH108	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	17700
524203	BH108	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.357
524203	BH108	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	200	3110
524203	BH108	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	23600
524203	BH108	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Arsenic	mg/L	0.025	0.160
524203	BH108	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Boron	mg/L	5	12.5
524203	BH108	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	3110
524204	BH110	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	941
524204	BH110	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Manganese	mg/L	0.05	0.140
524204	BH110	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	2160

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

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TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
524204	BH110	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	174
524205	BH1	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	673
524205	BH1	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	3340
524205	BH1	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	138
524206	BH3	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	1240
524206	BH3	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	61.5
524207	GW Dup-1	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial excl. TDS, DOC, Nutirents, Inorganics, Phenols)	Iron	mg/L	0.3	2.03
524207	GW Dup-1	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial excl. TDS, DOC, Nutirents, Inorganics, Phenols)	Manganese	mg/L	0.05	0.081
524207	GW Dup-1	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial excl. TDS, DOC, Nutirents, Inorganics, Phenols)	Arsenic	mg/L	0.025	0.027
524208	GW Dup-2	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	271
524208	GW Dup-2	O.Reg. 169(mg/L)AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	1310
524208	GW Dup-2	O.Reg.169/03(mg/L)	Comprehensive List for GW Parameters - Column 1 (Partial)	Sodium	mg/L	20	74.0

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MISSISSAUGA, ONTARIO
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Sep 23, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Comprehensive List for GW Parameters - Column 1 (Partial)															
pH	524152		6.81	7.01	2.9%	NA	100%	90%	110%	NA			NA		
Alkalinity (as CaCO3)	524152		18	19	NA	< 5	95%	80%	120%	NA			NA		
Electrical Conductivity	524152		50	48	4.1%	< 2	99%	80%	120%	NA			NA		
Total Dissolved Solids	524151	524151	290	304	4.7%	< 20	90%	80%	120%	NA			NA		
Chloride	524151	524151	27.0	27.3	1.1%	< 0.10	103%	90%	110%	100%	90%	110%	99%	85%	115%
Nitrate as N	524151	524151	0.33	0.32	3.1%	< 0.05	96%	90%	110%	101%	90%	110%	103%	85%	115%
Nitrite as N	524151	524151	<0.25	<0.25	NA	< 0.05	NA	90%	110%	103%	90%	110%	111%	85%	115%
Sulphate	524151	524151	73.2	73.9	1.0%	< 0.10	94%	90%	110%	100%	90%	110%	103%	85%	115%
Ammonia as N	524400		0.10	0.10	0.0%	< 0.02	96%	90%	110%	102%	90%	110%	101%	70%	130%
Total Kjeldahl Nitrogen	520906		134	132	1.5%	< 0.10	100%	80%	120%	98%	80%	120%	97%	70%	130%
Total Phosphorus	533168	524151	0.02	<0.02	NA	< 0.02	101%	80%	120%	105%	90%	110%	111%	70%	130%
Chemical Oxygen Demand	533170	524151	380	428	11.9%	< 5	98%	90%	110%	107%	90%	110%	91%	70%	130%
Dissolved Organic Carbon	487533		6.3	6.3	0.0%	< 0.5	97%	90%	110%	104%	90%	110%	87%	80%	120%
Phenols	524151	524151	<0.001	<0.001	NA	< 0.001	100%	90%	110%	103%	90%	110%	107%	80%	120%
Calcium	520452		91.6	92.7	1.2%	< 0.05	104%	90%	110%	101%	90%	110%	98%	70%	130%
Magnesium	520452		11.8	11.6	1.7%	< 0.05	102%	90%	110%	98%	90%	110%	95%	70%	130%
Sodium	520452		16.8	16.4	2.4%	< 0.05	105%	90%	110%	101%	90%	110%	97%	70%	130%
Potassium	520452		2.03	2.01	1.0%	< 0.05	102%	90%	110%	100%	90%	110%	97%	70%	130%
Arsenic	531183		0.006	0.005	NA	< 0.003	100%	90%	110%	99%	90%	110%	100%	70%	130%
Barium	531183		0.716	0.713	0.4%	< 0.002	96%	90%	110%	92%	90%	110%	98%	70%	130%
Boron	531183		0.505	0.528	4.5%	< 0.010	99%	90%	110%	102%	90%	110%	92%	70%	130%
Cadmium	531183		<0.002	<0.002	NA	< 0.002	100%	90%	110%	101%	90%	110%	96%	70%	130%
Chromium	531183		0.003	0.003	NA	< 0.003	100%	90%	110%	100%	90%	110%	91%	70%	130%
Copper	531183		<0.003	<0.003	NA	< 0.003	101%	90%	110%	103%	90%	110%	92%	70%	130%
Iron	531183		3.02	3.13	3.6%	< 0.010	104%	90%	110%	100%	90%	110%	91%	70%	130%
Lead	531183		<0.001	<0.001	NA	< 0.001	103%	90%	110%	101%	90%	110%	90%	70%	130%
Manganese	531183		0.454	0.468	3.0%	< 0.002	104%	90%	110%	105%	90%	110%	98%	70%	130%
Mercury	524151	524151	<0.0001	<0.0001	NA	< 0.0001	103%	90%	110%	98%	80%	120%	98%	80%	120%
Zinc	531183		<0.005	<0.005	NA	< 0.005	99%	90%	110%	100%	90%	110%	87%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 19U517442

PROJECT: 229152.001

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

3Lg

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY

Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: 6.7 / 7.4 / 8.1 / 6.9 / 6.6
AGAT Job Number: 19051744 2
Notes: ice

Client Information

Company: Pinchin
Contact: Tim McBride
Address: 957 Cambrian Heights Drive
Sudbury, ON, P3C 5S5
Phone: 705.521.0560 Fax:
PO#:
Client Project #: 229152.001
AGAT Quotation #: 281199

Report Information

1. Name: Tim McBride
Email: tmcbride@pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format

(Please "x" those that apply)

[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)*

(Please "x" the applicable box below)

Regular TAT:
[x] 5 to 7 working days

Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours

Date Required (Rush surcharges may apply)

Regulatory Guideline Required:

(Please "x" those that apply)

[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [X] Other (indicate) ODWQS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions -Cl, NO3, NO2, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	Conductivity, pH	TKN, COD, DOC	Total Phosphorous	TDS	Mercury	Phenols						
BH101	09/10/19	10am-6pm	water	7		x	x	x	x	x	x	x	x	x	x						
BH102	"	"	water	7		x	x	x	x	x	x	x	x	x	x						
BH103			water	7	Partial Sample	x	x	x	x	x	x	x	x	x	x						
BH104			water	7	Partial sample	x	x	x	x	x	x	x	x	x	x						
BH105			water	7		x	x	x	x	x	x	x	x	x	x						
BH106			water	7	Partial Sample	x	x	x	x	x	x	x	x	x	x						
BH107			water	7	Partial Sample	x	x	x	x	x	x	x	x	x	x						
BH108	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
~~BH109~~			water	7		x	x	x	x	x	x	x	x	x	x						
BH110	09/10/19	10am-6pm	water	7		x	x	x	x	x	x	x	x	x	x						
BH1	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
			TOTAL # OF CONTAINERS	77																	

* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Vaile	Sept. 12/19	Dima Z	19/9/13 9:30
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Vaile	9:30am		

Special Instructions
DOC - Lab to filter

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature:
AGAT Job Number:
Notes:

CHAIN OF CUSTODY RECORD

Client Information

Company: Pinchin
Contact: Tim McBride
Address: 957 Cambrian Heights Drive
Sudbury, ON, P3C 5S5
Phone: 705.521.0560 Fax:
PO#:
Client Project #: 229152.001
AGAT Quotation #: 281199

Report Information

1. Name: Tim McBride
Email: tmcbride@pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
(Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)*
(Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required:
(Please "x" those that apply)

[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [X] Other (indicate) ODWQS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions -Cl, NO3, NO2, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	Conductivity, pH	TKN, COD, DOC	Total Phosphorous	TDS	Mercury	Phenols						
✓ BH3	09/10/19	10am-6pm	water	7		x	x	x	x	x	x	x	x	x	x						
✓ GW Dup-1	↓	↓	water	7	Partial sample	x	x	x	x	x	x	x	x	x	x						
✓ GW Dup-2	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
TOTAL # OF CONTAINERS				21	* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays																

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle	Sept. 12/19	Sunia Z	19/9/13 956
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle	9:30am		

Special Instructions
DOC - Lab to filter

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
957 CAMBRIAN HEIGHTS DRIVE, UNIT 203
SUDBURY, ON P3C 5S5
(705) 521-0560
ATTENTION TO: Tim McBride
PROJECT: 229152.002 Kagawong Landfill
AGAT WORK ORDER: 20U661878
WATER ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician
DATE REPORTED: Oct 21, 2020
PAGES (INCLUDING COVER): 16
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

			SAMPLE DESCRIPTION:		BH107
			SAMPLE TYPE:		Water
			DATE SAMPLED:		2020-10-08
Parameter	Unit	G / S: A	G / S: B	RDL	1553211
pH	pH Units		6.5-8.5	NA	7.41
Alkalinity (as CaCO3)	mg/L		30-500	5	118
Electrical Conductivity	µS/cm			2	35400
Total Dissolved Solids	mg/L		500	20	27000[>B]
Chloride	mg/L		250	50	16800[>B]
Nitrate as N	mg/L	10.0		25	<25
Nitrite as N	mg/L	1.0		25	<25
Sulphate	mg/L		500	50	130[<B]
Ammonia as N	mg/L			0.2	38.9
Total Kjeldahl Nitrogen	mg/L			0.13	41.0
Total Phosphorus	mg/L			0.02	2.84
Chemical Oxygen Demand	mg/L			100	714
Dissolved Organic Carbon	mg/L		5	0.5	2.1[<B]
Dissolved Calcium	mg/L			5	2860
Dissolved Magnesium	mg/L			5	1500
Dissolved Potassium	mg/L			5	473
Dissolved Sodium	mg/L	20		5	3100[>A]
Dissolved Arsenic	mg/L	0.01		0.001	0.051[>A]
Dissolved Barium	mg/L	1.0		0.002	0.494[<A]
Dissolved Boron	mg/L	5.0		1.00	19.50[>A]
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002
Dissolved Copper	mg/L			0.001	0.003
Dissolved Iron	mg/L			0.010	0.191
Dissolved Lead	mg/L	0.010		0.0005	0.0006[<A]
Dissolved Manganese	mg/L			0.002	0.471
Dissolved Mercury	mg/L	0.001		0.0001	<0.0001
Dissolved Zinc	mg/L			0.005	0.009

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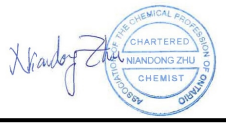

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Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards. Na value derived from O. Reg 248, B Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1553211 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

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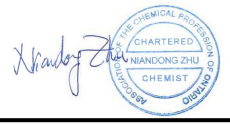

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AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

			SAMPLE DESCRIPTION:		BH101		BH102		BH103		BH104
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2020-10-08		2020-10-08		2020-10-08		2020-10-08
Parameter	Unit	G / S: A	G / S: B	RDL	1553108	RDL	1553206	RDL	1553207	RDL	1553208
pH	pH Units		6.5-8.5	NA	8.14	NA	8.19	NA	7.74	NA	7.79
Alkalinity (as CaCO3)	mg/L		30-500	5	292	5	333	5	297	5	258
Electrical Conductivity	µS/cm			2	618	2	534	2	12000	2	8790
Total Dissolved Solids	mg/L		500	20	358[<B]	20	304[<B]	20	8320[>B]	20	5280[>B]
Chloride	mg/L		250	0.20	40.7[<B]	0.10	1.97[<B]	10	4760[>B]	10	3380[>B]
Nitrate as N	mg/L	10.0		0.10	0.16[<A]	0.05	0.09[<A]	5	<5	5	<5
Nitrite as N	mg/L	1.0		0.10	<0.10	0.05	<0.05	5	<5	5	<5
Sulphate	mg/L		500	0.20	92.3[<B]	0.10	2.37[<B]	10	143[<B]	10	119[<B]
Ammonia as N	mg/L			0.02	0.16	0.02	0.20	0.03	5.28	0.04	7.81
Total Kjeldahl Nitrogen	mg/L			0.10	0.47	0.10	0.61	0.10	5.43	0.10	8.29
Total Phosphorus	mg/L			0.02	0.04	0.02	0.21	0.02	<0.02	0.02	0.02
Chemical Oxygen Demand	mg/L			5	27	5	25	10	89	10	74
Dissolved Organic Carbon	mg/L		5	0.5	4.8[<B]	0.5	6.3[>B]	0.5	3.7[<B]	0.5	3.9[<B]
Phenols	mg/L			0.001	0.002	0.001	0.003	0.001	0.003	0.001	0.004
Dissolved Calcium	mg/L			0.05	96.3	0.05	60.7	1.0	970	0.5	752
Dissolved Magnesium	mg/L			0.05	34.6	0.05	34.8	1.0	496	0.5	394
Dissolved Potassium	mg/L			0.05	4.86	0.05	0.44	1.0	66.6	0.5	106
Dissolved Sodium	mg/L	20		0.05	10.2[<A]	0.05	0.40[<A]	1.0	694[>A]	0.5	682[>A]
Dissolved Arsenic	mg/L	0.01		0.001	<0.001	0.001	<0.001	0.001	0.004[<A]	0.001	<0.001
Dissolved Barium	mg/L	1.0		0.002	0.036[<A]	0.002	0.007[<A]	0.002	0.033[<A]	0.002	0.037[<A]
Dissolved Boron	mg/L	5.0		0.010	0.277[<A]	0.010	<0.010	0.10	4.00[<A]	0.10	3.68[<A]
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Copper	mg/L			0.001	0.002	0.001	0.001	0.001	0.004	0.001	0.002
Dissolved Iron	mg/L			0.010	0.217	0.010	0.220	0.010	0.327	0.010	0.627
Dissolved Lead	mg/L	0.010		0.0005	0.0009[<A]	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L			0.002	0.010	0.002	0.026	0.002	0.095	0.002	0.407
Dissolved Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Zinc	mg/L			0.005	0.009	0.005	<0.005	0.005	<0.005	0.005	<0.005

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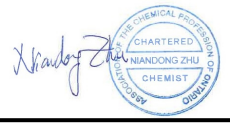

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

			SAMPLE DESCRIPTION:		BH105		BH106		BH108		BH109
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2020-10-08		2020-10-08		2020-10-08		2020-10-08
Parameter	Unit	G / S: A	G / S: B	RDL	1553209	RDL	1553210	RDL	1553223	RDL	1553224
pH	pH Units		6.5-8.5	NA	7.89	NA	8.13	NA	7.45	NA	7.23
Alkalinity (as CaCO3)	mg/L		30-500	5	240	5	395	5	106	5	94
Electrical Conductivity	µS/cm			2	6490	2	1170	2	33400	2	66000
Total Dissolved Solids	mg/L		500	20	2640[>B]	20	2220[>B]	20	27000[>B]	20	66300[>B]
Chloride	mg/L		250	5.0	2370[>B]	1.0	459[>B]	50	15500[>B]	100	34100[>B]
Nitrate as N	mg/L	10.0		2.5	<2.5	0.25	<0.25	25	<25	50	<50
Nitrite as N	mg/L	1.0		2.5	<2.5	0.25	<0.25	25	<25	50	<50
Sulphate	mg/L		500	5.0	72.4[<B]	0.50	30.6[<B]	50	<50	100	1230[>B]
Ammonia as N	mg/L			0.08	13.0	0.02	0.62	0.2	36.6	0.4	51.7
Total Kjeldahl Nitrogen	mg/L			0.10	13.3	0.10	1.09	0.13	37.5	0.14	55.0
Total Phosphorus	mg/L			0.02	<0.02	0.02	0.08	0.02	0.36	0.02	1.00
Chemical Oxygen Demand	mg/L			10	122	5	34	250	1400	500	2430
Dissolved Organic Carbon	mg/L		5	0.5	3.2[<B]	0.5	7.6[>B]	0.5	1.8[<B]	0.5	2.8[<B]
Phenols	mg/L			0.001	0.003	0.001	0.003	0.001	0.002	0.001	0.007
Dissolved Calcium	mg/L			0.5	2560	0.10	696	5	2610	5	7780
Dissolved Magnesium	mg/L			0.5	1170	0.10	248	5	1450	5	2780
Dissolved Potassium	mg/L			0.5	330	0.10	116	5	401	5	580
Dissolved Sodium	mg/L	20		0.5	2710[>A]	0.10	606[>A]	5	2800[>A]	5	5700[>A]
Dissolved Arsenic	mg/L	0.01		0.001	0.039[>A]	0.001	0.013[>A]	0.001	0.062[>A]	0.001	0.078[>A]
Dissolved Barium	mg/L	1.0		0.002	0.174[<A]	0.002	0.069[<A]	0.002	0.313[<A]	0.002	0.391[<A]
Dissolved Boron	mg/L	5.0		0.10	6.51[>A]	0.10	2.18[<A]	1.00	15.20[>A]	1.00	31.00[>A]
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	0.002[<A]
Dissolved Copper	mg/L			0.001	<0.001	0.001	0.002	0.001	0.001	0.001	0.009
Dissolved Iron	mg/L			0.010	12.7	0.010	3.45	0.010	0.301	0.010	2.45
Dissolved Lead	mg/L	0.010		0.0005	0.0006[<A]	0.0005	0.0033[<A]	0.0005	0.0007[<A]	0.0005	0.0020[<A]
Dissolved Manganese	mg/L			0.002	0.402	0.002	0.186	0.002	0.373	0.02	2.13
Dissolved Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Zinc	mg/L			0.005	<0.005	0.005	0.008	0.005	0.008	0.005	0.016

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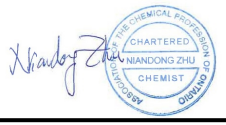

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Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

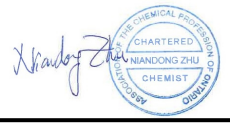
Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

			SAMPLE DESCRIPTION:		BH110		BH1		BH3-11		GW Dup-1
			SAMPLE TYPE:		Water		Water		Water		Water
			DATE SAMPLED:		2020-10-08		2020-10-08		2020-10-08		2020-10-08
Parameter	Unit	G / S: A	G / S: B	RDL	1553225	RDL	1553226	RDL	1553227	RDL	1553228
pH	pH Units		6.5-8.5	NA	8.03	NA	8.00	NA	8.10	NA	8.19
Alkalinity (as CaCO3)	mg/L		30-500	5	227	5	234	5	274	5	337
Electrical Conductivity	µS/cm			2	3170	2	3260	2	2240	2	540
Total Dissolved Solids	mg/L		500	20	2250[>B]	20	5620[>B]	20	1800[>B]	20	298[<B]
Chloride	mg/L		250	2.0	935[>B]	4.0	2260[>B]	1.0	407[>B]	0.10	1.96[<B]
Nitrate as N	mg/L	10.0		1.0	<1.0	1.0	<1.0	0.5	<0.5	0.05	0.09[<A]
Nitrite as N	mg/L	1.0		1.0	<1.0	1.0	<1.0	0.5	<0.5	0.05	<0.05
Sulphate	mg/L		500	2.0	186[<B]	2.0	1320[>B]	1.0	719[>B]	0.10	2.23[<B]
Ammonia as N	mg/L			0.02	1.81	0.08	13.8	0.02	3.49	0.02	0.20
Total Kjeldahl Nitrogen	mg/L			0.10	2.30	0.10	14.1	0.10	3.95	0.10	0.57
Total Phosphorus	mg/L			0.02	0.05	0.02	0.06	0.02	0.22	0.02	0.20
Chemical Oxygen Demand	mg/L			5	27	50	676	5	29	5	<5
Dissolved Organic Carbon	mg/L		5	0.5	1.9[<B]	0.5	6.9[>B]	0.5	4.8[<B]	0.5	6.6[>B]
Phenols	mg/L			0.001	0.003	0.001	0.045	0.001	0.006	0.001	0.006
Dissolved Calcium	mg/L			0.25	251	0.25	589	0.25	385	0.05	60.4
Dissolved Magnesium	mg/L			0.25	102	0.25	117	0.25	69.8	0.05	34.5
Dissolved Potassium	mg/L			0.25	29.7	0.25	87.2	0.25	48.3	0.05	0.44
Dissolved Sodium	mg/L	20		0.25	178[>A]	0.25	316[>A]	0.25	113[>A]	0.05	0.42[<A]
Dissolved Arsenic	mg/L	0.01		0.001	0.007[<A]	0.001	0.005[<A]	0.001	<0.001	0.001	<0.001
Dissolved Barium	mg/L	1.0		0.002	0.099[<A]	0.002	0.011[<A]	0.002	0.021[<A]	0.002	0.012[<A]
Dissolved Boron	mg/L	5.0		0.10	1.88[<A]	0.10	3.82[<A]	0.10	2.34[<A]	0.010	0.051[<A]
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Copper	mg/L			0.001	0.001	0.001	<0.001	0.001	<0.001	0.001	0.001
Dissolved Iron	mg/L			0.010	0.151	0.010	0.241	0.010	0.100	0.010	0.169
Dissolved Lead	mg/L	0.010		0.0005	0.0007[<A]	0.0005	0.0006[<A]	0.0005	0.0006[<A]	0.0005	0.0006[<A]
Dissolved Manganese	mg/L			0.002	0.063	0.002	0.055	0.002	0.040	0.002	0.026
Dissolved Mercury	mg/L	0.001		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Zinc	mg/L			0.005	0.012	0.005	<0.005	0.005	<0.005	0.005	0.005

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

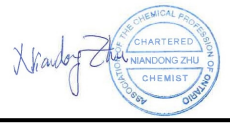
Comprehensive List for GW Parameters - Column 1 (Partial)

DATE RECEIVED: 2020-10-09

DATE REPORTED: 2020-10-21

			SAMPLE DESCRIPTION:		GW Dup-2
			SAMPLE TYPE:		Water
			DATE SAMPLED:		2020-10-08
Parameter	Unit	G / S: A	G / S: B	RDL	1553229
pH	pH Units		6.5-8.5	NA	8.10
Alkalinity (as CaCO3)	mg/L		30-500	5	275
Electrical Conductivity	µS/cm			2	2220
Total Dissolved Solids	mg/L		500	20	1940[>B]
Chloride	mg/L		250	1.0	415[>B]
Nitrate as N	mg/L	10.0		0.5	<0.5
Nitrite as N	mg/L	1.0		0.5	<0.5
Sulphate	mg/L		500	1.0	726[>B]
Ammonia as N	mg/L			0.02	3.78
Total Kjeldahl Nitrogen	mg/L			0.10	4.14
Total Phosphorus	mg/L			0.02	0.30
Chemical Oxygen Demand	mg/L			5	27
Dissolved Organic Carbon	mg/L		5	0.5	4.5[<B]
Phenols	mg/L			0.001	0.005
Dissolved Calcium	mg/L			0.25	380
Dissolved Magnesium	mg/L			0.25	68.2
Dissolved Potassium	mg/L			0.25	47.6
Dissolved Sodium	mg/L	20		0.25	111[>A]
Dissolved Arsenic	mg/L	0.01		0.001	<0.001
Dissolved Barium	mg/L	1.0		0.002	0.020[<A]
Dissolved Boron	mg/L	5.0		0.10	2.29[<A]
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002
Dissolved Copper	mg/L			0.001	<0.001
Dissolved Iron	mg/L			0.010	0.078
Dissolved Lead	mg/L	0.010		0.0005	0.0006[<A]
Dissolved Manganese	mg/L			0.002	0.033
Dissolved Mercury	mg/L	0.001		0.0001	<0.0001
Dissolved Zinc	mg/L			0.005	<0.005

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Comprehensive List for GW Parameters - Column 1 (Partial)

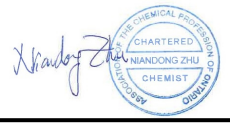
DATE RECEIVED: 2020-10-09 **DATE REPORTED: 2020-10-21**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards. Na value derived from O. Reg 248, B Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1553108-1553229 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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Exceedance Summary

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1553206	BH102	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Organic Carbon	mg/L	5	6.3
1553207	BH103	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	4760
1553207	BH103	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	8320
1553207	BH103	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	694
1553208	BH104	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	3380
1553208	BH104	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	5280
1553208	BH104	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	682
1553209	BH105	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	2370
1553209	BH105	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	2640
1553209	BH105	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Arsenic	mg/L	0.01	0.039
1553209	BH105	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Boron	mg/L	5.0	6.51
1553209	BH105	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	2710
1553210	BH106	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	459
1553210	BH106	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Organic Carbon	mg/L	5	7.6
1553210	BH106	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	2220
1553210	BH106	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Arsenic	mg/L	0.01	0.013
1553210	BH106	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	606
1553211	BH107	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)	Chloride	mg/L	250	16800
1553211	BH107	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)	Total Dissolved Solids	mg/L	500	27000
1553211	BH107	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)	Dissolved Arsenic	mg/L	0.01	0.051
1553211	BH107	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)	Dissolved Boron	mg/L	5.0	19.50
1553211	BH107	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial excl. Phenols)	Dissolved Sodium	mg/L	20	3100
1553223	BH108	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	15500
1553223	BH108	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	27000

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Exceedance Summary

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1553223	BH108	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Arsenic	mg/L	0.01	0.062
1553223	BH108	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Boron	mg/L	5.0	15.20
1553223	BH108	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	2800
1553224	BH109	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	34100
1553224	BH109	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sulphate	mg/L	500	1230
1553224	BH109	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	66300
1553224	BH109	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Arsenic	mg/L	0.01	0.078
1553224	BH109	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Boron	mg/L	5.0	31.00
1553224	BH109	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	5700
1553225	BH110	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	935
1553225	BH110	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	2250
1553225	BH110	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	178
1553226	BH1	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	2260
1553226	BH1	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Organic Carbon	mg/L	5	6.9
1553226	BH1	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sulphate	mg/L	500	1320
1553226	BH1	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	5620
1553226	BH1	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	316
1553227	BH3-11	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	407
1553227	BH3-11	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sulphate	mg/L	500	719
1553227	BH3-11	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	1800
1553227	BH3-11	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	113
1553228	GW Dup-1	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Organic Carbon	mg/L	5	6.6
1553229	GW Dup-2	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Chloride	mg/L	250	415
1553229	GW Dup-2	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Sulphate	mg/L	500	726

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Exceedance Summary

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1553229	GW Dup-2	ON 169/03 AO&OG	Comprehensive List for GW Parameters - Column 1 (Partial)	Total Dissolved Solids	mg/L	500	1940
1553229	GW Dup-2	ON 169/03 MAC/IMAC	Comprehensive List for GW Parameters - Column 1 (Partial)	Dissolved Sodium	mg/L	20	111

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Oct 21, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Comprehensive List for GW Parameters - Column 1 (Partial)															
pH	1554608		8.14	8.26	1.5%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	1554608		265	270	1.9%	< 5	100%	80%	120%						
Electrical Conductivity	1554608		1620	1620	0.0%	< 2	100%	90%	110%						
Total Dissolved Solids	1545000		304	302	0.7%	< 20	98%	80%	120%						
Chloride	1543680		120	120	0.0%	< 0.10	96%	70%	130%	98%	80%	120%	107%	70%	130%
Nitrate as N	1543680		44.5	44.4	0.2%	< 0.05	97%	70%	130%	105%	80%	120%	NA	70%	130%
Nitrite as N	1543680		<0.25	<0.25	NA	< 0.05	102%	70%	130%	91%	80%	120%	107%	70%	130%
Sulphate	1543680		40.6	41.3	1.7%	< 0.10	99%	70%	130%	102%	80%	120%	104%	70%	130%
Ammonia as N	1544637		<0.02	0.03	NA	< 0.02	108%	70%	130%	100%	80%	120%	100%	70%	130%
Total Kjeldahl Nitrogen	1547365		0.79	0.83	4.9%	< 0.10	104%	70%	130%	104%	80%	120%	100%	70%	130%
Total Phosphorus	1553108	1553108	0.04	0.03	NA	< 0.02	101%	70%	130%	97%	80%	120%	100%	70%	130%
Chemical Oxygen Demand	1543708		32	34	6.1%	< 5	101%	80%	120%	97%	90%	110%	93%	70%	130%
Dissolved Organic Carbon	1547125		25	25	0.0%	< 0.5	98%	90%	110%	106%	90%	110%	101%	80%	120%
Phenols	1544848		<0.001	<0.001	NA	< 0.001	96%	90%	110%	99%	90%	110%	103%	80%	120%
Dissolved Calcium	1553108	1553108	96.3	96.1	0.2%	< 0.05	97%	70%	130%	97%	80%	120%	96%	70%	130%
Dissolved Magnesium	1553108	1553108	34.6	34.3	0.9%	< 0.05	95%	70%	130%	94%	80%	120%	93%	70%	130%
Dissolved Potassium	1553108	1553108	4.86	4.80	1.2%	< 0.05	95%	70%	130%	94%	80%	120%	92%	70%	130%
Dissolved Sodium	1553108	1553108	10.2	10.0	2.0%	< 0.05	100%	70%	130%	100%	80%	120%	96%	70%	130%
Dissolved Arsenic	1553108	1553108	<0.001	<0.001	NA	< 0.001	97%	70%	130%	92%	80%	120%	99%	70%	130%
Dissolved Barium	1553108	1553108	0.036	0.034	5.7%	< 0.002	98%	70%	130%	95%	80%	120%	98%	70%	130%
Dissolved Boron	1553108	1553108	0.277	0.297	7.0%	< 0.010	100%	70%	130%	94%	80%	120%	97%	70%	130%
Dissolved Cadmium	1553108	1553108	<0.0001	<0.0001	NA	< 0.0001	100%	70%	130%	100%	80%	120%	101%	70%	130%
Dissolved Chromium	1553108	1553108	<0.002	<0.002	NA	< 0.002	93%	70%	130%	96%	80%	120%	91%	70%	130%
Dissolved Copper	1553108	1553108	0.002	0.002	NA	< 0.001	97%	70%	130%	100%	80%	120%	92%	70%	130%
Dissolved Iron	1553108	1553108	0.217	0.209	3.8%	< 0.010	101%	70%	130%	96%	80%	120%	96%	70%	130%
Dissolved Lead	1553108	1553108	0.0009	0.0008	NA	< 0.0005	93%	70%	130%	94%	80%	120%	97%	70%	130%
Dissolved Manganese	1553108	1553108	0.010	0.014	33.3%	< 0.002	105%	70%	130%	101%	80%	120%	98%	70%	130%
Dissolved Mercury	1553108	1553108	<0.0001	<0.0001	NA	< 0.0001	104%	70%	130%	95%	80%	120%	103%	70%	130%
Dissolved Zinc	1553108	1553108	0.009	0.007	NA	< 0.005	99%	70%	130%	101%	80%	120%	97%	70%	130%

Comments: NA Signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U661878

PROJECT: 229152.002 Kagawong Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Dissolved Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA

3 4 9 BIK

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: See Attached
AGAT Job Number: 20U661878
Notes:

Client Information

Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 229152.002 Kagawong Landfill
AGAT Quotation #: 281199

Report Information

1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
(Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)*
(Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required:
(Please "x" those that apply)
[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [x] Other (indicate) GW - ODWS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	Conductivity, pH, hardness	TKN, COD, DOC	Total Phosphorous	TDS	Mercury	Phenols						
✓ BH101	8/10/20	8am - 4pm	water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH102			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH103			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH104			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH105			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH106			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH107			water	5	Partial Sample	x	x	x	x	x	x	x	x	x	x						
✓ BH108			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH109			water	5	Partial Sample	x	x	x	x	x	x	x	x	x	x						
✓ BH110			water	8		x	x	x	x	x	x	x	x	x	x						
✓ BH1	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x						
			TOTAL # OF CONTAINERS	88																	

* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle AV.	Oct 9, 2020	Katie Bowers	20/10/09
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
To Purolator KB. 20/10/09 3:00pm	10 am		

Special Instructions
PLEASE FILTER DOC AT SAMPLE RECEPTION
9:30am

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: See Attached
AGAT Job Number: 20U661878
Notes:

Client Information
Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 229152.002 Kagawong Landfill
AGAT Quotation #: 281199

Report Information
1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format (Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)* (Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required: (Please "x" those that apply)
[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [x] Other (indicate) GW - ODWS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	Conductivity, pH, hardness	TKN, COD, DOC	Total Phosphorous	TDS	Mercury	Phenols						
~~BH101~~ BH13-11	8/10/20	8am-4pm	water	8		x	x	x	x	x	x	x	x	x	x						
~~BH102~~ GW Dup-1	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x						
~~BH103~~ GW Dup-2	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x						
~~BH104~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
~~BH105~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
~~BH106~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
~~BH107~~			water	8		x	x	x	x	x	x	x	x	x	x						
~~BH108~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
~~BH109~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
~~BH110~~			~~water~~	~~8~~		x	x	x	x	x	x	x	x	x	x						
BH1			water	8		x	x	x	x	x	x	x	x	x	x						
			TOTAL # OF CONTAINERS	88																	

* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle AV	Oct 9, 2020	Katie Bowers	20/10/09
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
To Purolator 20/10/09 3:00pm	10 am		

Special Instructions
PLEASE FILTER DOC AT SAMPLE RECEPTION
9:30am

AGAT Laboratories

Sample Temperature Log

Client: Pinchin

COC# or Work Order #: 20U661878

# of Coolers: 3

# of Submissions:

Arrival Temperatures - Branch/Driver

Cooler #1:	6.5	6.5	6.4	on ice
Cooler #2:	7.0	6.9	7.0	
Cooler #3:	8.0	7.9	7.8	
Cooler #4:				
Cooler #5:				
Cooler #6:				
Cooler #7:				
Cooler #8				
Cooler #9:				
Cooler #10:				

IR Gun ID: 1439003401

Taken By: Katie Bowers

Date (yyyy/mm/dd): 2020/10/09 **Time:** 9 : 30 AM / PM

Arrival Temperatures - Laboratory

Cooler #1:	3.4	3.5	3.8	on ice
Cooler #2:	2.5	2.9	3.0	
Cooler #3:	1.9	2.0	2.3	
Cooler #4:				
Cooler #5:				
Cooler #6:				
Cooler #7:				
Cooler #8				
Cooler #9:				
Cooler #10:				

IR Gun ID:

Taken By: SIMRAN

Date (yyyy/mm/dd): 2020/10/10 **Time:** 9 : 40 AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

FINAL REPORT

CA15501-OCT21 R

229152.003 Kagawong Ladfill

Prepared for

Pinchin Ltd

FINAL REPORT

CA15501-OCT21 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Pinchin Ltd	Project Specialist	Brad Moore Hon. B.Sc
		Laboratory	SGS Canada Inc.
Address	150 Algonquin Blv. E, Unit 2C Timmins, ON P4N 1A7. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Keri Bernard	Telephone	705-652-2143
Telephone	705-521-0560	Facsimile	705-652-6365
Facsimile		Email	brad.moore@sgs.com
Email	kbernard@Pinchin.com	SGS Reference	CA15501-OCT21
Project	229152.003 Kagawong Ladfill	Received	10/21/2021
Order Number		Approved	11/01/2021
Samples	Ground Water (14)	Report Number	CA15501-OCT21 R
		Date Reported	11/01/2021

COMMENTS

Temperature of Sample upon Receipt: 2 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: N/A

Raise RL for some NO2 and NO3 due to matrix interference

RL raised for phenol tags 11,13,15 & 16 due to sample matrix

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Pinchin Ltd
Project: 229152.003 Kagawong Ladfill
Project Manager: Keri Bernard
Samplers: Alana Valle

PACKAGE: **General Chemistry** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	BH1	BH3	BH101	BH102	BH103	BH104	BH105	BH106
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
						Result	Result	Result	Result	Result	Result	Result	Result
General Chemistry													
Alkalinity	mg/L as CaCO3	2	500			204	297	255	337	380	325	177	336
Conductivity	uS/cm	2				6220	2730	758	706	12500	6080	32300	6460
Total Dissolved Solids	mg/L	30	500			4590	2050	494	369	8080	3900	22100	4180
Chemical Oxygen Demand	mg/L	8				46	21	13	15	59	57	150	61
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05				8.85	4.02	0.42	1.40	2.09	4.31	4.67	5.42
Ammonia+Ammonium (N)	as N mg/L	0.04				10.6	4.05	0.31	1.16	5.34	7.32	30.6	9.33
Dissolved Organic Carbon	mg/L	1	5			4	3	4	6	2	6	2	5
Metals and Inorganics													
Phosphorus (total)	mg/L	0.03				0.22	0.15	0.06	0.18	0.13	0.19	0.38	0.25
Sulphate	mg/L	2	500			1400	700	93	< 2	140	98	340	71
Nitrite (as N)	as N mg/L	0.03		1		< 0.3↑	< 0.03	0.04	< 0.03	< 0.3↑	< 0.3↑	< 0.75↑	< 0.3↑
Nitrate (as N)	as N mg/L	0.06		10		0.10	0.18	0.12	< 0.06	< 0.6↑	< 0.6↑	< 0.6↑	< 0.6↑
Arsenic (dissolved)	mg/L	0.0002		0.01		0.0014	0.0004	0.0011	0.0014	0.0026	0.0026	0.0023	0.0029
Barium (dissolved)	mg/L	0.00002		1		0.0134	0.0185	0.0195	0.00896	0.0404	0.0113	0.139	0.0392
Boron (dissolved)	mg/L	0.002		5		3.48	2.16	0.365	0.019	4.72	1.20	7.48	1.66
Calcium (dissolved)	mg/L	0.01				796	490	95.4	66.4	1360	404	3200	630
Cadmium (dissolved)	mg/L	0.000003		0.005		0.000006	< 0.000003	< 0.000003	0.000003	0.000008	< 0.000003	0.000005	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05		0.00021	0.00015	0.00017	0.00037	0.00039	0.00035	0.00041	0.00045
Copper (dissolved)	mg/L	0.0002	1			0.0003	< 0.0002	0.0009	0.0010	0.0008	0.0007	0.0005	0.0004
Iron (dissolved)	mg/L	0.007	0.3			0.523	0.015	0.046	0.283	0.107	0.098	8.34	3.04

Client: Pinchin Ltd
Project: 229152.003 Kagawong Ladfill
Project Manager: Keri Bernard
Samplers: Alana Valle

PACKAGE: **Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	7	8	9	10	11	12	13	14
					Sample Name	BH1	BH3	BH101	BH102	BH103	BH104	BH105	BH106
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)													
Potassium (dissolved)	mg/L	0.009			120	60.2	4.02	0.875	126	52.1	583	104
Magnesium (dissolved)	mg/L	0.001			134	72.4	36.7	39.7	853	185	1250	195
Manganese (dissolved)	mg/L	0.00001	0.05		0.0553	0.0313	0.00735	0.0392	0.105	0.137	0.390	0.256
Sodium (dissolved)	mg/L	0.01	200	20	373	120	6.94	1.12	950	279	2910	431
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00021	< 0.00009	< 0.00009	0.00033
Zinc (dissolved)	mg/L	0.002	5		0.003	0.002	0.006	0.002	0.006	0.006	0.004	0.004
Other (ORP)													
pH	No unit	0.05	8.5		7.73	7.93	8.05	7.85	7.52	7.76	7.45	7.67
Chloride	mg/L	1	250		2000	420	65	5	3900	3000	15000	2900
Mercury (total)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001
Phenols													
4AAP-Phenolics	mg/L	0.02			0.009	< 0.002↓	< 0.002↓	0.007	< 0.02	0.021	0.080	0.006

Client: Pinchin Ltd
Project: 229152.003 Kagawong Ladfill
Project Manager: Keri Bernard
Samplers: Alana Valle

PACKAGE: **General Chemistry** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number: 15	16	17	18	19	20
					Sample Name: BH107	BH108	BH109	BH110	GW Dup 1	GW Dup 2
					Sample Matrix: Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date: 19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
					Result	Result	Result	Result	Result	Result
General Chemistry										
Alkalinity	mg/L as CaCO3	2	500		130	110	110	214	325	213
Conductivity	uS/cm	2			34000	36000	60000	3470	531	3480
Total Dissolved Solids	mg/L	30	500		23500	29100	52300	2200	429	2170
Chemical Oxygen Demand	mg/L	8			113	265	148	10	17	8
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			7.56	6.30	5.76	1.46	1.56	1.38
Ammonia+Ammonium (N)	as N mg/L	0.04			30.7	35.6	48.6	1.95	1.07	2.02
Dissolved Organic Carbon	mg/L	1	5		3	2		2	6	2
Metals and Inorganics										
Phosphorus (total)	mg/L	0.03			0.70	0.61	0.93	0.17	0.19	0.16
Sulphate	mg/L	2	500		110	43	1600	260	< 2	260
Nitrite (as N)	as N mg/L	0.03		1	< 0.75↑	< 3↑	< 3↑	< 0.3↑	< 0.03	< 0.3↑
Nitrate (as N)	as N mg/L	0.06		10	8.46	< 0.6↑	< 1.5↑	0.25	< 0.06	0.24
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0005	0.0014	0.0027	0.0019	0.0009	0.0020
Barium (dissolved)	mg/L	0.00002		1	0.252	0.210	0.149	0.0868	0.0087	0.0897
Boron (dissolved)	mg/L	0.002		5	14.6	12.6	18.9	1.45	1.31	2.31
Calcium (dissolved)	mg/L	0.01			3030	3010	6360	365	62.6	384
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003	0.000070	0.000040	0.000007	0.000007	0.000010
Chromium (dissolved)	mg/L	0.00008		0.05	0.00013	< 0.00008	0.00115	< 0.00008	0.00033	0.00017
Copper (dissolved)	mg/L	0.0002	1		0.0035	0.0016	0.0037	< 0.0002	0.0007	0.0006
Iron (dissolved)	mg/L	0.007	0.3		0.080	0.060	0.040	0.154	0.270	0.115

Client: Pinchin Ltd
Project: 229152.003 Kagawong Ladfill
Project Manager: Keri Bernard
Samplers: Alana Valle

PACKAGE: **Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	15	16	17	18	19	20
					Sample Name	BH107	BH108	BH109	BH110	GW Dup 1	GW Dup 2
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)										
Potassium (dissolved)	mg/L	0.009			474	445	537	37.5	0.886	39.4
Magnesium (dissolved)	mg/L	0.001			1390	1430	2060	110	37.5	116
Manganese (dissolved)	mg/L	0.00001	0.05		0.398	0.242	0.665	0.0693	0.0381	0.0645
Sodium (dissolved)	mg/L	0.01	200	20	2880	2820	5440	189	1.66	204
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009	0.00021	0.00067	< 0.00009	< 0.00009	< 0.00009
Zinc (dissolved)	mg/L	0.002	5		0.008	0.004	0.009	< 0.002	0.003	< 0.002
Other (ORP)										
pH	No unit	0.05	8.5		7.31	7.45	7.47	7.82	7.88	7.84
Chloride	mg/L	1	250		17000	18000	32000	920	4	920
Mercury (total)	mg/L	0.00001			0.00001	< 0.00001		< 0.00001	< 0.00001	< 0.00001
Phenols										
4AAP-Phenolics	mg/L	0.02			< 0.02	0.048	< 0.002↓	0.006	0.004	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
BH1					
Total Dissolved Solids	SM 2540C	mg/L	4590	500	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.523	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0553	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	373	200	20
Chloride	US EPA 325.2	mg/L	2000	250	
Sulphate	US EPA 375.4	mg/L	1400	500	
BH3					
Total Dissolved Solids	SM 2540C	mg/L	2050	500	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	120		20
Chloride	US EPA 325.2	mg/L	420	250	
Sulphate	US EPA 375.4	mg/L	700	500	
BH102					
Dissolved Organic Carbon	SM 5310	mg/L	6	5	
BH103					
Total Dissolved Solids	SM 2540C	mg/L	8080	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.105	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	950	200	20
Chloride	US EPA 325.2	mg/L	3900	250	
BH104					
Total Dissolved Solids	SM 2540C	mg/L	3900	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.137	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	279	200	20
Dissolved Organic Carbon	SM 5310	mg/L	6	5	
Chloride	US EPA 325.2	mg/L	3000	250	
BH105					
Total Dissolved Solids	SM 2540C	mg/L	22100	500	
Boron (dissolved)	SM 3030/EPA 200.8	mg/L	7.48		5
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	8.34	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.390	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	2910	200	20
Chloride	US EPA 325.2	mg/L	15000	250	
BH106					
Total Dissolved Solids	SM 2540C	mg/L	4180	500	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	3.04	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.256	0.05	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
BH106 (continued)					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	431	200	20
Chloride	US EPA 325.2	mg/L	2900	250	
BH107					
Total Dissolved Solids	SM 2540C	mg/L	23500	500	
Boron (dissolved)	SM 3030/EPA 200.8	mg/L	14.6		5
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.398	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	2880	200	20
Chloride	US EPA 325.2	mg/L	17000	250	
BH108					
Nitrite as Nitrogen	EPA300/MA300-Ions1.3	as N mg/L	< 3		1
Total Dissolved Solids	SM 2540C	mg/L	29100	500	
Boron (dissolved)	SM 3030/EPA 200.8	mg/L	12.6		5
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.242	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	2820	200	20
Chloride	US EPA 325.2	mg/L	18000	250	
BH109					
Nitrite as Nitrogen	EPA300/MA300-Ions1.3	as N mg/L	< 3		1
Total Dissolved Solids	SM 2540C	mg/L	52300	500	
Boron (dissolved)	SM 3030/EPA 200.8	mg/L	18.9		5
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.665	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	5440	200	20
Chloride	US EPA 325.2	mg/L	32000	250	
Sulphate	US EPA 375.4	mg/L	1600	500	
BH110					
Total Dissolved Solids	SM 2540C	mg/L	2200	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0693	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	189		20
Chloride	US EPA 325.2	mg/L	920	250	
GW Dup 1					
Dissolved Organic Carbon	SM 5310	mg/L	6	5	
GW Dup 2					
Total Dissolved Solids	SM 2540C	mg/L	2170	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0645	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	204	200	20
Chloride	US EPA 325.2	mg/L	920	250	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0504-OCT21	mg/L as CaCO3	2	< 2	1	20	98	80	120	NA		
Alkalinity	EWL0507-OCT21	mg/L as CaCO3	2	< 2	1	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0244-OCT21	mg/L	0.04	<0.04	0	10	97	90	110	97	75	125
Ammonia+Ammonium (N)	SKA0261-OCT21	mg/L	0.04	<0.04	ND	10	102	90	110	95	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5072-OCT21	mg/L	1	<1	4	20	105	80	120	91	75	125
Sulphate	DIO5072-OCT21	mg/L	2	<2	1	20	111	80	120	100	75	125
Chloride	DIO5073-OCT21	mg/L	1	<1	2	20	102	80	120	91	75	125
Sulphate	DIO5073-OCT21	mg/L	2	<2	ND	20	104	80	120	109	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0497-OCT21	mg/L	0.03	<0.03	ND	20	98	90	110	97	75	125
Nitrate (as N)	DIO0497-OCT21	mg/L	0.06	<0.06	ND	20	101	90	110	101	75	125
Nitrite (as N)	DIO0547-OCT21	mg/L	0.03	<0.03	ND	20	97	90	110	98	75	125
Nitrate (as N)	DIO0547-OCT21	mg/L	0.06	<0.06	ND	20	104	90	110	105	75	125
Nitrite (as N)	DIO0549-OCT21	mg/L	0.03	<0.03	ND	20	99	90	110	94	75	125
Nitrate (as N)	DIO0549-OCT21	mg/L	0.06	<0.06	14	20	105	90	110	106	75	125
Nitrite (as N)	DIO0576-OCT21	mg/L	0.03	<0.03	ND	20	98	90	110	97	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0229-OCT21	mg/L	1	<1	3	20	101	90	110	100	75	125
Dissolved Organic Carbon	SKA0243-OCT21	mg/L	1	<1	4	20	100	90	110	111	75	125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0568-OCT21	mg/L	8	<8	9	20	114	80	120	104	75	125
Chemical Oxygen Demand	EWL0583-OCT21	mg/L	8	<8	ND	20	98	80	120	104	75	125
Chemical Oxygen Demand	EWL0592-OCT21	mg/L	8	<8	3	20	108	80	120	102	75	125

QC SUMMARY

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0504-OCT21	uS/cm	2	< 2	0	20	100	90	110	NA		
Conductivity	EWL0507-OCT21	uS/cm	2	< 2	0	20	99	90	110	NA		

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0029-OCT21	mg/L	0.00001	< 0.00001	ND	20	101	80	120	117	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (dissolved)	EMS0147-OCT21	mg/L	0.0002	<0.0002	2	20	96	90	110	85	70	130
Barium (dissolved)	EMS0147-OCT21	mg/L	0.00002	<0.00002	6	20	100	90	110	97	70	130
Boron (dissolved)	EMS0147-OCT21	mg/L	0.002	<0.002	3	20	96	90	110	93	70	130
Calcium (dissolved)	EMS0147-OCT21	mg/L	0.01	<0.01	3	20	100	90	110	98	70	130
Cadmium (dissolved)	EMS0147-OCT21	mg/L	0.000003	<0.000003	11	20	99	90	110	88	70	130
Chromium (dissolved)	EMS0147-OCT21	mg/L	0.00008	<0.00008	4	20	108	90	110	100	70	130
Copper (dissolved)	EMS0147-OCT21	mg/L	0.0002	<0.0002	2	20	98	90	110	101	70	130
Iron (dissolved)	EMS0147-OCT21	mg/L	0.007	<0.007	2	20	100	90	110	125	70	130
Potassium (dissolved)	EMS0147-OCT21	mg/L	0.009	<0.009	2	20	109	90	110	104	70	130
Magnesium (dissolved)	EMS0147-OCT21	mg/L	0.001	<0.001	3	20	95	90	110	104	70	130
Manganese (dissolved)	EMS0147-OCT21	mg/L	0.00001	<0.00001	2	20	100	90	110	94	70	130
Sodium (dissolved)	EMS0147-OCT21	mg/L	0.01	<0.01	5	20	102	90	110	110	70	130
Lead (dissolved)	EMS0147-OCT21	mg/L	0.00009	<0.00001	2	20	105	90	110	109	70	130
Zinc (dissolved)	EMS0147-OCT21	mg/L	0.002	<0.002	2	20	97	90	110	89	70	130
Arsenic (dissolved)	EMS0156-OCT21	mg/L	0.0002	<0.0002	ND	20	107	90	110	105	70	130
Barium (dissolved)	EMS0156-OCT21	mg/L	0.00002	<0.00002	6	20	96	90	110	96	70	130
Boron (dissolved)	EMS0156-OCT21	mg/L	0.002	<0.002	9	20	98	90	110	100	70	130
Calcium (dissolved)	EMS0156-OCT21	mg/L	0.01	<0.01	1	20	103	90	110	104	70	130
Cadmium (dissolved)	EMS0156-OCT21	mg/L	0.000003	<0.000003	ND	20	95	90	110	90	70	130
Chromium (dissolved)	EMS0156-OCT21	mg/L	0.00008	<0.00008	ND	20	106	90	110	106	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Copper (dissolved)	EMS0156-OCT21	mg/L	0.0002	<0.0002	0	20	97	90	110	109	70	130
Iron (dissolved)	EMS0156-OCT21	mg/L	0.007	<0.007	1	20	108	90	110	100	70	130
Potassium (dissolved)	EMS0156-OCT21	mg/L	0.009	<0.009	1	20	102	90	110	100	70	130
Magnesium (dissolved)	EMS0156-OCT21	mg/L	0.001	<0.001	1	20	103	90	110	99	70	130
Manganese (dissolved)	EMS0156-OCT21	mg/L	0.00001	<0.00001	2	20	100	90	110	109	70	130
Sodium (dissolved)	EMS0156-OCT21	mg/L	0.01	<0.01	1	20	105	90	110	103	70	130
Lead (dissolved)	EMS0156-OCT21	mg/L	0.00009	<0.00001	19	20	101	90	110	86	70	130
Zinc (dissolved)	EMS0156-OCT21	mg/L	0.002	<0.002	3	20	97	90	110	99	70	130

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0504-OCT21	No unit	0.05	NA	1		100			NA		
pH	EWL0507-OCT21	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0242-OCT21	mg/L	0.02	<0.002	2	10	100	80	120	96	75	125
4AAP-Phenolics	SKA0270-OCT21	mg/L	0.02	<0.002	ND	10	100	80	120	94	75	125

Phosphorus by SFA

Method: SM 4500-P J | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0247-OCT21	mg/L	0.03	<0.03	ND	10	98	90	110	89	75	125

QC SUMMARY

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0571-OCT21	mg/L	30	<30	2	20	99	90	110	NA		
Total Dissolved Solids	EWL0609-OCT21	mg/L	30	<30	1	20	99	90	110	NA		
Total Dissolved Solids	EWL0645-OCT21	mg/L	30	<30	3	20	98	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0245-OCT21	mg/L	0.05	<0.05	ND	10	100	90	110	97	75	125
Total Kjeldahl Nitrogen (N)	SKA0248-OCT21	mg/L	0.05	<0.05	ND	10	101	90	110	99	75	125
Total Kjeldahl Nitrogen (N)	SKA0260-OCT21	mg/L	0.05	<0.05	ND	10	102	90	110	82	75	125

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

Laboratory Information Section

Received Date (mm/dd/yyyy): OCT 21 2021 — LAB LIMS #: Oct 1501

Received Time (After Hours Only): __:__ — Temperature Upon Receipt (°C): 2, 2, 3

Billing & Reporting Information

Invoice/Receipt to {3}:

Company: Pinchin
Attention: Keri Bernard
Address: 203-957 Cambrian Heights Drive, Sudbury, Ontario, P3C 5S5
Email: kbernard@pinchin.com

Quote #: 2021 672

Attached Parameter List: ☐ YES ☑ NO

Turnaround Time

Is *Rush Turnaround Time Required? ☐ YES ☑ NO

Specify:

* Rush TA Requests Require Lab Approval

Project Name/Number: 229152.003 Kagawong Landfill — P.O. #:

Client Information/Report To:

Company Name:		**Phone Number:**	705-521-0560
Contact Name:		**Fax Number:**	
Address:		**E-mail:**	
Copy to:			

Client Lab #:

Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested: Fall GW Package
BH1	10/19/21	1-6PM	8	X
BH3	↓	↓	8	X
BH101			8	X
BH102			8	X
BH103			8	X
BH104			8	X
BH105			8	X
BH106			8	X
BH107			8	X
BH108			8	X
BH109 → PARTIAL SAMPLE GEN+METALS, NO PHENOL, MERCURY, DOC			8	X
BH110			8	X
GW Dup 1			8	X
GW Dup 2	↓	↓	8	X

Sampled By {1}:	(Name) Alana Valle	(Signature) AV	Date: 10/20/21	(mm/dd/yy)
Relinquished by {2}:	(Name) Alana Valle	(Signature) AV	Date: 10/20/21	(mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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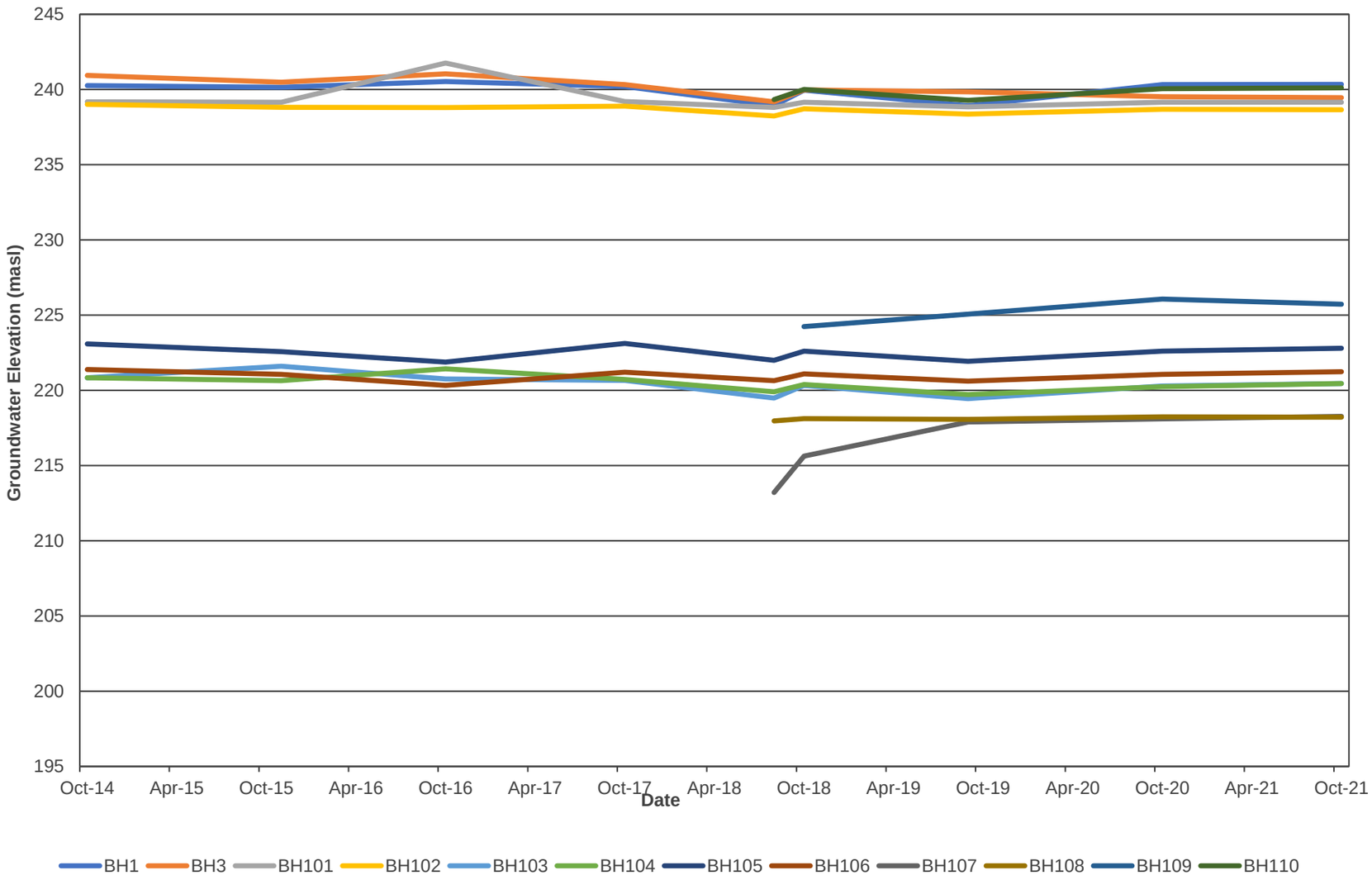
Revision #: 2.3
Date of Issue: 24 Jun. 2014

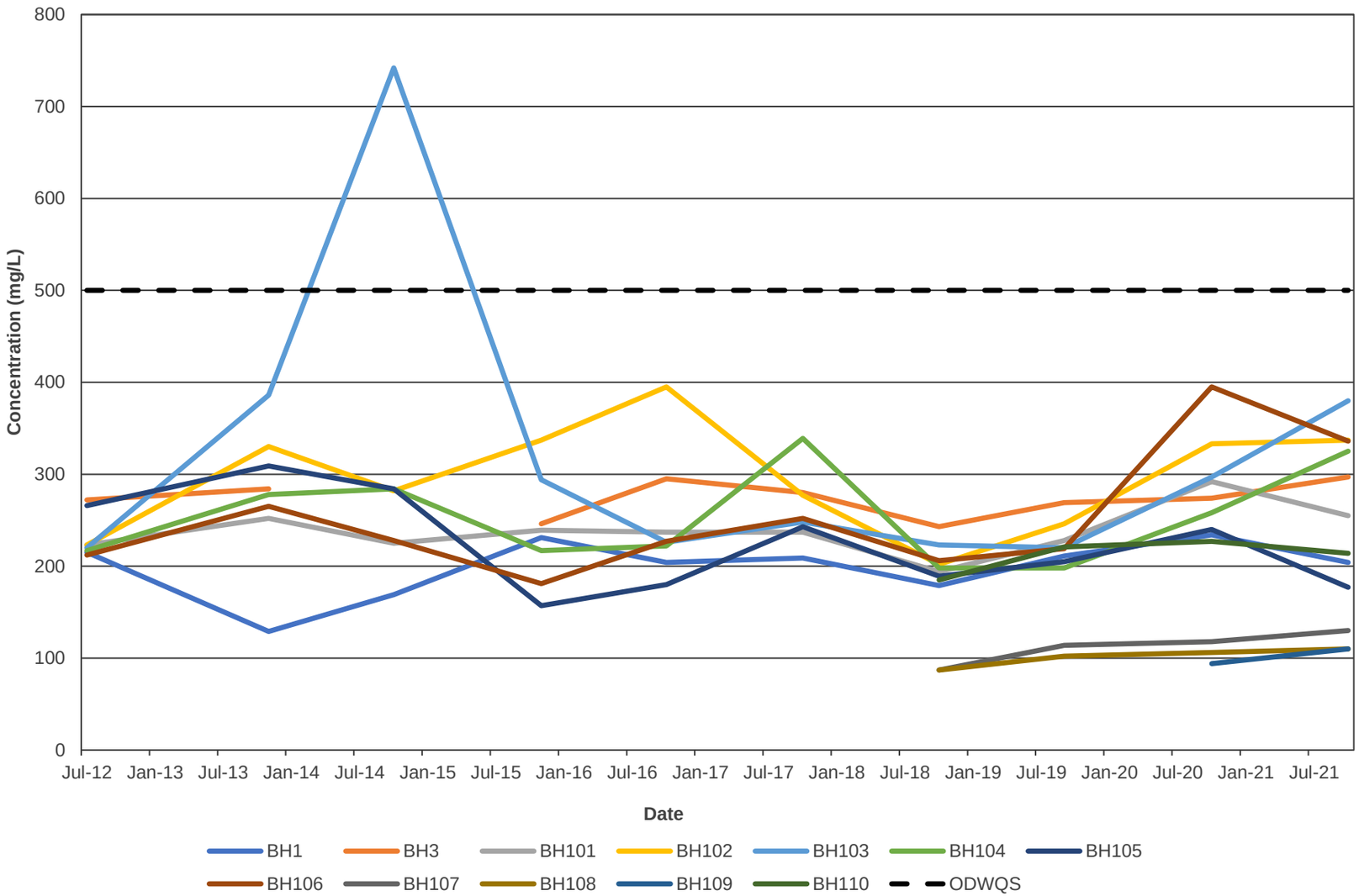
APPENDIX VI

Groundwater Trend Analysis

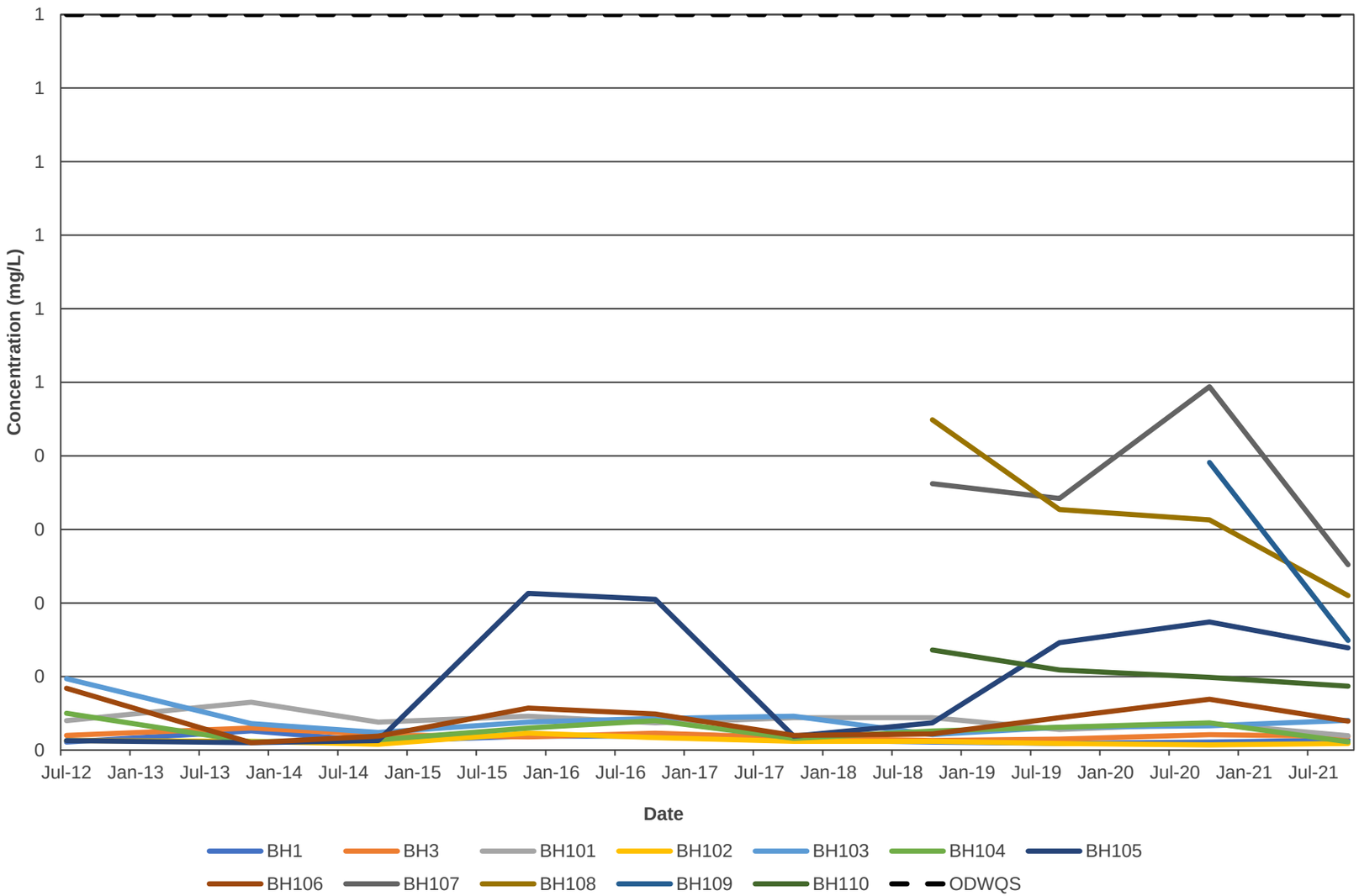
Groundwater Trend Analysis
Elevation



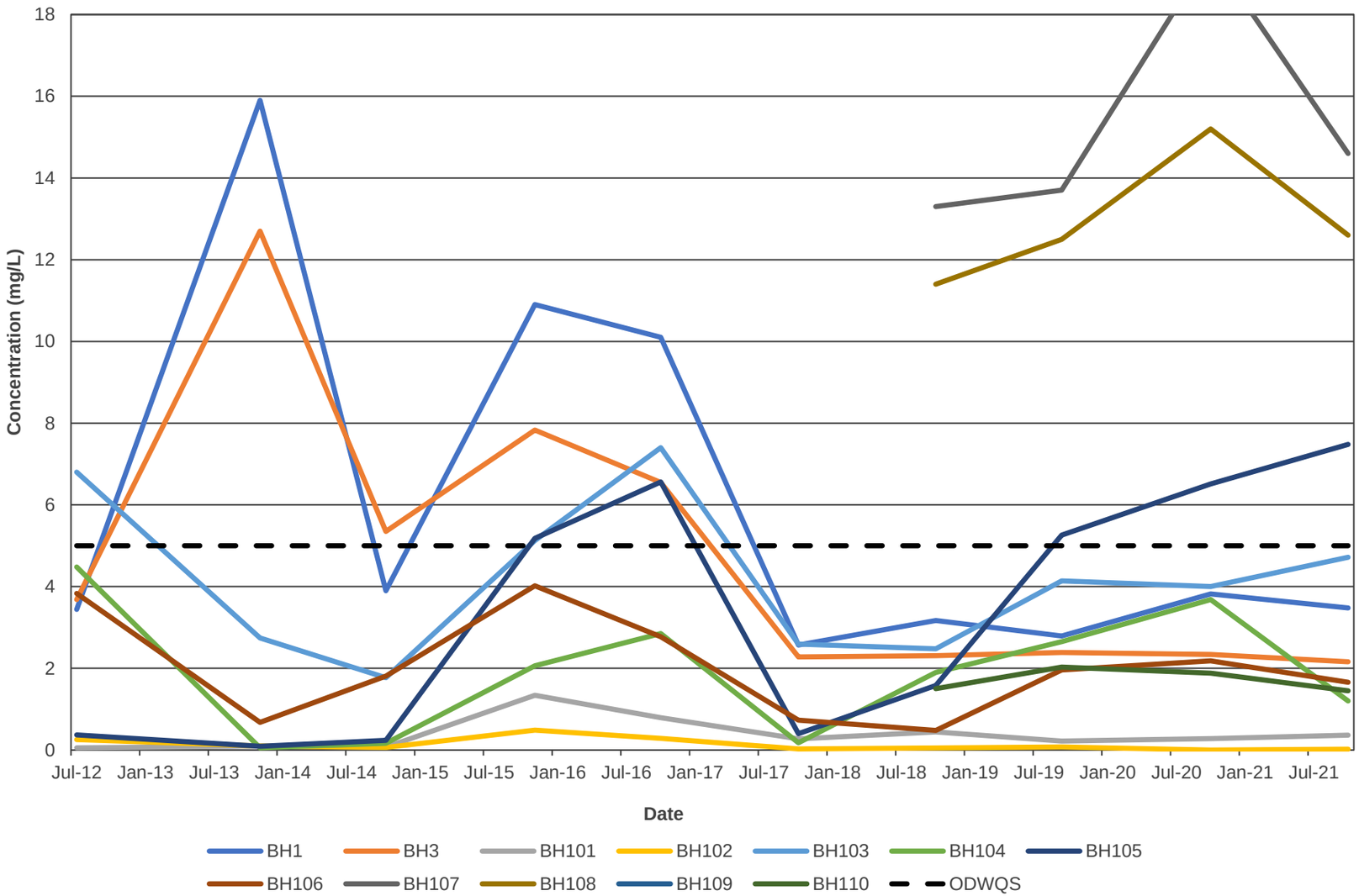
Groundwater Trend Analysis
Alkalinity



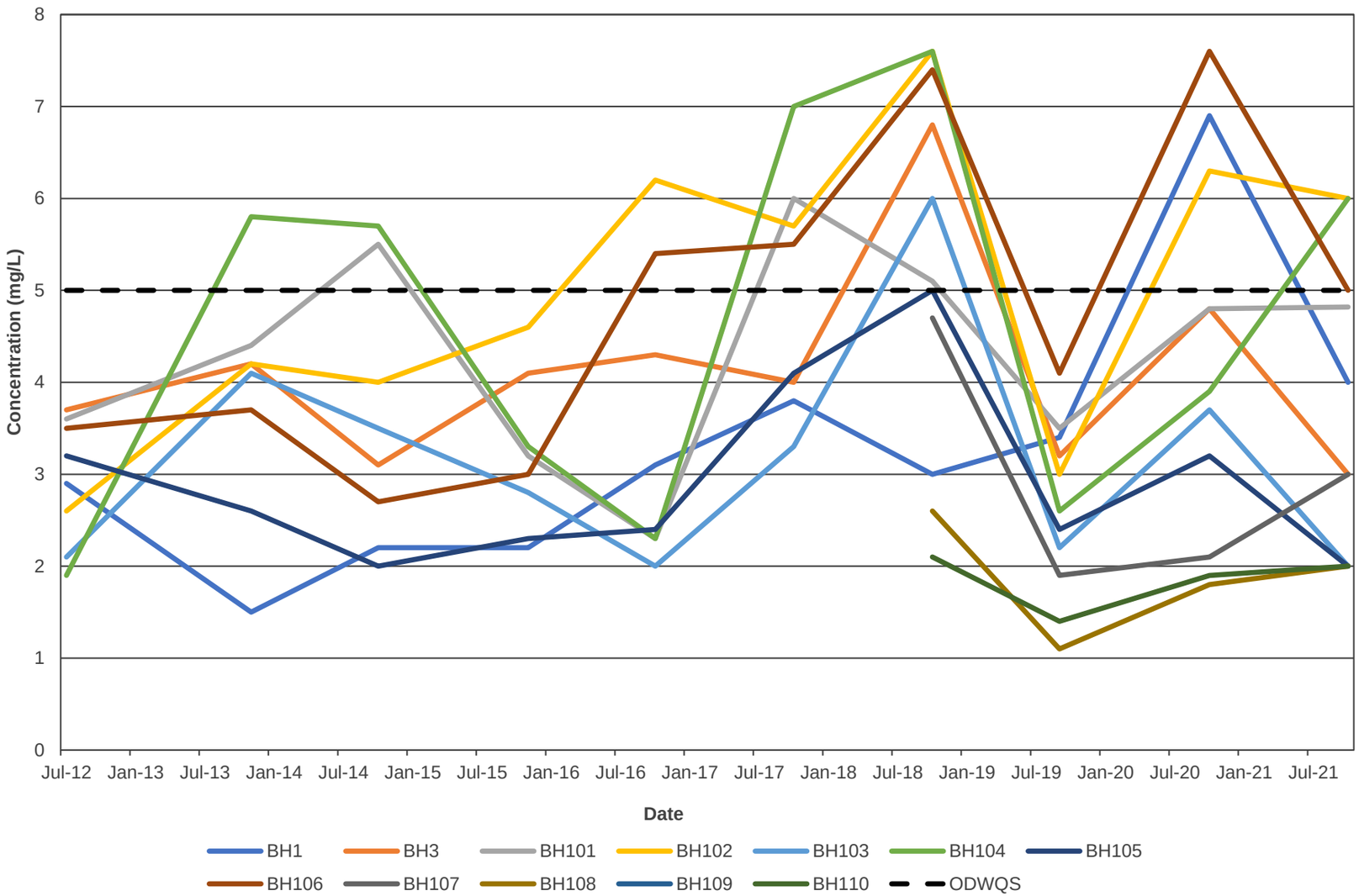
Groundwater Trend Analysis
Barium



Groundwater Trend Analysis
Boron



Groundwater Trend Analysis
DOC



APPENDIX VII

Photographic Log

	BH1 (Close) (2021)

	BH1 (Far) (2021)

	BH3 (Close) (2021)

	BH3 (Far) (2021)

	BH101 (Close) (2021)

	BH101 (Far) (2021)

	BH102 (Close) (2021)

	BH102 (Far) (2021)

	BH103 (Close) (2021)

	BH103 (Far) (2021)

	BH104 (Close) (2021)

	BH104 (Far) (2021)

	BH105 (Close) (2021)

	BH105 (Far) (2021)

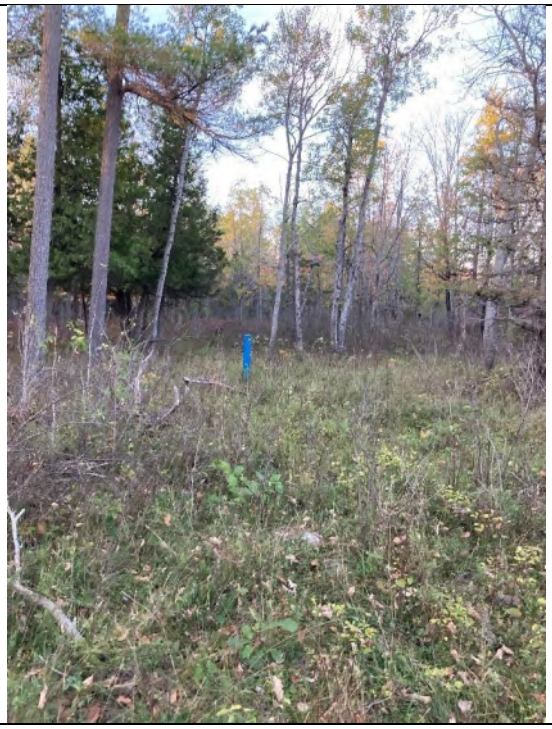
	BH106 (Close) (2021)

	BH106 (Far) (2021)

	BH107 (Close) (2021)

	BH107 (Far) (2021)

	BH108 (Close) (2021)

	BH108 (Far) (2021)

	BH109 (Close) (2021)

	BH109 (Far) (2021)

	BH110 (Close) (2021)

	BH110 (Far) (2021)

APPENDIX VIII

Monitoring and Screening Checklist

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Kagawong Landfill
Location (e.g. street address, lot, concession)	Highway 540, Lot 4, Concession 9
GPS Location (taken within the property boundary at front gate/ front entry)	400,100 m Easting and 5,083,500 m Northing
Municipality	Kagawong, Ontario
Client and/or Site Owner	Township of Billings
Monitoring Period (Year)	2019-2021
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A550501
Director's Order No.:	Type Here
Provincial Officer's Order No.:	Type Here
Other:	Type Here

Report Submission Frequency	◯ **Annual** ◉ **Other**	Triennial
The site is:	◉ **Active** ◯ **Inactive** ◯ **Closed**	
If closed, specify C of A, control or authorizing document closure date:		Select Date
Has the nature of the operations at the site changed during this monitoring period?	◯ **Yes** ◉ **No**	
If yes, provide details:	Type Here	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	◯ Yes ◉ No	

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	(●) **Yes** ( ) **No**	If no, list exceptions (Type Here):
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	( ) **Yes** (●) **No** ( ) **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
BH109	Dry well 2019	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	◯ **Yes** ◉ **No** ◯ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ◯ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	(●) **Yes** ( ) **No**	If no, the potential design and operational concerns/exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	( ) **Yes** (●) **No**	Several wells in exceedance of ODWQS and B-& Guideline	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	(●) **Yes** ( ) **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	(●) **Yes** ( ) **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) **Yes** ( ) **No** (●) **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

29-Mar-2022

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No changes to the monitoring program are recommended**	Type Here
○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No Changes to site design and operation are recommended**	Type Here
○ **The following change(s) to the site design and operation is/ are recommended:**	

Name:	Tim McBride		
Seal:	Add Image		
Signature:	Tim McBride 2022.03.29 13:24: 21-04'00'	**Date:**	29-Mar-2022
CEP Contact Information:	Tim McBride		
Company:	Pinchin Ltd.		
Address:	662 Falconbridge Road, Unit 3 Sudbury, Ontario P3A 4S4		
Telephone No.:	705.521.0560	Fax No. :	705.521.1309
E-mail Address:	tmcbride@pinchin.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	Select Date
Signature:		**Date:**	Select Date

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	N/A
Distance(s)	N/A

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	◯ Yes ◯ No	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	◯ Yes ◯ No ◯ **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	◯ **Yes** ◯ **No** ◯ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◯ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◯ **Yes** ◯ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	◯ **Yes** ◯ **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	◯ **Yes** ◯ **No**	If yes, specify (Type Here)

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	◯ **Yes** ◯ **No**	If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	◯ Yes ◯ No ◯ Not Known ◯ Not Applicable	If yes, provide details and whether remedial measures are necessary (Type Here)
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◯ **No** ◯ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

29-Mar-2022

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No Changes to the monitoring program are recommended**	Currently no surface water monitoring program
○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No changes to the site design and operation are recommended**	Type Here
○ **The following change(s) to the site design and operation is/are recommended:**	

CEP Signature	
Relevant Discipline	Hydrogeologist
Date:	29-Mar-2022
CEP Contact Information:	Tim McBride
Company:	Pinchin Ltd.
Address:	662 Falconbridge Road, Unit 3 Sudbury, Ontario P3A 4S4
Telephone No.:	705.521.0560
Fax No. :	705.521.1309
E-mail Address:	tmcbride@pinchin.com

Save As **Print Form**

Tiana Mills

To: Kathy McDonald
Subject: Invitation to Proclaim June 19th, 2022 The Longest Day of SMILES®

Dear Mayor Ian Anderson,

In these unprecedented times, Operation Smile Canada recognizes the importance of engaging community members in ways that enable them to use their passion and creativity to encourage positive change.

Which is why we are inviting you as the Mayor of Billings to proclaim June 19th, 2022 as the Longest Day of SMILES® in your community.

The Longest Day of SMILES® encourages community ambassadors to raise awareness and funds to help a child born with a cleft condition smile and change their life with free, safe, cleft surgery and comprehensive care. From sun-up to sun-down, from coast to coast to coast, Canadians are dedicating June 19th, 2022, and the time leading up to it, to helping children SMILE.

Operation Smile Canada is a volunteer-delivered global medical charity that exists to ensure everyone has access to safe, effective surgery that they need wherever they live in the world. Surgery that will change a child's life forever… help families, communities, countries, regions and yes, the world.

By proclaiming June 19th, 2022, as the Longest Day of SMILES® in Billings and challenging other mayors to do the same, you can provide waiting children with exceptional cleft care and a hopeful future with a new smile.

Our Community Engagement & Fundraising team is happy to support you and your community should you choose to participate with us.

To confirm your participation or to request more info, please email Candy Keillor, Community Engagement Specialist candy.keillor@operationsmile.org

To learn more about the transformational impact of Operation Smile Canada, visit: operationsmile.ca

We look forward to collaborating with you and your team to make this the best Longest Day of SMILES® yet! Together we can make a difference one smile at a time!

Keep Smiling,

Candy Keillor

Candy Keillor (she/her)
Community Engagement Specialist

Ontario Provincial Police

Police provinciale de l'Ontario

Manitoulin Detachment
Manitoulin Détachement
(Little Current, Espanola, Gore Bay)

54 Boosneck Road, PO Box 638
Little Current, ON P0P 1K0

Tel: 705-368-2200
Fax 705-368-2666

Tél. : 705-368-2200
Téléc. : 705-368-2666

File Reference:

March 28, 2022
Town Council – Billings Township
15 Old Mill Road
Kagawong, ON
P0P 1J0

Dear Mayor Anderson and Town Council,

I wish to provide you with an update regarding the OPP's efforts to implement Project Lifesaver in our surrounding area. We have been successful in confirming an Administrator for the program and have also received a generous donation of $16,000 from a corporate sponsor in Espanola. An official media announcement will be made soon regarding all of the partners involved in getting this program up and running. We will also be working closely with Northshore Search and Rescue.

Project Lifesaver will be available to all community members who reside on Manitoulin Island, the surrounding First Nations, the Town of Espanola, as well as residents in the area from Narin Centre to Walford. The OPP requires that there be two receivers in both Espanola and Little Current to run the program effectively.

The total cost required for Project Lifesaver is $24, 000. We are very grateful for the donation made by our corporate sponsor which provides the bulk of the funding needed. However, additional funds are required for the successful implementation of the program. We ask that (each) Township consider providing $1, 000 toward this funding that will allow us to cover the cost of necessary components such as the receivers, bracelets, batteries and information material made available to the public.

We eager to get this program started in our area. Our goal is to have the equipment purchased and officers trained for the summer 2022.

I would be more than happy to answer any questions you may have as you consider this request. Thank you for both your time and your consideration of a contribution toward this very important program.

Sincerely,

P/C Tessa Kasch\ #14962
E-mail: tessa.kasch@opp.ca
Cell: 705-863-1419

The Corporation of the
Township of Billings

By-Law 2021-49

Being a By-Law to establish a COVID-19 Vaccination Policy

WHEREAS, The Corporation of the Township of Billings is committed to providing and maintaining a healthy and safe working environment;

AND WHEREAS, part of the Township's responsibilities identified in the Occupational Health and Safety Act states an employer shall take every precaution reasonable in the circumstances for the protection of a worker;

NOW THEREFORE, the Council of the Corporation of the Township of Billings enacts the COVID-19 Vaccination Policy, attached to this by-law as "Schedule A".

READ A FIRST, SECOND AND THIRD TIME AND ENACTED this 2nd day of November, 2021.

Ian Anderson, Mayor
BRIAN BARKER
DEPUTY MAYOR

Kathy McDonald, CAO/Clerk

Township of
BILLINGS

Schedule "A"

Vaccination Policy and Procedures

Overview

As a municipality, the Township of Billings is obligated to abide by the provisions of the Occupational Health and Safety Act, Ontario Regulation 364/20 (Reopening of Ontario Act), guidance from the PHSD and current industry practices when developing the procedures on how the Townships Covid Vaccination Policy and Procedure will work.

All of the Townships workers, office and outside workers, have been considered as essential during the duration of the period of the epidemic and the various provincial shutdowns, keeping that in mind, all of the Townships workers and volunteers have had exposures to residents and others while performing their duties. The Township believes that because its employees are essential and that they are required to deal with the public, in person, that there is a requirement for a higher standard of protocols that the Townships employees must follow to protect the ongoing services that the Township is required to provide.

The procedure that will be developed will deal with employees who have been vaccinated, employees who have not been vaccinated and employees who refuse to be vaccinated.

The procedure will not be biased or be an attempt to single out to any of the above-mentioned employees, but it will be consistent with current Provincial regulations and PHSD guidelines and other municipalities vaccinations policies regarding vaccination policy and proof of vaccinations.

The Policy will be as follows:

1.0 Persons Affected by this Policy

1.1 All full-time Township employees.

1.2 All Township Council members.

1.3 All part-time workers (including fire fighters and summer student hires).

1.4 All volunteers performing duties on behalf of the Township.

1.5 All contractors (who will be in contact with Township staff) hired to perform work for and on behalf of the Township.

1.6 All persons entering into Township facilities for Township sponsored or privately sponsored events.

2.0 Proof of Vaccinations

2.1 All of the persons identified in section 1.0 are required to provide proof of vaccinations. This proof can be verified with the following items:

a) Provincially issued "Vaccination Certificate" or "Vaccination Passport"
b) Proof of vaccination certificates issued at vaccination centres
c) Proof of Vaccination will be presented to the Township office no later than November 12, 2021
***Note: Proof of vaccination will be verified by the CAO or Deputy Clerk and a copy of the Proof of Vaccination will be kept on file in the employee personnel file.**

2.2 Persons identified in section 1.0 who cannot or will not provide the required proof of vaccination, must provide one of the following:

a) Written proof of a medical reason, provided by either a physician or registered nurse practitioner, that sets out:
- that the person cannot be vaccinated against Covid-19/Variants; and
- the effective time period for the medical exemption. (i.e., permanent or time limited)

2.3 Proof that the individual has completed a Covid vaccination educational program approved by the Township.

3.0 Additional Requirements

3.1 Persons identified in section 1.0 who elect not to provide proof of Covid-19/Variant vaccinations shall be subject to or cause themselves or other employees to be subject to:

a) taking extra measures such as increased use of face coverings, higher frequencies of workplace sanitization; and
b) other measures identified by PHSD

3.2 Persons identified in section 1.0 may also be subject to additional requirements such as:

a) Change in work role and duties
b) Additional Covid testing. (Weekly Covid Rapid testing)
***Note: Persons required to perform Covid Rapid Antigen Testing will sign an agreement with the Township stating that they will perform 2 Covid Rapid Antigen Tests per week and report the results (time dated photos) to the CAO or Deputy Clerk.**
c) Redeployment or relocation.
d) Leave of absence or termination.

4.0 Municipal Facilities

4.1 All persons entering into a Township facility for a Township sponsored/organized event will be required to wear protective face coverings, keep a distance of 2 metres from others, hand sanitize and to sign contact tracing forms.

4.2 All persons entering into a Township facility for a Township sponsored/organized event will be required to show proof of having received recognized Covid vaccinations. Accepted proof of vaccination will include:

a) Provincially issued "Vaccination Certificate" or "Vaccination Passport"
b) Proof of vaccination certificates issued at vaccination centres
c) A certificate for medical exemption that is provided by a physician or a registered nurse practitioner
d) The conditions identified in a), b) and c) are subject to change upon Provincial regulatory amendments or PHSD guidelines

4.3 All persons using the Township exercise facility will be required to comply with the provisions identified in provisions 4.1 and 4.2.

4.4 All persons renting and using any municipal facility for a public/private function event will be required to wear protective face coverings, keep a distance of 2 metres from others, hand sanitize and to sign contact tracing forms.

4.5 All persons renting any municipal facility for a public/private event will be required to sign a Memorandum of Use Agreement with the Township that will require the lessee to enforce provincial Covid proof of vaccination protocols.

5.0 Contractors

5.1 Contractors who will be performing work for the Township will be required to have their employees abide by current legislative regulations and public health protocols regarding hygiene, physical distancing, wearing of face coverings and contact tracing.

5.2 Contractors who will be performing work for the Township will be required to provide proof of vaccination for all of their employees who will be performing work. Accepted proof of vaccination will include:

a) Provincially issued "Vaccination Certificate" or "Vaccination Passport"
b) Proof of vaccination certificates issued at vaccination centres
c) A certificate for medical exemption that is provided by a physician or a registered nurse practitioner

5.3 Contractors who are not having direct and regular interaction with Township employees will not be required to provide proof of vaccination.

6.0 Implementation

6.1 Proof of vaccination for Township employees will be required to be verified within a period of 5 working days after the implementation of this policy.

6.2 Unvaccinated employees wishing to provide a medical exemption certificate will be required to provide proof of a medical consultation appointment within a period of 5 working days after the implementation of this policy.

7.0 Policy Enforcement

7.1 This policy will be enforced by the CAO/Clerk, Public Works Superintendent, Health and Safety Coordinator and the Bylaw Enforcement Officer.

8.0 Penalties

8.1Township employees who fail to comply with providing the required documentation identified in section 3.0 of this policy will be subject to the provisions of the Township Progressive Disciplinary Process as identified in the Township Employee Handbook.

8.2 Lessees and their guests who fail to comply with the provisions set out in the Township Memorandum of Use Agreement can or will be charged under the provisions set out in Ontario Regulation 364/20 and will forfeit the opportunity for future facility rentals from Billings Township.

The Corporation of The
Township Of Billings

By-Law 2022-18

Being a By-Law to establish a Health and Safety Policy

WHEREAS, The Corporation of the Township of Billings is committed to providing and maintaining a healthy and safe working environment;

AND WHEREAS, Section 25 of the *Occupational Health and Safety Act* states that an employer shall prepare a written occupational health and safety policy, review that policy at least once a year and set up and maintain a program to implement it;

NOW THEREFORE, The Corporation of the Township of Billings enacts the Health and Safety Policies and Procedures, attached to this by-law as "Schedule A"; and,

FURTHER, that the Health and Safety policy, 2018-37, and amendment, 2019-48, previously passed are hereby rescinded.

READ a first, second and third time and enacted in Open Council this 19th day of April, 2022.

_____ _____

Ian Anderson, Mayor Kathy McDonald, CAO/Clerk

Township of
BILLINGS
Come experience Billings... Exceptional

Health and Safety Policies and Procedures
The Corporation of the Township of Billings

August 2, 2018

(Revised December 17, 2019)
(Revised October 7, 2020)
(Revised January 21, 2021)
(Revised March 24, 2022)

Table of Contents

DISCLAIMER

The contents of this policy are to be used as part of an overall workplace specific health and safety program. It is neither considered to be legal advice nor to be viewed as comprehensive and complete in and of itself.

This policy was replicated from a production of other municipal townships and has been tailored for The Corporation of the Township of Billings.

The Corporation of the Township of Billings will review this policy on a yearly basis and any changes will be reviewed with the Council and the Safety Committee representatives, posted and distributed to all employees.

HEALTH AND SAFETY POLICY STATEMENT

The Corporation of the Township of Billings is committed to providing a workplace that is committed to the protection of its employees and the general public against illness, injury and accidental loss to persons and property.

In fulfilling this commitment, the Township will provide and maintain a safe and healthy work environment by performing work through acceptable industry standards, compliance with Occupational Health and Safety Act and the applicable Regulations.

The Township will strive to identify all foreseeable hazards which may result in personal injury/illness, fire, damage to property, damage to equipment and harm to the environment.

The Township will manage this program by utilizing recognized loss prevention management techniques and with information from government agencies and safety associations.

All employees of the Township will comply with the policy and safe operating procedures and safety rules as it applies to the work they are required to perform.

The Township will operate the Health and Safety Program utilizing loss control leadership principals and a program of employee inclusiveness when program improvements or changes are being brought forward.

_____ _____

Safety Representative CAO/Clerk

Date _____ Date _____

SENIOR MANAGEMENT COMMITMENT

The purpose of this part of the policy is to ensure that the senior management staff develops, endorses and implements a policy and program to reduce injuries and occupational illnesses. Studies have shown senior management involvement is a key element in the success of any program.

Senior management is considered to be any of the following: CAO, clerk, clerk treasurer, supervisors, superintendents or the health and safety coordinator.

All of the above will ensure that the goal of improved health and safety performance will be achieved by ensuring the following actions are carried out.

1) Produce a plan for a health program that will be continually evaluated for its effectiveness and compliance with legislative changes.
2) Respond to Health and Safety Committee recommendations.
3) Establish a program that effectively communicates information and updates in staff meetings or employee shift meetings.
4) When making changes or improvements to the H&S program or policies, that all employees actively participate by being solicited for opinion or through active participation.
5) Encourage off the job health and safety values.
6) Support training and development initiatives.
7) Have management involved in workplace inspections

HEALTH AND SAFETY CONTINUOUS SUPPORT PROGRAM POLICY AND PROCEDURES

Scope

The concept of this policy is to demonstrate continuous improvement within all aspects of operations with employees, contractors, visitors or the public in regards to safety, health and wellness.

Procedure

The concept of this policy is to demonstrate continuous improvement within all aspects of operations with employees, contractors, visitors or the public in regards to safety, health and wellness.
To achieve success in doing so the management team must plan and commit to the following philosophies, personal actions and goals:

a) To promote the principles that health and safety is a primary focus for the entire management team, all employees and to the community as well.
b) To provide an environment that enables all employees to participate and work collaboratively in developing, promoting and improving health and safety at work.
c) To ensure that health and safety concerns are integrated into all strategies, processes and performance measures.
d) To assist in effectively managing health and safety by eliminating, minimizing and controlling hazards.
e) That definite budgets are set for the implementation of health and safety training, equipment and promotion.
f) That each department set ongoing goals in regards to personal injuries, housekeeping standards and identified inspection deficiencies.

g) That management, supervisors and JH&SC routinely review all workplace inspection reports, incident/accident reports, recommendations, industry publications and government publications and safety associations.
h) That the Health and Safety Coordinator, JH&SC and supervisors perform yearly audits of training needs, scheduled maintenance and planned inspections as part of the yearly health and safety policy review.
i) That workplace promotions for off the job health and safety activities be planned for and implemented which would include: Wellness Initiatives, Vehicle Safety, Health and Safety at Home, Personal Health and Safety and Recreational Health and Safety.

INDIVIDUAL RESPONSIBILITIES AND DUTIES

SCOPE

The intent of this policy is to ensure that all workplace parties at all levels identified in the Occupational Health and Safety Act (OH&SA) are aware of all their responsibilities.

DEFINITIONS:

1) employer" means a person who employs one or more workers or contracts for the services of one or more workers and includes a contractor or subcontractor who performs work or supplies services and a contractor or subcontractor who undertakes with an owner, constructor, contractor or subcontractor to perform work or supply services;
2) "Responsibility" is defined as an individual's obligation to carry out assigned duties.
3) "Responsibility and authority' can be delegated to a worker giving them the right to be supervisors if they are competent to carry out the task.
4) "Prescribed "refers to a section of the OH&SA or the Regulations for Industrial Establishments, Construction Projects, Mining Plants as well as any other supporting Regulations.
5) "supervisor" means a person who has charge of a workplace or authority over a worker;
6) worker" means any of the following, but does not include an inmate of a correctional institution or like institution or facility who participates inside the institution or facility in a work project or rehabilitation program:

   1. A person who performs work or supplies services for monetary compensation.

   2. A secondary school student who performs work or supplies services for no monetary compensation under a work experience program authorized by the school board that operates the school in which the student is enrolled.

   3. A person who performs work or supplies services for no monetary compensation under a program approved by a college of applied arts and technology, university, private career college or other post-secondary institution.

   4. REPEALED: 2017, c. 22, Sched. 1, s. 71 (2).

   5. Such other persons as may be prescribed who perform work or supply services to an employer for no monetary compensation;

7) "workplace" means any land, premises, location or thing at, upon, in or near which a worker works

DUTIES OF THE EMPLOYER:

The Employer shall ensure that:

a) Equipment, materials and protective devices as prescribed are provided.
b) Equipment, materials and protective devices are maintained in good condition.
c) Prescribed measures and procedures are carried out in the workplace.
d) Equipment, materials and protective devices are used as prescribed.
e) A building or structure of the workplace capable of supporting all loads to which it may be subjected without causing materials therein to be stressed beyond the allowable unit stresses established under the Building Code Act.
f) Provide information, instruction, and supervision to a worker to protect the health and safety of a worker.
g) When appointing a supervisor, appoint a competent person.
h) Acquaint a worker or person in authority over a worker with any hazard in the workplace and the handling, storage, use, disposal and transportation of any device, article, equipment and/or biological/chemical hazardous materials or physical agents.
i) Afford assistance and cooperation to a Health and Safety Committee and /or Health and Safety Representative carrying out their specific functions and responsibilities under the OH&SA.
j) Only employ in the workplace a person over such age as may be required by law.
k) Not knowingly permit a person who is under such age as may be prescribed in or about the workplace.
l) Take every precaution reasonable in the circumstances for protection of the worker.
m) Post in the workplace a copy of the OH&SA and any explanatory material prepared by the Ministry both in English and the majority language of the workplace outlining the rights, responsibilities and duties of workers.
n) All contractors or sub-contractors performing work for the Township shall provide documentation (when requested) that they are compliant with requirements of the OH&SA and the applicable regulations.
o) Establish an occupational health service for workers as prescribed.
p) Where an occupational health service is established maintain the same according to the standards prescribed.
q) Keep and maintain accurate records of the handling, storage, use and disposal of biological, chemical or physical agents as prescribed.
r) Accurately keep and maintain and make available to the worker affected such records of a worker to biological, chemical or physical agents as may be prescribed.
s) Notify a Director of the use or introduction into a workplace of such biological, chemical or physical agents as may be prescribed.
t) Monitor at such time or times or at such an interval or intervals the levels of biological, chemical or physical agents in the workplace and keep records thereof as prescribed.
u) Comply with a standard limiting the exposure of a worker to biological, chemical or physical agents as prescribed.
v) Where so prescribed, only permit a worker to work or be in a workplace that has undergone such medical examinations, test or x-rays as prescribed and who is found to be physically fit to work in the workplace.

w) Where so prescribed, provide a worker with written instructions as to the methods and procedures to be taken for the protection of the worker.
x) Carry out such training programs for workers, supervisors and committee members as may be prescribed.

ADDITIONAL DUTIES OF EMPLOYERS

a) In a medical emergency for the purpose of diagnosis or treatment provide, upon request, information in the possession of the employer, including confidential information, to a legally qualified medical practitioner and to such others as may be prescribed.
b) Prepare and review annually a written health and safety policy and develop and maintain a program to implement the policy.
c) Post in a conspicuous place a copy of the occupational health and safety policy.
d) Provide to a JH&SC representative, the results of a report respecting occupational health and safety that is in the employer's possession and if that report is in writing, a copy of the portions of the report that concern occupational health and safety; and
e) Advise workers of the results of the report as referred to in (d) and if the report is written, make available to them upon request, copies of portions of the report that contain occupational health and safety.

OTHER EMPLOYER RESPONSIBILITIES

a) Ensure the workplace is maintained in a healthy and safe condition.
b) Provide ongoing safety education training and safety committee meetings.
c) Ensure monthly inspections are performed and followed up on.
d) Provide written safe operating procedures.
e) Ensure employee observations are performed
f) Include safety performance as part of employee evaluations.
g) Ensure that good health and safety performance is recognized.
h) Ensure personal protective equipment is worn.
i) Ensure that health and safety is on all managerial and supervisory meeting agendas.
j) Ensure that all accidents, incidents and close calls are investigated and that information is sent to the appropriate personnel.
k) Ensure first aid facilities are provided and maintained as prescribed.
l) Ensure that any substandard acts or conditions are corrected.
m) Ensure health and safety reference material is readily available for all workers.
n) Ensure health and safety is a part of hiring and employee transfers.
o) Ensure that any required medicals are performed.
p) Ensure there is a progressive disciplinary system in place that includes safety infractions.

DUTIES OF A SUPERVISOR

a) Ensure that all workers work in a manner and with the protective devices, measures and procedures required by the Act and the Regulations and the Township health and safety policies and procedures.
b) Uses or wears the equipment, protective devices or clothing that the employer requires to be worn.

c) Ensures that all workers are aware of any existing hazards. (especially in non-routine work instruction)
d) Ensure that written instruction is provided where required or prescribed.
e) Ensure that all reasonable precautions are taken in the circumstance for the protection of the worker.
f) Ensure that safety is part of daily discussions with the workers.
g) Ensure that workers are following all safe operating procedures applicable to their work.
h) Perform daily workplace inspections of facilities and equipment.
i) Ensure that any substandard health and safety performance is corrected as soon as possible.
j) Ensure good safety performance is recognized.
k) Ensure that health and safety reference material is readily available to workers.

DUTIES OF A WORKER/TEMPORARY/CONTRACT WORKER

1) Ensure that they work in compliance with the provisions of the OH&SA, the Regulations and Township safe operating procedures.
2) Ensure that they use or wear equipment, protective devices or clothing that the employer requires to be used or worn.
3) Report to his employer or supervisor the absence or defect of any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker.
4) Report to the employer or supervisor any contravention of the OH&SA or the Regulations or the existence of any hazard of what he or she knows of.
5) Ensure that they do not remove any required protective devices and if it is required to do so replace the protective device immediately after completing the task.
6) Ensure that they do not operate equipment, machine or device or work in a manner that may endanger himself, herself or another worker.
7) Ensure that they do not engage in any prank, contest, feat of strength, unnecessary running or rough and boisterous conduct.
8) Ensure that all accidents, incidents or close calls are reported immediately or as soon as possible.
9) Ensure they are actively involved in all safety initiatives requested of them, including attending required safety training course.

DUTIES OF CONTRACTORS AND SUB-CONTRACTORS

All individuals or organizations performing work for the Township of Billings will provide, when required, the following information.

a) Documentation (When required) of an established health and safety policy and that a program to implement the policy is evident.
b) Documentation (When required) of liability insurance coverage.
c) Documentation (When required) that workers operating equipment are trained in the operation of the equipment or if the equipment requires specialized training that the worker has documented proof of training.

d) Documentation (When required) that workers have received training and are aware of the OH&SA and the applicable Regulations.
e) Documentation (When required) of worker training and awareness of safe handling of any hazardous materials associated with the work
f) Documentation (If the required information is not available from the WSIB on-line site) of WSIB status i.e., Certificate of Clearance or Independent Operator status will be sourced by the employer.
g) Completion and submission (When required) of the following documents (as required): (See Appendix # 1)
   - Certificate of Insurance
   - Undertaking to Comply
   - Pre- Construction Contractor Safety Meeting Checklist

*When required will include:
a) Projects of with cost of $50,000+; or
b) Jobs where the contractor will be performing work on a worksite for more than 3 working days.
c) At the discretion of the CAO or Public Works superintendent.

DUTIES OF VOLUNTEERS

Volunteers are an integral asset in performing community projects within the Township of Billings, but it is important that the volunteer be treated as a regular employee in regards to their personal health and safety as identified in the OH&SA Definitions of a Worker (5) which states:

5.Such other persons as may be prescribed who perform work or supplies services to an employer for no monetary compensation.

To meet the legislated responsibility, all volunteers performing work for the Township will be required to complete the following safety training courses:

a) -Ministry of Labour 4 Step Basic Safety Awareness for Workers
b) -WHMIS 2015
c) -Workplace Violence and Harassment
d) Other applicable legislative requirements

Volunteers are also required to:

a) Work in a manner consistent with the Duties of a Worker as prescribed in Section 28 of the OH&SA
b) Follow any Safe Operating Procedures associated with the work being performed.
c) Wear all the PPE identified to perform the work.

All committee chair persons who will be organizing volunteer work are required to provide the names of all of the volunteers and the details of the work to be performed to the health and safety coordinator four weeks in advance of the work to be performed.

DUTIES OF THE HEALTH AND SAFETY COORDINATOR

a) Implement and modify, if required, the provisions of the Township health and safety policy and safe operating procedures of the in a way that ensures compliance with the OH&SA and the Regulations.
b) Provide monthly reports to the Township Council identifying health and safety activities.
c) Ensure that a program is in place to ensure that all policies are complied with, and that the program is evaluated on a yearly basis and that any changes are documented, approved by Council and distributed to the JH&SC and all workers.
d) Ensure that training needs are identified and that the appropriate training is delivered.
e) Ensure written safe operating procedures are developed for work where it is prescribed and/or for work deemed hazardous enough to warrant a written procedure.
f) Coordinate activities with the JH&SC.
g) Assist in accident, incident or near miss investigations.
h) Assist in any Ministry of Labour inquiries or concerns.

JOINT HEALTH AND SAFETY COMMITTEE REPRESENTATIVE

Joint Health and Safety Committees (JH&SC) are integral to the internal responsibility system of an organizational health and safety program.
JH&SC representative are required under the OH&SA to carry out various functions within the scope of their responsibilities and must be supported by all personnel in the organization as prescribed in the OH&SA.
The composition and selection of JH&SC is to be done as per the OH&SA Section 9(2).
JH&SC representatives have the prescribed right to:

a) Identify situations that may be a source of danger or a hazard to workers.
b) Make recommendations to the employer and the workers for the improvement of health and safety in the workplace.
c) Obtain health and safety information regarding existing hazards, materials, processes, industry safety standards, health or safety testing of any equipment, machine, device, article, thing, material or biological, chemical or physical agent in or about the workplace.
d) Perform workplace inspections at least once per month and have the inspection posted as per the JH&SC Terms of Reference.
e) Review completed Accident/Incident Reports or near miss reports.
f) Take part in workplace hazard assessments or workplace testing.
g) Be present at or assist in a work refusal investigation.
h) Assist in any investigation resulting in death or critical injury.
i) Accompany an officer from the Ministry of Labour in a workplace inspection.

VISITORS/GENERAL PUBLIC RESPONSIBILITIES

Visitors and the general public are persons who do not come under the any of the previously identified categories but who are more than likely to be encountered in the various workplaces or facilities open to the public. All employees must ensure the following:

a) That all visitors obey all posted signs regarding restricted access.
b) Any visitor is accompanied by an employee when entering into a restricted access area.

GENERAL SAFETY RULES

Scope

The purpose of the general safety rules is to ensure that there are minimum standards of conduct that need to be met to be in compliance with the safety policies or procedures.

Procedure

The following rules and standards must be adhered to, and enforced by all employees who exercise authority over workers:

1) Personal protective equipment and safety related equipment must be used or worn when and where they are required as per Safe Operating Procedures.
2) Safety related electronic devices shall be used according to safe operating policies and procedures.
3) Report all accidents, incidents and near miss incidents immediately to your supervisor.
4) Reporting to work in an intoxicated state or under the influence of alcohol or recreational cannabis is strictly prohibited.
5) Consuming alcohol or recreational cannabis while at work is strictly prohibited.
6) Employees are required to follow written safe operating or handling procedures when performing their work or when working with hazardous materials. Employees are required to obey all posted signs and notices.
7) Employees operating township vehicles/equipment must be in possession of a license or certificate for the vehicle/equipment being operated.
8) Employees operating township vehicles
9) /Equipment must comply with the rules of the Highway Traffic Act and other applicable regulations.
10) Horseplay, pranks, rough or boisterous conduct, and profane language is prohibited.

Failure to comply with these rules can or will result in disciplinary actions that are listed in employee handbooks or in employee codes of conduct.

POSTED DOCUMENTS POLICY AND PROCEDURE

Scope

The distribution and availability of specific health and safety information is identified in the OH&SA and the Regulations. To achieve these requirements safety information boards will be installed in highly visible and accessible locations for employees to view.

Procedure

The following information shall be posted or readily available.

1) The Township Health and Safety Policy
2) The OH&SA and applicable Regulations
3) Health and Safety at Work Prevention Poster
4) WSIB form 82. In Case of Injury Poster.
5) Emergency telephone numbers.
6) Fire and Evacuation procedures.
7) Workplace Harassment and Violence Policy & Blank reporting forms.
8) Names and contact information for JH&SC representatives.

9) JH&SC meeting minutes, monthly inspection reports, recommendations, accident/incident report summaries, health and safety testing reports or other pertinent safety activities.
10) WHMIS regulations and MSDS binder.
11) MOL inspection reports and orders.
12) Safety awareness information.

HAZARD RECOGNITION AND CONTROL POLICY AND PROCEDURE

Scope

Hazard recognition and control is one of the key elements to controlling employee exposure to workplace ergonomic issues, workplace stressors or physical, mechanical, chemical, biological or environmental agents that could possibly cause occupational injury or illness.

Procedure

To achieve the goal of identifying and implementing controls to protect employees is a multi-step process that utilizes the following tools.

a) Job/Task Inventory- Identify all workplace occupations and then all jobs or tasks that are performed in all areas of all workplaces.
b) Job/Task Analysis- a process that identifies external hazards as well as the frequency and severity potential using a systematic rating system. (See Appendix # 1)
c) Hazard Analysis-Based off of the level of potential severity each hazard is examined to determine if controls are required for the protection of the employee performing the task.
d) Control Implementation-determining what the most effective form of control will be i.e., at the source, along the path or at the worker.

Through the process, information gathered shall be shared with the employer, the JH&SC, supervisors and all other employees.

This process will be utilized as part of the evaluation of new equipment purchases, work process changes and any facility/workplace modifications.

SAFE OPERATING POLICY AND PROCEDURES

Scope

Written Safe Operating Procedures for work processes and equipment that present a major loss potential are essential for employee hazard awareness training and having a reference for supervisors to refer to when directing work for employees.

Procedure

The written safe operating procedures for work processes that have the potential for major loss potential will be based off a process that at a minimum. uses the following components:

a) Purpose of the procedure.
b) Legislative references.
c) Required safety equipment or PPE.
d) Identified hazards.
e) Responsibilities of the employer, supervisor and the worker.

f) Detailed job performance instructions.
g) An annual review check sheet. (Where applicable)
h) Supporting manufacturer information or industry recommended best working procedures for the task or similar task.

All safe operating procedures shall be reviewed annually by the JH&SC, departmental supervisor and the workers performing the work.

Follow-up evaluations by all parties will be performed to determine the effectiveness of the written procedure.

HAZARD REPORTING POLICY AND PROCEDURE

Scope

The OH&SA requires employers, supervisors and employees to report hazards or unsafe acts immediately or as soon as reasonably possible. The purpose of this policy is to detail the procedures to be followed when a hazard is identified.

Procedure

This can be done verbally for hazards that can be corrected immediately or within a reasonable time frame agreed upon by the employee and supervisor or the worker will submit a Hazard Reporting Form. (See Appendix 1)

If the hazard is a recurring problem or the hazard is not being addressed, the employee should advise the JH&SC and submit a recommendation form to the employer detailing the concern.
The employer will respond to the recommendation in writing as per the OH&SA Section 9(19.1) (20) (21).
If the issue is an unsafe act, it must be reported and acted upon immediately by the supervisor or anyone who has authority over the direction of the work.
If the unsafe condition or act results in a work refusal, the work refusal process identified in Part V Section 43 through 49 of the OH&SA must be followed.

INSPECTION POLICY AND PROCEDURES

Scope

Workplace facility inspections, vehicle inspections and equipment inspections are another key element of the health and safety program that involves all workers being aware of their work environment and the equipment that they are using and reporting any deficiencies. Inspection requirements are identified in multiple areas of the Occupational Health and Safety Act and the Regulations with the responsibility to perform them being listed in the responsibilities for employers, supervisors, workers and JH&SC members. Inspection requirements for workplace specific circumstances will be identified in Safe Operating Procedures.

Procedure

To achieve the requirements of this policy the following types of inspections will be utilized:

Informal Inspections will be conducted by supervisors and workers on an ongoing basis in their areas of responsibilities. Items identified while performing informal inspections shall be recorded on a Hazard Reporting Form and be followed up according to hazard reporting procedures.

Formal Inspections will be conducted by managers, supervisors, workers operating commercial vehicles and heavy equipment and JH&SC representatives as prescribed by the OH&SA and the Regulations. Formal inspection reports will be conducted using the JH&SC inspection checklist (See Appendix # 1) with deficiencies recorded on a JH&SC inspection reporting form (See Appendix # 1) for follow-up actions.

This inspection process will include, but not be limited to the following:

a) Management safety walks.
b) Health and Safety Coordinator weekly workplace observations.
c) Supervisors ongoing observations of their work area.
d) Supervisors monthly formal inspection
e) Workers ongoing observations in their work area.
f) Workers operating commercial vehicles and heavy equipment.
g) JH&SC formal monthly inspection as identified in the JH&SC inspection schedule.

WORK REFUSAL POLICY AND PROCEDURE

Scope

The OH&SA, Part V sections 43 through 49, sets out specific provisions that must be followed in the event that a worker has a reason to believe that:

1) Any equipment, machine, device or thing that he/she is to use or operate is likely to endanger the worker or another worker;
2) The physical condition of the workplace or the part thereof in which he/she works or is to work is likely to endanger himself or herself; or
3) Workplace violence is likely to endanger himself or herself; or
4) Any equipment, machine, device or thing he/she is to use or operate or the physical condition of the workplace or the part thereof in which he or she works or is to work is in contravention of the Act or regulations and such a contravention is likely to endanger himself, herself or another worker, the worker may refuse to do the work.

Procedure

When a worker initiates a work refusal the following process will be followed:

1) The employer/supervisor and JH&SC representatives will be notified, and with the worker staying in place, the employer or supervisor and the JH&SC representative will investigate the concern.
2) If the issue gets resolved the worker will return to work and the supervisor will complete an incident report that will be forwarded to the JH&SC.
3) If the issue cannot be resolved and within reasonable grounds, the supervisor or employer will contact the Ministry of Labour.
4) The Ministry of Labour in consultation with the JH&SC representative and the supervisor or employer will investigate the issue.
5) The Ministry of Labour Inspector will give his report in writing.
6) Once the necessary corrections are corrected the worker will return to work.

7) If the worker still refuses to work the supervisor/employer may ask another worker to perform the task, under the condition that the new worker has had the refusal explained to him/her in the presence of the worker who initiated the work refusal.
8) Upon completion of resolving the work refusal process, the supervisor will complete and submit, to management, an Accident/Incident Report. (See Appendix # 1)

EMERGENCY SITUATIONS AND EVACUATION POLICY AND PROCEDURES

Scope

The preservation of life and property is a key concern if and when an emergency situation arises, and not all emergencies require the same responses.

To achieve this goal the employer shall ensure that a plan is established and posted for the most probable emergencies that could occur.

The four most probable emergency situations that could occur are: Fire, gas leak (ammonia/propane), power failure and workplace violence situations.

Procedure

FIRE EMERGENCY

a) In the event of a fire being discovered, the person discovering the fire shall call out “fire, fire, fire “three times and direct someone to call 911 and activate fire alarms and direct another person to meet the emergency vehicles.
b) Upon hearing the fire warning, all employees shall evacuate the building in an orderly fashion out the nearest exit or fire exit.
c) Once out of the building employees will gather in a designated area and perform a roll call.
d) No person who has exited the building shall re-enter the building.
e) If the fire can be put out with an extinguisher, then try to do so. If not ensure everybody has exited the building.
f) Wait until emergency response personnel have cleared the building prior to re-entry.
g) The employer will ensure that employees have been given proper evacuation training, fire extinguisher training, posted an evacuation route in a visible location, has a monthly monitoring of fire equipment and has posted emergency phone numbers.

GAS LEAK EMERGENCY

a) In the event of a gas leak the person discovering gas leak will call out “gas, gas gas” three times and direct someone to call 911 and someone to meet the emergency response vehicles.
b) Repeat items b) c) d) from fire emergency.
c) Remain outside of the building until it has been cleared by emergency response personnel.

POWER OUTAGE EMERGENCY

a) In the event of a power outage employees are required to stay where they are unless they are able to safely exit the building and meet in the designated meeting area.
b) If the power continues to stay off and you cannot safely exit the building, stay where you are until someone with a light locates you and safely escorts you out.

WORKPLACE VIOLENCE EMERGENCY

Workplace violence is a threat that can come from many different sources and can come in multiple forms as well, depending on where you work and what your job is.
The level of threat and the situation also dictate what actions you may need to take.
Worksite specific procedures will be produced for office workers and outside workers.
Immediate Threat/Intimidating Situation

a) Stay calm and summon assistance if required.
b) Attempt to deescalate the situation.
c) Call 911 and advise them of the nature of their emergency. Be specific as you can in ensuring that you give your location, how many persons are involved, identity of persons involved and other pertinent details.
d) Give any details that may assist first responders in approaching the situation.
e) Exit the area of threat if it can be done safely by leaving the building or going to a designated safe area.

Violence Committed

a) Call 911 immediately if a person commits an act of violence against you or another person.
b) Advise 911 of the relevant information and include any medical information as necessary.
c) Follow items c, d, e listed in Immediate Threat/Intimidating Situation.

Non-emergency Situation

a) If you are not in immediate physical danger, but you have information or concerns regarding workplace violence, contact your supervisor immediately.

LONE WORKER POLICY AND PROCEDURE

Scope

Due to the nature of the various services that the Township provides to its' residents, Township workers perform multiple duties that require them to work alone.
As part of the Townships responsibility to take every reasonable precaution in the circumstances for the protection of the worker, the Township has identified that workers who perform work alone can possibly be more vulnerable if an injury or unforeseen event occurs.

Definition

Lone Worker is a worker who works alone or in isolation where assistance would not be readily available in case of an emergency or if the worker became ill or injured.

Procedure

To ensure that the Township is in compliance with its' responsibilities, the Township will take the following actions:

a) Perform an assessment of all job's workers perform to identify what jobs have workers performing work alone.
b) Assess each identified lone Worker Situation using the Lone Worker Injury Probability Checklist to determine if written safe operating procedures or other controls need to be produced, implemented or amended.
c) Perform a Workplace Violence assessment.
d) Implement procedures for possible workplace violence.

e) Provide training to all workers regarding lone workers and emergency procedures for workplace violence situations.
f) Review this procedure on a yearly basis.

ELECTRONIC DEVICES USE POLICY AND PROCEDURES

Scope

The purpose of this policy is to limit the use of cell phones and other communication devices at work. Inappropriate use of communication devices at work can cause injuries because it's distraction and may interfere with their proper and safe use of equipment and machinery. Devices and headphones or wireless ear pieces may also get tangled in machinery or interfere with proper use of personal protective equipment.

Application

This Policy applies to workers, temporary workers and other workers at the Township, including all personnel affiliated with third parties working at Township facilities.

The devices covered by this Policy include hand held electronic communication devices, text pagers, and other wireless devices or gaming devices, whether owned by the Township or the individual worker (collectively referred to as "Devices").

Procedure

All Township employees are required review and verify their understanding of electronic device usage by signing off on a Township Electronic Devise Use Agreement upon hiring with the Township. (See Appendix # 1)

The rules set out in this Policy apply to all work-related activities, including but not limited to the conduct of job-related activities, whether such devices are owned by the Township or the worker. The Policy applies to all conversations, whether personal or business-related.

Prohibited Uses

a) General-While in the workplace during work hours, workers are expected to focus on work and may not inappropriately use any device in the workplace for any inappropriate purpose, including but not limited to:
b) Engaging in personal conversations;
    - Playing games;
    - Surfing the internet
    - Checking e mail; and
    - Sending or receiving text messages.
c) Driving-While operating a vehicle, workers may not answer a communication device (two-way radios are excepted) unless and until they pull over in a safe spot (or let a passenger answer the call). This is also against the law under the Highway Traffic Act, Chapter 4. If it's urgent, workers may accept or return the call, provided that they remain parked off the roadway. They may not resume driving until their conversation is over. Workers may not make outgoing calls while driving. If workers need to place a call, they must first pull over in a safe spot. At all times while driving the regulations under the Highway Traffic Act must be followed.

Permitted Uses: Workers may use devices while they're not working in the following designated areas (break room/ lunch room). Use of hands-free devices while driving for Township work/ business ins not permissible.

LOCKOUT POLICY AND PROCEDURE

Scope

Lock-out is a term used for a systematic method of disabling the power source of any equipment, machine, device or thing while maintenance, servicing or repairs are being performed by one or more persons in a workplace that may be in full production or shut down for maintenance reasons.
It should be noted that power sources to consider may include electricity, hydraulics, compressed air, gravity and other sources of energy.

Procedure

The employer will identify the situations where lockout procedures are required and develop written safe operating procedures to follow when performing these specific tasks as well as providing training for all workers performing the various task.
The safe operating procedure will identify the following:

a) Persons permitted to perform the work.
b) When the work is to be performed.
c) Specific methods of locking out energy sources i.e., locks, blocks, signage…
d) Process for restarting energy sources.
e) Review Ontario Regulation 851 Sections 42, 75 & 76.
f) Verify all steps have been reviewed and implemented prior to the start of any work.

CONFINED SPACE ENTRY POLICY AND PROCEDURE

Scope

Confined space work puts employees in situations where they are exposed to serious injuries or the possibility of death. Therefore, it important that Township identifies all situations where an employee may be exposed to confined space work and provide written procedures for the work process.

Definition

Confined space entry defined is when an employee will enter into a space that is partially or fully enclosed that:

a) Is not designed and constructed for continuous human occupancy; and
b) In which atmospheric hazards may occur because of its construction, location, or contents or because of work that is done in it.

Procedure

The employer will be responsible for identifying all tasks that are considered to be confined space entry and develop written safe operating procedures for each identified task and provide training for all employees who will be performing these tasks.

The safe operating procedure shall include the following:

a) Persons permitted to perform the work.
b) Testing requirements if required.
c) Conditions of entry

d) Means of communication.
e) Personal protective equipment required.
f) Rescue equipment and personnel as required.
g) Review Ontario Regulations 632/05.

TRAFFIC CONTROL POLICY AND PROCEDURES

Scope

Traffic control is a critical aspect of Public Works employee's safety when performing work on public roadways. The goal of traffic control is to ensure any worker performing work on a highway or any other roadway who may be endangered be vehicular traffic unrelated to the job/work is adequately protected.

Procedure

To ensure these objectives are met the employer shall:

a) Ensure that a written plan is implemented for each of the various roadwork duties that are performed by the supervisors and workers. See safe Operating Procedure # 11
b) Provide the necessary safety devices to protect the workers and that the devices meet the standards identified in Ontario Regulation 213/91 Sections 67-69.
c) That all workers performing traffic control duties receive training equivalent to the guidelines listed in the Book 7 training course and the Traffic Control Persons Guidelines manual.
d) That supervisors and workers are competent to perform the work.
e) That written plans are available to all employees and taken to the worksite and that the plans include the type of roadway, volume of traffic, speed limits, weather conditions, safety devices required, personnel required and the time of day.
f) That all workers have and wear the appropriate protective clothing and protective equipment.

PERSONAL PROTECTIVE EQUIPMENT (PPE) POLICY AND PROCEDURE

Scope

The wearing, caring and fitting of PPE is another important factor in taking all reasonable precautions for the protection of the worker. Whether providing or advising what type of PPE to use, the employer shall ensure that all PPE used meets the CSA standards defined in the various Regulations. All employees shall wear PPE as prescribed (Township SOPs) and as part of their duties as a worker in the OH&SA.

Definition

Personal Protective Equipment is clothing and equipment that is worn or used in order to provide protection against hazardous substances or environments.

Procedure

The employer shall ensure that all employees will be properly fitted and trained in the use and care of their PPE.

See Safe Operating Procedures #1i n all departmental safe operating procedures binders.

PPE items identified in the manual include hard hats, eye protection, hearing protection, respiratory protection, skin protection, visibility clothing, foot protection, personal floatation devices and fall protection equipment.

WHMIS POLICY AND PROCEDURE

Scope

WHMIS is a process that was developed in the 1980's to assist and train all workplace parties about the safe handling and use of all the hazardous materials associated with the workplace processes or operations.

Procedure

1)To ensure that all employees are WHMIS 2015 functional, the employer will provide training that includes the following information:

a) GHS hazard warning symbols
b) Supplier labels
c) Workplace labels
d) Safety Data Sheets
e) Training evaluation
f) Workplace specific hazardous materials training

2) The employer shall provide and have readily available, Safety Data Sheets for all hazardous materials that are used in the various Township work areas.
3) The employer shall ensure that an annual inventory of hazardous materials is performed at the various Township work areas.
4) The employer shall ensure that Safety Data Sheets are requested when new products, that may be hazardous materials, are being ordered.
5) The employer shall that all Safety Data Sheets for new products are review with the workers using the product.

TRAINING AND DEVELOPMENT POLICY AND PROCEDURE

Scope

Employee training is a cornerstone of a health and safety program. Employee health and safety training is mandated by the OH&SA and the applicable Regulations as well as any other training identified by performing workplace hazard analyses. It is important that employees receive the training, but it is important that the employer verify an employee's understanding of the training.

Procedure

All employees will receive basic introductory health and safety training within the first two weeks of their employment. This training will include:

H&S Coordinator

a) MOL Basic 4 Step Safety Awareness plus a review questionnaire.
b) AODA Accessibility Training
c) WHMIS 2015
d) Workplace Violence and Harassment training.
e) Health and Safety Policy, Safe Operating Procedures
f) Injury/Illness Reporting, Accident/Incident/Near Miss Reporting

Supervisor

a) All items identified in the New Hire Refresher Training form (See Appendix #1) as required by the work that the worker will be performing.

All employees who are performing work that requires special licensing or certification will be required to provide documentation proving they are qualified or will be trained within a reasonable period of time to become certified or licensed, examples of this would be:

a) Snow plow operator
b) Grader operator
c) Backhoe operator
d) DZ driver's license
e) MOL 5 Step Supervisory Safety Training
f) Hazard Recognition and Control
g) Confined Space Entry
h) Traffic Control
i) Working at Heights
j) Propane Handling
k) First Aid
l) Municipal Fuel Attendant
m) Chainsaw Operator

All returning contract or student workers will be required to do the new hire/refresher training.
All workers transferring into new jobs will receive the required training to perform the work safely.

JH&SC HEALTH AND SAFETY TRAINING POLICY AND PROCEDURE

All management, supervisory and worker personnel who are involved in the JH&SC, performing inspections, performing accident/incident investigations or emergency preparedness and response will receive the training required to perform their duties, this would include:

a) Hazard Recognition and Control (workplace Inspections)
b) Accident Investigation
c) First Aid

All employees will receive emergency preparedness training for emergency situations.
The training will be provided by either in-house personnel or by outside sources.
This training policy will be reviewed by the JH&SC/HSR as part of the yearly health and safety policy audit. Any changes will be forwarded to the appropriate personnel and posted in a visible location.

EMPLOYEE WELLNESS POLICY AND PROCEDURE

Scope

With the issues of mental and emotional wellness and physical wellness, being brought to the public forefront, the Township of Billings recognizes that the mental, emotional and physical wellness of all of its employees is an important issue.

Mental and emotional health and wellness is as important as a person's physical heath.
Mental and emotional health includes a person's emotional, psychological and social well being and physical health would include personal health and lifestyle activities.
Having sound mental, emotional and physical health is important as it also determines how a person will handle stress, make sound choices and how he /she will react when dealing with family, co-workers and the general public.

Mental, emotional and physical health is important for the social well-being of the employee, their family and their employer.

The Township recognizes that it has a responsibility to develop and implement a policy that will create an awareness of mental, emotional and physical wellbeing and that the Township will offer confidential assistance in in the event of an employee requiring assistance.

The Township will strive to ensure that it will recognize and support employee wellbeing by ensuring that managers and staff work collaboratively in eliminating unhealthy stressors and workplace hazards.

Procedures

Employee Awareness

1) The Township will provide, on a bi-monthly basis, information handouts relating to mental, emotional or physical well being.
2) The Township will post, on bi-monthly basis, mental, emotional or physical health themed posters in its facilities where workers meet at the start of their shifts.
3) The Township will provide, in conjunction with other municipalities, an annual ½ - day awareness seminar that will have guest speakers and workshops that focus on mental, emotional and physical well being.

Employee Assistance

1) In the event that an employee comes forward seeking assistance with a mental, emotional or physical health concern, the Township will, in confidence, provide contact information for the employee to source support information relating to their situation.
2) In the event that an employee comes forward seeking assistance with a mental, emotional or physical health concern, the Township will provide, if required and if capable, a modified work program that will assist in return to regular duties
3) In the event that an employee comes forward seeking assistance with a mental, emotional or physical health concern, the Township will provide assistance in assisting the employee with providing documents and making contact with the Township's group insurance provider.

FIRST AID POLICY AND PROCEDURES

Scope

During the course of performing work, minor injuries may occur. When these injuries occur, they need to be treated to prevent any further complications or to determine if professional medical assistance is required. It is also important that these injuries and follow-up treatment are recorded for future reference if required.

Definition

First Aid injuries are injuries requiring basic treatment to control minor lacerations, scrapes, burns, bruising and other minor injuries that can be treated by a certified first aider.

Procedures

1) If an injury cannot be adequately treated the employee will be taken to seek professional medical attention.

2) First Aid injuries that are treated by the injured employee or certified first aider must be recorded in the first aid log book.

3) First Aid kits and their contents and the required amount of first aiders will be provided as per WSIB Regulation 1101.A copy of WSIB Regulation 1101 will be posted/ available at each first aid station.
4) All vehicles will be outfitted with a first aid kit.
5) First Aid kits and their contents will be inspected on a quarterly or on a as need basis and the dates of inspections will be recorded.
6) The names of certified first aiders will be posted at the first aid station.

MEDICAL AID POLICY AND PROCEDURES

Scope

During the course of performing work, injuries or illnesses may occur. When these injuries or illnesses occur and they cannot be treated by the employee or a first aider the employee will need to be taken to receive professional medical attention.

Definition

Medical Aid injuries refers to any injury not severe enough to warrant more than the day of injury off, but where medical treatment by a doctor or health care professional is given.

Procedure

Medical aid injuries/illnesses are injuries/illnesses requiring professional medical attention either at a clinic or hospital. Medical aid injuries require the following procedures to take place:

a) Have the injured/ill employee complete a WSIB Form 6 (Workers Report of Injury/disease).
b) The employer will complete and submit a WSIB form 7 (Employers Report of Injury/Disease). This report must be submitted to the WSIB within three days of the reported injury or illness.
c) The immediate manager/supervisor will complete, within 72 hours of the incident, an Investigation/Corrective Report (See Appendix # 1) provided in the Accident/Illness/Injury tool kit.
d) If the employee is able to return to work and perform his/her regular duties or perform his/her work with minor accommodation no further action is required other than follow up by the employer/supervisor.
e) If the injured/ill employee is not able to return to work and perform his/her duties but will be able to do so after a specified period of time prescribed by his/her physician no further action is required other than follow up by the employer/supervisor.

EARLY RETURN/MODIFIED WORK POLICY AND PROCEDURES

Scope

Early return to work or modified work are requirements under the WSIB Act where the employer is required to accommodate an employee if they become injured at work. The Township is required to have a policy and procedure in place to meet its responsibilities.

Definition

Modified Work is work that is offered when an injured worker is able to return to work but is unable to perform all of the duties of the pre-accident job. It includes any modification of the previous job that helps a worker safely return to work.

Procedure

If an injured/ill worker is not able to return to work and perform his/her regular duties but is capable of performing modified duties the employer will initiate the following procedures:

a) The injured/ill worker will be provided with a WSIB form 2647 (Functional Abilities Form) that the injured/ill employee will have completed by his/her physician and returned to the employer in reasonable time.
b) Based off of the information provided on the Functional Abilities Form the employer will complete a Modified Work Plan and provide a modified work program that will facilitate an early and safe return to work.
c) The employer/supervisor will create a modified work log (See Appendix #1) to keep record of all contacts and updates from the injured/ ill employee until the injured/ill employee is capable of returning to regular duties.
d) In the event that the injured/ill employee has an injury/illness that is permanent, the employer will provide the employee with work that will be consistent with the permanent limitations listed on a report provided by his/her physician.
e) In the event the injured/ill employee is requiring any type of specialized training or orientation to be able to perform any modified duties, the employer will coordinate this through discussions with the employee, the supervisor and the WSIB. These discussions will include the employees' pre-injury job, the pre-injury job with modifications, suitable duties in the pre-injury department, suitable duties in other departments or any other suitable work. All information regarding these discussions will be recorded on Communication Record for Modified Work Programs. (See Appendix # 1)
f) The employer will report to the WSIB any of the following:
    1) Any changes in wage.
    2) Change in duties/duration of the program.
    3) Failure to cooperate. If there is a failure to cooperate by the injured/ill employee the concern will be brought forward to the appropriate WSIB representative.
    4) End of program

NOTE: An Accident/Incident/injury/Illness Reporting /Return to Work/Modified Work Procedure kit that details definitions as well as more specific procedural details has been provided to all supervisors. (See Appendix # 1)

RETURN TO WORK PROCEDURES FOR NON-WORK-RELATED INJURY/ILLNESS

Scope

Accidental injury or an illness are situations that are not confined to the workplace. When these situations arise, the Township will assess the situation on a case-by-case basis.

Procedure

If a worker experiences a non- work-related injury/illness and the worker is not able to perform their regular duties but is capable of performing modified duties in a position of value for the Township, the following procedures will be initiated.

a) The worker will take a Township Functional Abilities Form (FAF) (See Appendix # 1) to their physician to complete and return it back to the office in reasonable time.
b) Based off of the information on FAF the employer will develop a modified work plan to accommodate the workers limitations to facilitate an early and safe return to work.
c) The employer will create a contact log that will record all discussions and follow-up contacts regarding the workers modified work program.

d) In the event that the injury/illness is permanent the employer will discuss future employment options (retraining, creating a new position, wages) with the worker.
e) If there is a failure to cooperate in the return-to-work program the insurance carrier will be notified and that based off of the insurance carrier's response a follow up course of action may be taken.
f) The employer will notify the insurance carrier of any changes regarding:
    1) Wages
    2) Modified work program/duration of program
    3) Failure to cooperate
    4) End of program

ACCIDENT/INJURY/ILLNESS INVESTIGATION POLICY AND PROCEDURE

Scope

The follow-up to any type of accident/injury/illness is a key method of preventing a recurrence of the same or similar type situation. Investigation Reports will assist in recording specific information regarding an incident/accident, basic and root causes of the incident and follow-up recommendations.

Definitions

The various types of situations requiring investigations are:

a) Fatality/Critical Injury Accident- Both of these types of injuries because of the seriousness of them and the prescribed actions required by the employer will involve the MOL, JH&SC representative as part of the investigation process.

b) Lost Time/Medical Aid Accident- Both of these types of injuries require professional medical attention and have the potential to cause permanent injury. These injuries can be investigated by the immediate supervisor along with the JH&SC representative or HSR.

c) Occupational Illness- Because of the varying number of types of occupational illnesses and the varying nature of the investigation, the investigation will be initiated by the immediate supervisor but could include managers, JH&SC representatives, MOL and possibly outsourced professional help.

d) Property Damage/Near Miss/ Accidents/Incidents- These could be fire, environmental situations, motor vehicle accidents or situations that had the potential for injury or damage that are to be investigated by the immediate supervisor.

Procedure

Because of the varying nature of the types of investigations and the complexities that could be encountered, all investigation reports shall be filed within three working days as a minimum and within seven working days at a maximum.

All investigation reports will be done using the Accident/Incident and Corrective/Preventive Action Form provided in the managers accident/injury/illness tool kit. (See Appendix # 1)

The ultimate goal is to identify the immediate, underlying and root causes and recommend the corrective actions to take to prevent the recurrence of the same or similar situation.

The resulting reports will be distributed to the JH&SC, supervisors, managers and any other agency that may be prescribed.

It will be the responsibly of the immediate supervisor to ensure all recommendations from the report are followed up on and that the completion of recommendations will be documented and distributed to the appropriate personnel.

Supervisors, managers and JH&SC representatives will all receive training in investigative techniques.

Investigations will utilize investigative techniques based off of practical loss control management standards.

PREVENTATIVE MAINTENANCE POILCY AND PROCEDURE

Scope

Preventative maintenance is key to ensuring various pieces of equipment are safe to operate and that they work efficiently. Preventative maintenance is also an important aspect in reducing or limiting legislative or public liabilities.

Procedure

All preventative maintenance will be performed as per manufacturers specifications or as identified in an equipment maintenance plan. The preventative maintenance plan will be set up by the Public Works superintendent.

If for any reason the schedule and the work being performed does not meet legislative requirements or industry standards, the maintenance plan will be adjusted accordingly.

The Public Works superintendent will ensure that there will be documentation kept on file on all preventative maintenance work performed.

The maintenance plan records will be inspected by the employer twice per year with records of the inspection kept on file.

HEALTH AND SAFETY RECOMMENDATION POLICY AND PROCEDURE

Scope

As part of the duties of the JH&SC Representative identified in the OH&SA 9(18)(b), recommendations for identified workplace deficiencies or other health and safety concerns shall be brought forward using the internal recommendation form. (See appendix # 1)

Procedure

Once a recommendation is brought forward the following steps shall be taken.

SUPERVISOR/MANAGEMENT RESPONSIBILITIES

a) Review the recommendation with the representative in detail so the intent of the recommendation is fully understood.
b) Determine if the recommendation can be actioned by his/her self and reply in writing as prescribed by the OH&SA within 21 days. He/she shall follow up as per the written response and post a completed copy of the recommendation in visible location. The completed copy shall be distributed to the appropriate personnel.
c) If he/she cannot action the recommendation he/she will forward the recommendation to the appropriate personnel who shall respond as prescribed by the OH&SA.
d) Once the recommendation has been responded to and actioned, a copy of the recommendation shall be posted in a visible location and distributed to the appropriate personnel.
e) Discuss actions taken with the representative.

JH&SC Representative

a) The JH&SC/HSR representative producing the recommendation shall ensure that the information is detailed and accurate.

b) Ensure the recommendation is discussed at a JH&SC/HSR meeting.

TOWNSHIP OF BILLINGS

HEATH AND SAFETY POLICY REVISIONS SCHEDULE

Year	Policy being Revised	Description of Revision
January 2021	Hazard Recognition and Control	a) Revised wording description of Recognition and Control tools.
January 2021	Safe Operating Procedures	a) Revised component list of SOPs for work processes.
January 2021	Hazard Reporting Procedure	a) Added use of Hazard Reporting Form
January 2021	Inspections Policy and Procedures	a) Added informal and formal inspection procedures.
January 2021	Lone Worker Policy	a) Add provision regarding Lone Worker Phone App.
January 2021	Lone Worker Cellphone App. Policy	a) Added new policy.
February 2021	Duties of a Volunteer	a) Revised training requirements.
October 2021	Management Policy Statement	a) Added regard employee inclusiveness
January 2022	H&S Policy	a) Added document appendix.
January 2022	H&S Policy	a) Added Policy Revisions Schedule
February 2022	H&S Policy	a) Reformatted all policies and procedures b) Reviewed and revised basic wording in all policies and procedures. c) Added Employee Wellness Policy
March 3, 2022	Appendix # 1	a) Update documents list identified in H&S Policies.
March 24, 2022	Appendix # 1	a) Add Electronic Devices Policy

TOWNSHIP OF BILLINGS

HEALTH AND SAFETY POLICY AND PROCEDURES

APPENDIX 1

INDEX

Workplace Hazard Reporting Form

Date:_____

Department: _____

Name: _____
(Person Submitting Report)

Name: _____
(Person Receiving Report)

Hazard Observed (Please be detailed)   **(Use reverse side if needed)**

Corrective Action Taken (Please be Detailed)   **(To be completed by supervisor/manager)**

_____ _____

(Date Corrective Action (Completed) **(Supervisors Signature)**

Hazard: Is any source of potential damage, harm or adverse effects on someone or something. This can include people, property, equipment or environment.

Comments

Hazard Reporting Procedure (Worker)

1) If you see a hazard that poses an immediate threat of harm you shall:
   a) Correct the hazard, if possible, without putting yourself at risk.
   b) Notify your supervisor immediately, or as soon as reasonably possible.
   c) If you need to leave the area to locate the supervisor, notify any workers in the area or block the area off.
2) If the hazard does not pose an immediate threat of harm, you shall:
   a) Complete a Hazard Reporting Form and submit it to your supervisor as soon as reasonably possible.
   b) Notify any other workers in the area.

Hazard Reporting Procedure (Supervisor)

1) Upon receiving a concern of a hazard that poses an immediate threat of harm risk the supervisor shall:
   a) Respond to the area where the identified hazard is with the worker.
   b) Take all necessary precautions to protect all workers from potential harm.
   c) Initiate the necessary corrective actions as soon as reasonably possible.
   d) Complete a Hazard Reporting Form.
   e) Submit a copy of the Hazard Reporting Form to the Health and Safety Coordinator and the JH&SC Representative and post the completed form on the employee bulletin board (Within 5 working days).
2) Upon receiving a Hazard Reporting Form where the hazard does not pose an immediate threat of harm, the supervisor shall:
   a) Discuss the concerns of the identified hazard with the worker who submitted the form.
   b) Organize and implement corrective actions.
   c) Discuss with the worker when the corrective actions have been completed.
   d) Complete, distribute and submit a copy of the completed form to the reporting worker, JH&SC representative and the H&S Coordinator and post a copy on the employee bulletin board.

*Note: If the identified hazard is a recurring matter. it shall be identified on a JH&SC inspection report and followed up on according to the procedures associated with JH&SC Inspection Reports.

JH&SC Workplace Inspection Checklist

Date: _____

Location: _____

Inspector: _____

Health and safety Policies	Yes	N/A	No	Actions
Are workers aware of SOPs and their requirements for housekeeping?				
Have the workers been informed of any specific housekeeping requirements that they have to perform?				
Work Areas				
Are the work and storage areas clean and free of debris?				
Are accesses to entrances and exits clear and unblocked?				
Is the lighting adequate.				
If ventilated, is the system clear of dust, debris or any obstructions?				
Exits and Entrances				
Are entrances and exits kept unobstructed, clean and dry at all times?				
Are entrances and exits well lit?				
Are emergency lights working?				
Grounds/Floors/Stairways				
Are there any trip hazards?				
Are there any uneven surfaces?				
Are the surfaces clean and dry?				
Are walkways wide enough for equipment and material movements?				
Are there any cables or hoses taped down or covered?				
Dust and Dirt Removal				
Is the area swept, mopped or vacuumed frequently?				
Is Compressed air used for any cleaning purposes?				
Are materials available for spill cleanups?				
Storage				
Are tools or equipment properly stored?				
Are materials properly stacked and stored?				

Are storage racks/cabinets in good condition?				
Area of Inspection	**Yes**	**N/A**	**No**	**Actions**
Tools and Equipment				
Are workplace tools/machines in good condition?				
Do the tools/equipment have designated storage area?				
Safety Equipment				
Are fire extinguishers in their proper location?				
Are fire extinguishers fully charged?				
Are road safety signs other safety equipment properly stored?				
Waste Disposal				
Are waste materials properly separated i.e., hazardous, non-hazardous, flammable ….?				
Is the waste storage area clean and neat?				
Are there adequate house cleaning supplies?				
Others				
Are safety signs for fire extinguishers, entrances, equipment and workstations in good condition?				
Are first aid stations and first aiders identified?				
Have first aid stations been inspected and restocked?				
Are material safety data sheets available for products being used?				
Have the safety boards been updated?				
Covid-19				
Is the appropriate signage in place?				
Are Covid-19 SOPs posted or available?				
Are there adequate sanitizing supplies available?				
Are Covid-19 screening check forms available.				

Comments

Location: _____ Date: _____(dd/mm/yyyy)

Unsafe Acts & Conditions				Corrective Action			
Item #	Hazards Observed	Repeat Item (Y/N)	Priority (H M L)	Suggested Action	Person Responsible for Action	Action Taken	Date

Inspected by: Date:	Above Noted Action taken Supervisor's signature: _____
Extra Information	

Inspection Report Follow-up Procedures

1) Once the inspection has is completed, the person performing the inspection will forward the inspection report to the CAO Clerk.
2) Once received, the CAO Clerk will review the identified deficiencies and assign the persons responsible for follow-up corrective actions.
3) Once the report is received by the person responsible for the corrective action, that person will complete the corrective action as per the hazard rating designated to the deficiency, note the date and what corrective action was taken.
4) Once the corrective actions have been completed, the person responsible will return the completed inspection report back to the CAO Clerk.

5) Once completed, copies of the Inspection Report will be posted on the appropriate safety boards.

Note: Any identified deficiency that cannot be corrected within a reasonable time frame consistent with the identified hazard rating (Immediate Action Required H-High, M-Medium, L-Low) will be written up as a formal recommendation as per Section 9 (20) of the OH&SA.

Township of Billings
Workplace Hazard Assessment
Evaluation Format

Severity (0-6)
0: No injury or illness or production/quality or other loss of less than $500.00.
2: Minor injury or no lost time injury or non-disruptive property damage, or a production/quality or other loss of $500 to $1000.
4: A lost time injury or illness without permanent disability, or disruptive property damage, or production/quality loss, or other loss of more than $1000 but not exceeding $5000.
6: Permanent disability or loss of body part or life and or extensive loss of structure, equipment or materials or production/quality or other losses exceeding $5,000.

Frequency (1-3)			
Number of persons exposed or having contact with the hazard.	Number of times persons may be exposed to or have contact with the hazard.		
	Less than Daily	Few times per day	Many times per day
Few	1	1	2
Moderate	1	2	3
Many	2	3	3

Probability (-1 to +1)
-1: Less than average chance of loss.
0: Average chance of loss.
+1: Greater than average chance of loss

Significance (0-10) (total)
0-2: Low
3-5: Medium
6-10: High

Accident/Incident/injury/Illness Reporting /Return to Work/Modified Work Procedure

Purpose

The purpose of this procedure is to ensure that all workplace injuries, illnesses, accidents, incidents are properly reported, treated, followed up on, and that the necessary documents are properly filled out by the appropriate personnel.

Categories

The following list contains the types circumstances that must be reported to your supervisor immediately or as soon as reasonably possible:

a) Fatality, critical injury, lost time injury, no lost time injury and first aid injuries.
b) Any occupational illness
c) Property damage, motor vehicle accident or near miss incident.
d) Fire, explosion or environmental release.

Definitions

Accident: An unplanned event that causes death, personal injury or property damage.

Explosion: A sudden burst or release of energy that causes personal injury, property or equipment damage or fire.

Fire: A situation where the combustion of materials has taken place causing personal injury, property or equipment damage.

Incident/Close Call: Is an event or occurrence that could cause personal injury or property damage.

Illness: Is a disease or period of sickness that affects either body or mind.

Injury: is where a wound, bruise, cut, gash, crushing, avulsion, abrasion, contusion or trauma that causes hurt, harm, pain, suffering or impairment.

Critical Injury: As defined by Ontario Regulation 834 critical injuries one or more of the following:

a) Places life in jeopardy.
b) Produces unconsciousness.
c) Results in a substantial loss of blood.
d) Fracture of an arm or leg but not a finger or toe.
e) Amputation of an arm or leg but not a finger or toe.
f) Burns to a major portion of the body.

Fatality: Is when a worker dies as a result of a work-related injury or illness.

Environmental Release: is a discharging, disposing, dumping emptying, spilling, leaking, pumping or pouring of a material that will cause harm to the environment.

Documents

The following documents must be kept available and completed in reasonable time by the appropriate persons.

WSIB Form 6 Worker's Report of Injury

WSIB Functional Abilities Form.

Consent for Release of Medical Information.

These forms are to be given to the employee by the supervisor, to take to the physician when the employee goes to seek medical attention.

WSIB Form 7 Employers Report of Injury/Disease.

This form needs to be completed and submitted to the WSIB within three days of a worker reporting an injury requiring professional medical assistance.

Investigation/Corrective Action Report

This report must be completed by the supervisor within 3-7 days after the injury/ illness/accident/incident is reported.

Communication Log for Modified Work

This form needs to be updated by the supervisor every time there is a contact regarding an injured employee modified work program.

Responsibilities

Employer

It is the responsibility of the employer to provide a safe and healthy workplace, but in the event of injury/ illness, accident/incident, fire, explosion, environmental release or a critical or fatal injury the employer is required to take certain steps as part of their overall responsibilities.

Critical/Fatal Injury

In the event of one these injuries the employer must ensure that:

a) The scene where the accident occurred is secured and not altered. The only exemption is if during the treatment of the worker that something needs to be moved in the preservation of life it may be done. The employer will ensure that MOL will be made aware of any such movements.
b) They will notify the Ministry of Labour
c) They will notify the JH&SC representative.
d) Assist the Ministry of Labour in any way possible.
e) Provide a written report of the accident to the Ministry of Labour within 48 hours.
f) Complete and submit a WSIB Form 7

Supervisor

In the event that there are not any employer personnel available the supervisor will carry out the responsibilities of the employer. The supervisor will also do the following:

a) Call 911.
b) Administer first aid if it's possible.
c) Control the accident scene.
d) Delegate someone to meet the emergency responders.
e) Provide a completed Investigation and Corrective Action Report to the employer within 24 hours.

JH&SC/HSC Representative

There are not any specific duties identified under the OH&SA that the JH&SC/HSR can assist, but they could assist with the Ministry of Labour Investigator or in the investigation process and bring forward any recommendations resulting from the investigation.

Personal Injury

Employer

In the event of a personal injury accident that requires professional medical attention the employer shall:

a) Submit a completed WSIB Form 7 as required.

b) Review the Investigation/Corrective Action Report and follow up on recommendations.
c) Accommodate any early return/modified work programs that may arise from the injury.
d) Forward a copy of the Investigation/Corrective Actions Report to the JH&SC/HSR.

Supervisor

In the event of a personal injury accident that requires professional medical attention the supervisor shall:

a) Ensure that the injured worker receives first aid treatment and is provided with transportation to receive the medical treatment if required.
b) Provide the injured worker with the following documents that need to be filled in by themselves and the professional tending to the injured worker:
-WSIB Form 6 Workers Report of Injury
-WSIB Functional Abilities Form
-Consent for Release of Medical and Claim File information.
c) Complete an accident investigation and submit the results on the Investigation/Corrective Actions Report within 3-7 days.
d)Follow up on any recommendations arising from the accident investigation.
e) Assist in any early return/modified work activities if/when required.

Employee

In the event an employee requires professional medical attention resulting from a personal injury accident the injured worker shall:

a) Receive medical treatment and follow any directions from the health care professional and have the health care professional complete the WSIB Functional Abilities Form
b) Complete the WSIB Form 6 and the Release of Medical Information and Files form and submit them and the completed Functional Abilities Form to your supervisor the following day or as soon as reasonably possible.
c) Comply with all directions put forward by the health care professional.
d) Comply with early return/modified work program suggested by the heath care professional.

JH&SC/HSR

a) Review the investigation report and recommendations and submit any further recommendations.

Note: Copies of all documents relating to the injury shall be forwarded to the CAO/Clerk Treasurer.

Property Damage/Near Miss Incidents

In the event of a property damage or near miss incident the following actions will be taken:

Employer

a) Assist in the investigation if required.
b) Follow up on any recommendations arising from the Investigation/Corrective Action Report.
c) Forward a copy of the Investigation/Corrective Action Report or Recommendations to the JH&SC.

Supervisor

a) Perform an investigation regarding the incident and prepare and submit an Investigation/Corrective Action Report within 3-7 days to the CAO/Clerk Treasurer.
b) Follow-up on any recommendation arising from the Investigation/Corrective Action Report

Employee

a) Assist in the investigation regarding the incident.

JH&SC/HSR

a) Review the investigation report and recommendations and submit any further recommendations.

Environmental Release

In the event of an environmental non-containable release of a substance that will cause damage to the environment the Ministry of the Environments' Spills Action Centre shall be notified. After the Ministry is notified, the following actions shall take place:

Employer

a) Follow-up on any recommendations from the Ministry of the Environment.
b) Assist in an investigation of the incident.
c) Follow-up on any recommendations arising from the Investigation/Corrective Action Report.
d) Forward a copy of the Investigation/Corrective Action Report to the JH&SC.

Supervisor

a) Assist in responding to any Ministry of the Environment recommendations.
b) Perform an investigation regarding the release, and prepare and submit an Investigation/Corrective Action Report to the CAO/Clerk/Clerk Treasurer and the JH&SC/HSR within 3-7 days.
c) Follow up on any recommendations arising from the Investigation/Corrective Actions Report.

Employee

a) Assist in the investigation regarding the release.

JH&SC/HSR

a) Review the inspection report and recommendations and submit any further recommendations.

Return to Work/Modified Work Program

Purpose

Early return/modified work is a program that recognizes that workers who are injured or become ill at work or outside of work, and are temporarily disabled and are capable of performing work that is safe and productive. The goal of this program to provide work that respects the injured workers dignity and allows the injured worker a safe and timely return to their regular employment. To do this effectively the following actions shall be taken:

Employer

It is the employer's responsibility to:

a) Provide and support an early return/modified work program.
b) Provide a program that allows an injured/ill worker a safe, timely, productive and safe work that respects the dignity of the worker.
c) Will provide the WSIB with a signed copy of the modified work plan.
d) Will notify the WSIB of any change in wages, any changes to the plan or if the worker is not being compliant with the plan.
e) Notify the WSIB when the injured /ill worker is cleared to return to regular duties.

Supervisor

The supervisor is a key person in the process of preparing the injured/ill workers return to work/modified work program. The supervisor shall:

a) Ensure that any modified work will not aggravate the workers disability or constitute any additional hazard to the worker or other workers.
b) The supervisor and the injured/ill worker will review and discuss the modified work plan to determine if it will be acceptable. (The injured/ill worker can have the work program reviewed by his/her health care provider)
c) Ensure that regular contacts are made with the injured/ill worker and that these contacts are recorded on a Modified Work Contact Log.

Employee

For a modified work plan to be successful the worker shall:

a) Give timely notice to the employer/supervisor of any treatments or appointments regarding their recovery.
b) Be active in giving feedback to the employer/supervisor regarding any progress or issues with the work program.
c) Provide timely updates of their condition from their health care provider.
d) Cooperate with requests for documentation as required by the WSIB or the employer.

Investigation/Corrective Action Report

Employee Name

Task being performed at the time of Injury/illness

Type of Incident

Near Miss___ Property Damage____ First Aid____ Medical Aid___

Critical Injury_____ Fatality___ Motor Vehicle Incident____ Other _____

Date and Time of Incident Location of Incident

Details of Incident (add extra sheet if needed)

Primary Cause:

Root Cause:

Recommendations for Corrective Actions:

Actions Completed (include date and who completed the action)

Person Completing this Report _____ Date: _____

CAO/Clerk Treasurer_____ Date: _____

JH&SC/HSR _____ Date: _____

Modified Work Plan

DATE

EMPLOYEE NAME

SUPERVISORS NAME

WSIB CLAIM NUMBER

ADJUDICATORS NAME

DATE OF INJURY

NATURE OF INJURY

RETURN TO WORK DATE

HEALTH CARE PROVIDER

PHYSICAL RESTICTIONS

(Please attach Functional Abilities Form)

DUTIES TO BE PERFORMED

WORKER_____
SUPERVISOR_____
CAO/CLERK TREASURER_____

MODIFIED WORK CONTACT LOG

ITEMS DISCUSSED & Date

_____
_____
_____
_____

ITEMS DISCUSSED & DATE

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_____
_____

ITEMS DISCUSSED& DATE

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ITEMS DISCUSSED& DATE

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_____

Consent for Release of Medical Information

I _____ (Employee) authorize and direct any physician or practitioner who has treated or examined me or any hospital, clinic or medical facility where I have been treated, or persons that have any record or knowledge of my health, any insurance company and/or WSIB to release any documents regarding my condition to my employer.

This consent to release information shall apply throughout my treatment program.

A photocopy of this authorization will be as valid as the original.

Dated at _____, Ontario, this ____ of _____ 20____

Employee Signature _____

Witness Signature _____

Functional Abilities Form for Non-Work-Related Injury/Illness

To the Physician

Our employee _____ has experienced a non-work-related injury/illness.

As part of our responsibility to assist our employees in their recovery to return to regular duties or modified duties we ask that you please complete this Functional Abilities Form.

Please list any physical limitations that our employee has so that we can develop a modified work program to suit any limitations.

Please Identify if there are limitations in the following areas.

Spinal Column Movements

1) Bending Forwards

_____

_____-

2) Bending Backwards

_____

_____

3) Twisting

_____

_____

4) Side Bending

_____

_____

Neck

1) Looking up

_____

_____

2) Rotation

_____

_____

3) Side Bending

_____

_____

4) Additional information regarding neck and spine movements

_____

_____

Sitting Activities

1) Desk Work (reading, writing, computer work) (% of day)

_____

_____

2) Driving (% of day)

_____

_____

3) Other Work (office duties, equipment operation) (% of day)

_____

_____

4) Additional information regarding sitting activities

_____

_____

Standing Activities

1) Standing (% of day)

_____

_____

2) Walking (distance, % of day, type of surface)

_____

_____

3) Balance (activities requiring balancing)

_____

_____

4) Stooping, Crouching, Squatting, Kneeling, Crawling, Climbing

_____

_____

5) Additional information regarding standing activities

_____

_____

Lifting/Carrying/Pushing/Pulling

1) Lifting from/to floor (minimum/ maximum weight values)

_____

_____

2) Lifting from shoulder to above (minimum/maximum weight values)

_____

_____

3) Carrying (minimum/maximum weight values and distance)

_____

_____

4) Pushing (minimum/maximum weight values)

_____

_____

5) Pulling (minimum maximum weight values)

_____

_____

6) Additional information regarding Lifting, Carrying, Pushing, Pulling

_____

_____

Working with shoulders, elbows, wrists, hands, fingers

_____

_____

Indoor/Outdoor Work

_____

_____

Working at Heights

_____

_____

Environmental Conditions (cold, heat, dampness)

_____

_____

Personal Protective Equipment (work boots, safety glasses, hard hat, gloves etc. ……)

_____

_____

Schedule Demands (punctuality, regular attendance, shift work, on call)

_____

_____

Medications (alertness, fatigue)

_____

_____

Additional Information (duration of limitations)

_____

_____

Date of Evaluation _____

Physicians Name _____

Physicians Signature _____

Follow-up Evaluation Date _____

NEW HIRE/EMPLOYEE REFRESHER TRAINING RECORDS

EMPLOYEE NAME:

DATE OF HIRE:

Task	Task Details	Delivery/Verification	Candidate Signature	Instructor	Date
Delivered by the H&S Coordinator					
H&S Legislation and responsibilities	OH&SA Regulations Duties of a worker Right to Refuse MOL 4 Step Awareness H & S Policy and Procedures Safe Operating Procedures	**Verbal** _____ **Handout** _____ **Test** _____			
Workplace Harassment & Violence	Workplace harassment Policy Reporting Harassment/Bullying Emergency Procedures	**Verbal** _____ **Handout**_____ **Test** _____			
WHMIS 2015	What is WHMIS Types of Hazards Supplier/Workplace Labels Hazard Warning Symbols Safety Data Sheets Controls	**Verbal** ____ **Handout** ____ **Test** ____			
Ontarians with Disabilities Act	Purpose Content	**Handout** _____ **Test** _____			
Time Sheets	Employee to complete time sheets daily.	**Verbal** ___ **Demonstrate** ___			
	Pay Periods				
In-house Forms	Hazard Reporting Vehicle Inspection Grader Inspection Backhoe Inspection Bulldozer Inspection	**Verbal** _____ **Demonstrate** _____			
Vehicle Inspection	General Vehicle Condition (Interior/Exterior) Milage	**Verbal** _____ **Demonstrate** _____			

	Refueling Fire Extinguisher First Ait Kit Accident Reporting Kit				
Refuelling Vehicles and Equipment	Safe Operating Procedure # 16 TSSA Checklist	**Verbal ____** **Demonstrate _____** **Verify _____**			
Enter/Exit Equipment	3 Point Contact entry and Exit into Trucks and Equipment	**Demonstrate ____** **Verify _____**			
PPE (Fitting/Care)	Safety Glasses Hard Hat with Visor Visibility Clothing Footwear Respiratory Protection Sunscreen	**Verbal ____** **Demonstrate ____**			
First Aid	Reporting First Aiders First Aid Station/Kits First Aid Recording Book	**Verbal _____**			
Fire Extinguishers	Operation Locations	**Verbal ____** **Demonstrate _____**			
Manual Material Handling	Video Safe Operating Procedure # 18 Lifting Technique Assessing the Load Assessing the Environment Human Elements	**Verbal ___** **Review ___** **Verify ____**			
Using Ladders	Video Safe Operating Procedure #25 Ladder Hazards Pre-use Inspection Types and Grades of Ladders Working at Heights Regulations	**Verbal ____** **Read SOP ____** **Review ____** **Verify _____**			
Riding Mowers	Video Read/Review Operators Manual Pre-start checks Starting the Mower Driving the Mower/Speed Control Parking the Mower Refueling the Mower Loading and Tying Down the Mower Basic Mower Maintenance PPE/Sunscreen/Hot Weather Work Ground Conditions Working Near People/Parked Vehicles	**Verbal ____** **Read SOP ____** **Demonstrate ____** **Verify _____**			

	Safe Operating Procedure # 8 and # 14				
Garbage Pick-up	PPE Required Tools Needles General First Aid/Wildlife Encounters Safe Lifting	**Verbal ____** **Handout ____**			
Washroom or Shower Cleaning	PPE Mixing Cleaning Solution Signage Safe Operating Procedures #19 & 28	**Read SOP's ____** **Review ____**			
Working at Marina	Video PPE TSSA Fuelling Checks Working in Hot Weather Safe operating Procedures #14, 16, 18 20	**Read SOP's _____** **Demonstrate ____** **Review ____** **TSSA Checklist ____**			
Landfill Work	PPE Safe Lifting/Material Handling Hot/cold Weather Work Work Place Violence and Emergency Procedures Safe Operating Procedures # 14, 15, 16, 19, 20	**Read SOP's _____** **Demonstrate _____** **Review ____**			

Note to Instructor:

1) Upon completion of each section of required training you must verify to your satisfaction that the worker understands the concepts of the topic covered and can demonstrate how to safely complete or perform the various tasks.
2) To prevent training and information overload for new hire employees, this training will be completed within the employees first 10 working days.
3) This training must be performed by all employees on a yearly or as need basis.
4) All employees must sign off and date the topics that have been completed.
5) Supervisors/Staff must sign-off (initial) on topics that have been completed.

Recommendation Form

Recommendation No:

Date Recommendation Submitted:

Person (s) submitting Recommendation:

Person Receiving Recommendation:

Details of Recommendation: (Please be specific

Employer Response: (Within 21 days in writing)

Employer Actions:(If required, list date of action)

Completion Sign-off

_____ _____
Supervisor **Date**

_____ _____
JJ&SC Representative **Date**

_____ _____
Manager **Date**

CERTIFICATE OF INSURANCE

(Please complete separate certificates for each separate insurer)
Contract No.: _____ Location _____
Named Insured _____
Name of Insurer: _____

This certificate is furnished to THE TOWNSIP of BILLINGS as evidence that the insurance policy(ices) described below have been issued to the insured, provide coverage as shown and are in force at this time for the terms shown. If any of the above policies are not renewed, cancelled or materially changed so as to restrict such coverage, thirty (30) days minimum written advance notice will be provided to THE TOWNSHIP of BILLINGS, at the address shown above.

Type of Insurance	Policy Number	Expiry Date	Limit	Deductible
Comprehensive General Liability*				
Automobile Liability				
Aircraft Liability				
Watercraft Liability				
All Risks Equipment				
Other				

**Including: all premises liability, all owner operations, occurrences wording(not claims made), personal injury, broad form property damage (including products and completed operations), blanket written contractual, contractor's legal liability, cross liability clause, endorsed to show that this policy is primary, no exclusion for blasting, collapse and underground hazard (if applicable), owner's and contractor's protective, pollution exclusion amended to include hostile fire.

It is hereby understood and agreed that THE CORPORATION of the TOWNSHIP OF BILLINGS is added as an additional insured with respect to operations of the named insured related to the above operations, and for those in law they are responsible.
It is further understood and agreed the insurer waives all rights of subrogation against THE CORPORATION of the TOWNSHIP OF BILLINGS and it's subsidiary, associated and affiliated departments except for liability arising out of their negligence.
This coverage complies with the requirements of the Ontario Provincial Standard General Conditions of Contract, Section GC6.03
and the Supplementary General Conditions of the applicable Contract.

Date: _____

Authorised Representative (Broker or Underwriter): _____

UNDERTAKING TO COMPLY WITH THE CORPORATION OF THE TOWNSHIP OF BILLINGS

Name of Contractor: _____ (the "Constructor")

Description of Contract: _____ (the "Contract")

Name of Authorized Representative
of the Contractor _____

1. I/We hereby undertake:

   (a) To comply with all health and safety and environmental legislation in the performance of this contract;

   (b) To maintain a safe and healthy work environment during the performance of this contract;

2. I/We hereby agree:

   (a) That compliance with all health and safety and environmental legislation is a condition of the contract and that non-compliance with same may, in the Township of Billings (hereinafter the Corporation or the Owner) discretion, lead to the termination of this Contract;

   (b) To permit the Corporation to audit my/our health and safety and environmental records during the term of the contract and upon its conclusion and to co-operate fully with any such audit(s).

   (c) To permit the Corporation to monitor the adherence of the pre-construction checklist and provide forthwith to the Corporation any orders, directives or narratives received by a regulatory authority related to any work being performed to fulfill the requirements of the contract.

3. (a) I/We understand that contractor safety deficiencies will be addressed by the Corporation in the following progressive steps:

   (i) The problem will be identified to the Contractor (site supervisor).

(ii) The Contractor's head office will be contacted about the problem, orally and later in writing.

(iii) If required by law, to immediately, report the problem to a provincial and/or federal Ministry, the Corporation will immediately do so.

(iv) If not required by law to immediately report the problem, and the problem remains unresolved, the Corporation may report the problem to the appropriate Ministry(ies).

(v) The Contract may, in the Corporation's discretion, be suspended or terminated and/or payment withheld by the Corporation.

(b) I/We acknowledge and agree that, depending upon the nature and/or seriousness of the deficiency, the Corporation reserves the right to bypass any or all of the steps described in subsection 3(a).

4. I/We hereby acknowledge:

(a) receipt of a copy of the Corporation's Contractor Safety Policy and that I/we understand and undertake to adhere to the terms of this Policy and to co-operate with the Corporation in its efforts to ensure compliance thereunder.

I/We have the authority to bind the Contractor.

_____(Date)

SIGNED, SEALED AND DELIVERED
in the presence of:

(Name of Contractor)

Per:

_____ _____

(Print name of Signing Party under each signature)

_____ _____

(Print name)

Pre-Construction Contractor Safety Meeting Checklist

This pre-construction checklist is to be used to facilitate the communication of known site hazards to the contractors performing work on Township property or construction projects.

Project Description: **Contract No.:** **Date and Time of Meeting:** **Attendance:**

Know Hazards at the Job Site	Control Measures in Place
○ Construction	○ Personal Protective Equipment ○ First Aid Services on site. ○ Emergency Response Plan ○ Pre-construction briefing ○ Housekeeping Plan
○ Excavation	○ Geotech report, sloping, benching, shoring
○ Overhead Utility Hazards	○ Contact with Ontario Hydro
○ Underground Utility Hazards	○ Contact with Ontario Hydro ○ Contact with fuel provider ○ Contact with Public Works
○ Mobile Heavy Equipment	○ Operators qualified ○ Reversing procedures ○ Speed limits
○ Traffic Control	○ Traffic Control Plan ○ Signage ○ Traffic Control Persons
○ Working at Heights	○ Fall Protection Plan ○ Fall Protection Equipment Available
○ Confined Space	○ Confined Space Operating Procedures
○ Hazardous Materials (asbestos, silica, biological, toxic etc..)	○ WHIMS Training ○ Asbestos Exposure Plan ○ Silica Exposure Plan ○ Labels, SDS ○ Personal Protective Equipment
○ Special Tools or Equipment	○ Safe Operating Procedure
○ Environmental Conditions	○ Safe Operating Procedures ○ Personal Protective Equipment
○ Workplace Violence	○ Violence Prevention Training
○ Noxious Plants	○ Noxious Plant Identification Training ○ Safe Operating Procedure

	○ Personal Protective Equipment
○ Animals, Wasps, Bees, Insects etc…	○ Animal, Insect Awareness
○ Documents	○ Notice of Project ○ WSIB Certificate of Clearance ○ WSIB Independent Operator Status ○ Proof of Liability Insurance

Comments:

Billings Township Representative (signature) _____

Contractor Representative (signature) _____

Date: _____

1.Township of Billings

Electronic Devices Use Policy

Purpose: The purpose of this policy limiting the use of cell phones and other communication devices at work is to protect you. Inappropriate use of communication devices at work can cause injuries because it's distraction and may interfere with their proper and safe use of equipment and machinery. Devices and headphones or wireless ear pieces may also get tangled in machinery or interfere with proper use of personal protective equipment.

Devices Covered: The devices covered by this Policy include cell phones and other wireless devices or gaming devices, whether owned by the Municipality or the individual worker (collectively referred to as "Devices").

Persons Covered: This Policy applies to workers, temporary workers and other workers at the Municipality, including all personnel affiliated with third parties working at Municipal facilities.

Activities Covered: The rules set out in this Policy apply to all work-related activities, including but not limited to the conduct of job-related activities, whether such vehicles are owned by the Municipality or the worker. The Policy applies to all conversations, whether personal or business-related.

Prohibited Uses

a. General-While in the workplace during work hours, workers are expected to focus on work and may not inappropriately use any Device in the workplace for any inappropriate purpose, including but not limited to:

- Engaging in personal conversations;
- Playing games;
- Surfing the internet
- Checking e mail; and
- Sending or receiving text messages.

b. Driving-While operating a vehicle, workers may not answer a communication device (two-way radios are excepted) unless and until they pull over in a safe spot (or let a passenger answer the call). This is also against the law under the Highway Traffic Act, Chapter 4. If it's urgent, workers may accept or return the call, provided that they remain parked off the roadway. They may not resume driving until their conversation is

over. Workers may not make outgoing calls while driving. If workers need to place a call, they must first pull over in a safe spot.

Permitted Uses: Workers may use Devices while they're not working in the following designated areas (break room/ lunch room). Use of hands-free devices while driving for municipal work/ business ins not permissible.

Violations: Workers who violate this policy will be subject to disciplinary measures up to and including dismissal, depending on the circumstances.

I have read and will abide by the terms of this policy regarding the use of communication devices at work.

Name (printed)

Signature _____ Witness _____

Date _____ Date _____

Municipality of
CENTRAL MANITOULIN

P.O. BOX 187, 6020 HWY #542
MINDEMOYA, ON P0P 1S0
PHONE: (705) 377-5726 FAX: (705) 377-5585
EMAIL: centralm@amtelecom.net

April 6, 2022

Township of Billings
P.O. Box 34,
Kagawong, ON
P0P 1J0

Attn: Participant Municipality

Dear Council

RE: Household Hazardous Waste Day

The Municipality of Central Manitoulin is once again preparing for Household Hazardous Waste Day. To avoid conflict with Canada Day, the HHWD scheduled date for 2022 will be Saturday July 23, 2022 from 1:00 p.m. to 4:00 p.m. It will still be located at 7 Lakeshore Rd in Mindemoya (municipal road shed). In partnership with the Town of N.E.M.I. we will continue to utilize Drain-All, which is the same company as last year.

Central Manitoulin would like to ensure that your municipality will be participating this year. The division of costs will still be based on number of households from your municipality, who attend the event. **As in past events it is expected that all participating municipalities will send a volunteer to help in the event**. Please let us know by May 27, 2022 if you will be participating, as advertisements will need to be prepared. We will also be preparing a mass mailer for our municipality and we can supply you with a copy so that you can mass mail to your municipality if you so choose.

If you have any questions or require any further information I can be contacted at the above phone number or you can e-mail me at centraldc@amtelecom.net.

Sincerely,

Denise Deforge

Denise Deforge
Treasurer

Municipal Finance Matters

Annual Repayment Limit

What is the Annual Repayment Limit?

The Annual Repayment Limit (ARL) may be generally summarized as the maximum amount that a municipality in Ontario can pay each year (without first going to the Local Planning Appeal Tribunal) in principal and interest payments for its long-term debt and other long-term financial commitments.

For most municipalities (not including Toronto) the ARL is set at 25 percent of their annual own-source revenues (such as property taxes, user fees and investment income), less their annual existing long-term debt service costs and payments for other long-term financial obligations. Municipalities may only exceed their ARL with the prior approval of the Local Planning Appeal Tribunal (LPAT).

For more information about the ARL, please see O. Reg. 403/02 (Debt and Financial Obligation Limits) on https://www.ontario.ca/laws/regulation/020403.

Role of the Ministry of Municipal Affairs and Housing

The Ministry of Municipal Affairs and Housing issues an updated ARL statement to municipalities once a year. The ARL statement is typically sent to each municipality at the beginning of the calendar year and reflects the most recent financial information submitted by the municipality in its Financial Information Return (FIR), available on https://efis.fma.csc.gov.on.ca/fir/

How Does the Ministry Calculate the ARL? *

The calculation of the ARL involves a number of steps. The ministry first determines the municipality's annual own-source revenue from sources such as property taxes, user fees and investment income. The ministry then calculates the amount that is 25 percent of the municipality's annual own-source revenue. Finally, the ministry subtracts the municipality's annual existing debt service costs and payments for other long-term financial obligations from the 25 percent figure to arrive at the ARL.

The ministry calculates 25 percent of the municipality's annual own-source revenue:

The ministry subtracts municipal debt and other financial obligations to determine the ARL:

For details on specific municipalities, please see
https://efis.fma.csc.gov.on.ca/fir/index.php/reports-and-dashboards/annual-repayment-limits/

**For illustrative purposes only*

Role of Municipalities

Municipalities in Ontario are responsible for ensuring that they do not exceed their ARL. When a municipality proposes long-term borrowing (or other long-term financial obligation), the municipal treasurer is responsible for updating the limit provided by the ministry. The treasurer must determine if there is capacity within the municipality's ARL to undertake the planned borrowing.

Local Planning Appeal Tribunal (LPAT)

Applications and appeals in relation to a range of matters are brought before the LPAT (formerly known as the Ontario Municipal Board). In cases where municipalities intend to borrow or commit to amounts above their updated ARL, they must first seek the approval of the LPAT. Learn more at http://elto.gov.on.ca/tribunals/lpat.

Ontario

Ministry of Municipal Affairs and Housing
777 Bay Street,
Toronto, Ontario M5G 2E5

Ministère des affaires municipales et du logement
777 rue Bay,
Toronto (Ontario) M5G 2E5

2022 ANNUAL REPAYMENT LIMIT

(UNDER ONTARIO REGULATION 403 / 02)

MMAH CODE:	**83603**
MUNID:	**51021**
MUNICIPALITY:	**Billings Tp**
UPPER TIER:	
REPAYMENT LIMIT:	**$ 701,452**

The repayment limit has been calculated based on data contained in the 2020 Financial Information Return, as submitted to the Ministry. This limit represents the maximum amount which the municipality had available as of December 31, 2020 to commit to payments relating to debt and financial obligation. Prior to the authorization by Council of a long term debt or financial obligation, this limit must be adjusted by the Treasurer in the prescribed manner. The limit is effective January 01, 2022

FOR ILLUSTRATION PURPOSES ONLY,

The additional long-term borrowing which a municipality could undertake over a 5-year, a 10-year, a 15-year and a 20-year period is shown.

If the municipalities could borrow at 5% or 7% annually, the annual repayment limits shown above would allow it to undertake additional long-term borrowing as follows:

5% Interest Rate		
(a) 20 years @ 5% p.a.	$	8,741,638
(a) 15 years @ 5% p.a.	$	7,280,829
(a) 10 years @ 5% p.a.	$	5,416,424
(a) 5 years @ 5% p.a.	$	3,036,919

7% Interest Rate		
(a) 20 years @ 7% p.a.	$	7,431,189
(a) 15 years @ 7% p.a.	$	6,388,762
(a) 10 years @ 7% p.a.	$	4,926,703
(a) 5 years @ 7% p.a.	$	2,876,090

Date Prepared: 1-Apr-22

DETERMINATION OF ANNUAL DEBT REPAYMENT LIMIT

(UNDER ONTARIO REGULATION 403/02)

MUNICIPALITY: **Billings Tp** MMAH CODE: **83603**

		1 $
	Debt Charges for the Current Year	
0210	Principal (SLC 74 3099 01)	16,280
0220	Interest (SLC 74 3099 02)	1,532
0299	**Subtotal**	17,812
0610	Payments for Long Term Commitments and Liabilities financed from the consolidated statement of operations (SLC 42 6010 01)	0
9910	**Total Debt Charges**	17,812

		1 $
	Amounts Recovered from Unconsolidated Entities	
1010	Electricity - Principal (SLC 74 3030 01)	0
1020	Electricity - Interest (SLC 74 3030 02)	0
1030	Gas - Principal (SLC 74 3040 01)	0
1040	Gas - Interest (SLC 74 3040 02)	0
1050	Telephone - Principal (SLC 74 3050 01)	0
1060	Telephone - Interest (SLC 74 3050 02)	0
1099	**Subtotal**	0
1410	Debt Charges for Tile Drainage/Shoreline Assistance (SLC 74 3015 01 + SLC 74 3015 02)	0
1411	Provincial Grant funding for repayment of long term debt (SLC 74 3120 01 + SLC 74 3120 02)	0
1412	Lump sum (balloon) repayments of long term debt (SLC 74 3110 01 + SLC 74 3110 02)	0
1420	**Total Debt Charges to be Excluded**	0
9920	**Net Debt Charges**	17,812

		1 $
1610	Total Revenue (SLC 10 9910 01)	5,272,900
	Excluded Revenue Amounts	
2010	Fees for Tile Drainage / Shoreline Assistance (SLC 12 1850 04)	0
2210	Ontario Grants, including Grants for Tangible Capital Assets (SLC 10 0699 01 + SLC 10 0810 01 + SLC10 0815 01)	1,899,619
2220	Canada Grants, including Grants for Tangible Capital Assets (SLC 10 0820 01 + SLC 10 0825 01)	778,368
2225	Deferred revenue earned (Provincial Gas Tax) (SLC 10 830 01)	0
2226	Deferred revenue earned (Canada Gas Tax) (SLC 10 831 01)	42,350
2230	Revenue from other municipalities including revenue for Tangible Capital Assets (SLC 10 1098 01 + SLC 10 1099 01)	0
2240	Gain/Loss on sale of land & capital assets (SLC 10 1811 01)	0
2250	Deferred revenue earned (Development Charges) (SLC 10 1812 01)	0
2251	Deferred revenue earned (Recreation Land (The Planning Act)) (SLC 10 1813 01)	0
2252	Donated Tangible Capital Assets (SLC 53 0610 01)	0
2253	Other Deferred revenue earned (SLC 10 1814 01)	0
2254	Increase / Decrease in Government Business Enterprise equity (SLC 10 1905 01)	0
2255	Other Revenue (SLC 10 1890 01 + SLC 10 1891 01 + SLC 10 1892 01 + SLC 10 1893 01 + SLC 10 1894 01 + SLC 10 1895 01 + SLC 10 1896 01 + SLC 10 1897 01 + SLC 10 1898 01)	36,086
2299	**Subtotal**	2,756,423
2410	Fees and Revenue for Joint Local Boards for Homes for the Aged	-360,578
2610	**Net Revenues**	2,877,055
2620	**25% of Net Revenues**	719,264
9930	**ESTIMATED ANNUAL REPAYMENT LIMIT** (25% of Net Revenues less Net Debt Charges)	701,452

* SLC denotes Schedule, Line Column.

Date Prepared: 1-Apr-22

The Corporation of the City of Cambridge
Corporate Services Department
Clerk's Division
The City of Cambridge
50 Dickson Street, P.O. Box 669
Cambridge ON N1R 5W8
Tel: (519) 740-4680 ext. 4585
mantond@cambridge.ca

March 31, 2022

Re: Motion: Councillor Wolf re: Request to impose a moratorium on all new gravel applications, including expansions to existing licensed sites

At the Special Council Meeting of March 22, 2022, the Council of the Corporation of the City of Cambridge passed the following Motion:

WHEREAS Ontario currently has over 3600 licenses and 2500 permits held by Operators located throughout the Province that are able to meet the expected near term needs of Ontario's construction industry;

AND WHEREAS in 2020 there was approximately 5,677,296 tonnes of aggregate extracted from properties located within the Township of North Dumfries;

AND WHEREAS applications continue to be submitted without a definitive determination if there is a need for additional supply;

AND WHEREAS gravel pits and quarries can be destructive of natural environments and habitats when not properly planned and managed;

AND WHEREAS pits and quarries have negative social impacts on host and neighbouring communities like Cambridge in terms of noise, air pollution, and truck traffic;

AND WHEREAS the urgent need to reduce greenhouse gas emissions in order to combat climate change has brought awareness to the very high carbon footprint associated with the production of concrete and asphalt which are major end-users of aggregates;

NOW THEREFORE BE IT RESOLVED THAT the Province of Ontario be requested to impose an immediate temporary moratorium on all new gravel applications, including expansions to existing licensed sites, pending a broad consultation process that would

include First Nations, affected communities, independent experts and scientists, to chart a new path forward for the extraction and processing of aggregates in Southern Ontario which:

i) Proposes criteria and processes for determining the need for new aggregate licences (including the expansion to existing licenses);

ii) Recommends updated policies and restrictions for aggregate extraction below the water table to reflect current groundwater sciences; including quarterly water monitoring reports.

iii) Assesses the cumulative impacts of aggregate operations in terms of off-site impacts to environmental systems; the groundwater regime and baseflow contributions to area watercourses, wetlands, etc; area habitat including corridors; traffic along haul routes; and, dust and noise emissions;

iv) Develops new guidelines for reprocessing / recycling of concrete and asphalt products in order to ensure sustainable aggregate supplies;

v) Recommends a fair levy for aggregate extraction that includes compensation for the full environmental and infrastructure maintenance costs to the local community of extraction and distribution of aggregate;

vi) Provides greater weight to the input by local municipalities to lessen the social impacts from aggregate extraction and truck haul routes through their communities

AND FURTHER THAT a copy of this Resolution be sent to the Honourable Doug Ford, Premier of Ontario, the leaders of all Provincial Parties, the Minister of Northern Development, Mines, Natural Resources & Forestry, the MPPs of Waterloo Region, and, the Region of Waterloo.

Should you have any questions related to the approved resolution, please contact me.

Yours Truly,

Danielle Manton
City Clerk

Cc: (via email)
Hon. Premier Ford
Association of Municipalities of Ontario
City of Cambridge Council

Ministry of Municipal Affairs and Housing

Office of the Deputy Minister

777 Bay Street, 17th Floor
Toronto ON M7A 2J3
Tel.: 416 585-7100

Ministère des Affaires Municipales et du Logement

Bureau du sous-ministre

777, rue Bay, 17e étage
Toronto ON M7A 2J3
Tél. : 416 585-7100

March 31, 2022

Good Afternoon,

On March 30, 2022, the government released its More Homes for Everyone Plan, that proposes targeted policies and initiatives for the immediate term to address market speculation, protect homebuyers and increase housing supply.

Details about the range of measures in the government's plan can be found in the news release here: Ontario is Making It Easier to Buy a Home | Ontario Newsroom.

The More Homes for Everyone Plan is informed by a three-part consultation with industry, municipalities and the public. This includes the Rural Housing Roundtable and the first ever Ontario-Municipal Housing Summit, letters to all 444 municipalities asking for their feedback, and follow-up meetings with the leaders of municipal organizations. On behalf of the ministry, thank you for being part of our consultations and sharing your valuable input.

The government also introduced Bill 109 - the *More Homes for Everyone Act, 2022*, and is seeking feedback on the changes proposed under the legislation and on other initiatives, through a series of housing related public consultations. This includes seeking input on how to support gentle density for multi-generational and missing middle housing, as well as addressing housing needs in rural and northern communities. These and other related consultations can be found through the Environmental Registry of Ontario and the Ontario Regulatory Registry.

The government committed to prioritizing implementation of the Housing Affordability Task Force's recommendations over the next four years, with a housing supply action plan every year, starting in 2022-23. To facilitate this, the government plans to establish a Housing Supply Working Group, that would engage with municipal and federal governments, partner ministries, industry, and associations to monitor progress and support improvements to its annual housing supply action plans.

Ontario looks forward to continued collaboration with municipalities to address the housing crisis and hear your ideas and advice on the More Homes for Everyone Plan.

Sincerely,

K. Manson-Smith

Kate Manson-Smith

Deputy Minister

c. Joshua Paul, Assistant Deputy Minister – Housing Division
Sean Fraser, Assistant Deputy Minister – Planning and Growth Division
Caspar Hall, Assistant Deputy Minister – Local Government Division

Ministry of Municipal Affairs and Housing

Office of the Minister
777 Bay Street, 17th Floor
Toronto ON M7A 2J3
Tel.: 416 585-7000

Ministère des Affaires municipales et du Logement

Bureau du ministre
777, rue Bay, 17e étage
Toronto ON M7A 2J3
Tél. : 416 585-7000

Ontario

234-2022-1674

April 6, 2022

Dear Head of Council:

For the past two years, you, your council colleagues and municipal staff have been at the forefront of the response to COVID in Ontario. I deeply appreciate your continued collaboration with the province and your inspiring dedication.

With key public health and health system indicators continuing to remain stable or improve, Ontario is cautiously and gradually easing public health and workplace safety measures with all remaining measures, directives and orders to end by April 27, 2022.

Today I am writing to inform you of the status of the emergency orders that were led by my ministry and made in early 2020 under the *Emergency Management and Civil Protection Act*, and later continued under the *Reopening Ontario Act, 2020*, to help municipalities address some of the challenges brought on by the pandemic.

The Work Deployment Measures for Municipalities Order will end on April 27, 2022

Since April 16, 2020, O. Reg. 157/20, Work Deployment Measures for Municipalities (order) provided municipalities with the flexibility to deploy certain staff to where they were needed most in response to COVID-19 pressures.

The order was a temporary measure and, in line with the province's lifting of public health measures, it will end on April 27, 2022.

Any deployments your municipality has made using the authority in the order will need to end by April 27, 2022. If your municipality is relying on the order to deploy staff, it is important to work collaboratively and in good faith with your bargaining agents to develop staffing plans beyond April 27, 2022.

The Patios Order will end on April 27, 2022

O. Reg. 345/20, Patios, eliminated Planning Act requirements for notice and public meetings and removed the ability to appeal when municipalities passed temporary use by-laws for new or expanded restaurant and bar patios. This allowed municipalities to pass or amend these by-laws quickly to address local circumstances and needs as they evolved.

The order was a temporary measure and, in line with the province's lifting of public health measures, will end on April 27, 2022.

As the order will end on April 27, 2022, your municipality may wish to consider making any necessary changes to temporary use by-laws for restaurant and bar patios prior to this date. Changes were made as part of Bill 13, the *Supporting People and Businesses Act, 2021* in December 2021 to help streamline the planning system and provide municipal councils broader authority to allow more planning decisions to be made by committees of council or staff. Municipalities can now delegate decisions dealing with minor amendments to zoning by-laws, such as temporary use by-laws, should they choose to (and subject to having appropriate official plan policies in place).

Temporary Health or Residential Facilities

O. Reg 141/20 came into effect on April 9, 2020. It has exempted temporary shelters and health facilities, established to respond to the effects of the pandemic, from the requirement to obtain a building permit or a change of use permit under the Building Code Act, from complying with the technical requirements of the Building Code and with certain by-laws and approvals under the Planning Act, subject to certain conditions related to protecting public health and safety.

This order will also end on April 27, 2022. I understand that some of these temporary facilities are still in use to respond to the effects of the pandemic. I intend to make amendments to the Building Code that would continue to exempt these facilities from the need for a building permit and compliance with the Building Code on a temporary basis, while ensuring they continue to be regularly inspected. Your municipality may wish to consider if any new temporary use or zoning by-laws or amendments to existing temporary use or zoning by-laws may be needed before the order ends on April 27, 2022.

There may be other emergency orders that are ending and may impact your municipality. For the latest information, please visit the government's page on COVID-19 emergency information.

If your municipality has any questions about any of the changes outlined above, we encourage your staff to contact your local Municipal Services Office.

Thank you again for your continued support in protecting the health and well-being of Ontarians while delivering the services they depend upon.

Sincerely,

Steve Clark
Minister of Municipal Affairs and Housing

C: Chief Administrative Officers
Municipal Clerks
Kate Manson Smith, Deputy Minister of Municipal Affairs and Housing
Brian Rosborough, Executive Director, Association of Municipalities of Ontario

Ministry of the Solicitor General

Office of the Fire Marshal and Emergency Management

25 Morton Shulman Avenue
Toronto ON M3M 0B1
Tel: 647-329-1100
Fax: 647-329-1143

Ministère du Solliciteur général

Bureau du commissaire des incendies et de la gestion des situations d'urgence

25 Morton Shulman Avenue
Toronto ON M3M 0B1
Tél. : 647-329-1100
Téléc. : 647-329-1143

Ontario

April 01, 2022

Your Worship Ian Anderson
Township of Billings
P.O. Box 34, 15 Old Mill Road
Kagawong, ON P0P1J0

Dear Mayor Ian Anderson:

As the Chief of Emergency Management for Ontario, it is incumbent on me to monitor, coordinate and assist municipalities with their respective municipal emergency management programs in accordance with the Emergency Management and Civil Protection Act (EMCPA). To confirm municipalities are in compliance with the EMCPA, every municipality in Ontario submits a compliance package to Emergency Management Ontario on a yearly basis.

Based on our analysis of the information provided by your Community Emergency Management Coordinator (CEMC), we have determined that your municipality was not fully compliant with the mandatory emergency management program requirements of the EMCPA in 2021. We acknowledge and congratulate you for the efforts you have made in the development of your emergency management program and for meeting the majority of the requirements under the EMPCA.

The safety of all our citizens is important, and one way to ensure that safety is to ensure that your municipality is prepared in case of an emergency.

The lack of full compliance was due to the following reasons:

- The municipality has not designated an Emergency Information Officer or the Emergency Information Officer designated is not an employee of the municipality (O.Reg.380/04, s. 14 (1))
- The required training was not completed for the Municipal Emergency Control Group (O. Reg. 380/04,s.12 (3) and Fire Marshal & Chief, Emergency Management Guidance: 2018-01-01)
- The Annual Exercise for the MECG was not conducted or all members of the Municipal Emergency Control Group did not participate in the exercise (O.Reg.380/04 s. 12 (6))
- The Emergency Management Program Committee (EMPC) has not reviewed all parts of the program in 2019 (O.Reg.380/04,s.11 (6))

We look forward to working with you in 2022 to ensure that the challenges noted above are addressed, so that your municipality can be fully compliant with the requirements of the EMCPA.

If you have any questions or concerns about this letter, please contact our Emergency

Management Field Officer assigned to your Sector; their contact information is below.

Name: SarahJacob
Email: sarah.jacob@ontario.ca
Phone: 249-878-5920

Sincerely,

Teepu Khawja
Assistant Deputy Minister and Chief, Emergency Management

cc: Megan Bonenfant - CEMC
Sarah Jacob - Field Officer - Killarney Sector

Ministry of Agriculture,
Food and Rural Affairs

Office of the Minister

77 Grenville Street, 11th Floor
Toronto, Ontario M7A 1B3
Tel: 416-326-3074
www.ontario.ca/OMAFRA

Ministère de l'Agriculture, de
l'Alimentation et des Affaires rurales

Bureau du ministre

77, rue Grenville, 11e étage
Toronto (Ontario) M7A 1B3
Tél. : 416 326-3074
www.ontario.ca/MAAARO

Ontario

April 8, 2022

Katherine McDonald
CAO
Township of Billings
clerktreasurer@billingstwp.ca

Dear Ms. McDonald,

The Canadian Food Inspection Agency (CFIA) has confirmed cases of highly pathogenic avian influenza (H5N1) in Ontario.

While the CFIA leads the disease response for highly pathogenic avian influenza, and has imposed permitting requirements in defined areas of the province, I am writing to inform you and your constituents that Ontario is taking action to help limit the spread of the virus in the province.

On the advice and recommendation of the Chief Veterinarian for Ontario, I have issued a Minister's Order under the *Animal Health Act, 2009*, for the purpose of limiting the commingling of birds from different locations in Ontario, in order to reduce the likelihood of disease transmission in domestic birds by limiting direct contact.

Effective April 9, 2022, this Order temporarily prohibits events where birds commingle, such as bird shows, bird sales and swaps, portions of fairs where birds are exhibited, sport and educational displays where birds are brought from multiple locations, vaccination gatherings for birds from multiple locations, and prohibits the movement of birds to those events. Temporarily reducing direct contact between birds from different locations will limit the spread of avian influenza and protect flock health. This Order will expire on May 9, 2022, but may be extended if required.

This Order builds on the government's actions to limit the spread of avian influenza, including increasing surveillance and testing capacity and providing education and resources for all those along the poultry supply chain. As well, the Ontario government has expanded mental health supports for farmers and their families.

I also continue to encourage your constituents to further enhance their biosecurity measures.

If your municipality permits backyard flocks, I strongly encourage you to share these essential resources with them. Additionally, I am asking you to take a proactive approach in limiting public events that involve the commingling of birds.

Avian influenza subtype H5N1 has been identified in Ontario, and eight other provinces, including Nova Scotia, and Alberta, as well as numerous US states Avian influenza is not a threat to food safety but impacts domesticated and wild birds. Ontario poultry and eggs are safe to eat when, as always, proper handling and cooking takes place. People working with poultry should take additional precautions and are strongly encouraged to follow all public health guidelines and maintain strict biosecurity.

I understand that temporarily stopping participation in these activities is disappointing news for many Ontario farmers, bird owners and hobbyists. By pausing these activities in the short term, I firmly believe we will help protect the poultry industry for the long term.

For more information on the Minister's Order, please visit NEWSROOM and OMAFRA's Avian Influenza webpage.

The Ontario Ministry of Agriculture, Food and Rural Affairs continues to monitor this quickly developing situation and may implement further measures as part of the response to this disease.

I appreciate your cooperation as we continue to work together to enhance biosecurity and reduce the spread of avian influenza.

Sincerely,

Lisa M. Thompson
Minister of Agriculture, Food and Rural Affairs

Resources:

- OMAFRA Avian Influenza Website
- CFIA Avian Biosecurity – Protect Poultry, Prevent Disease
- Checklist to Implementing an Effective Biosecurity Plan
- Suggested Solutions for Farmers – Deterring Migratory Birds
- Biosecurity Recommendations for Small Flock Poultry Owners
- How to prevent and detect disease in backyard flocks and pet birds
- Biosecurity for Small Poultry Flocks During High Risk Periods for Avian Influenza
- Mental health resources for farmers

Billings Museum Committee
Minutes

April 4, 2022 Electronic

Present: Deb Flaxman, Dianne Fraser, Michael Hunt (Chair), Diane Larocque, Brad MacKay, Kathy McDonald (staff), Rick Nelson (staff).

1. **Opening**
   The meeting was called to order at 7:05 p.m. by Michael Hunt.

2. **Approval of the Agenda**
   Motion by Deb Flaxman, seconded by Diane Larocque
   That the agenda for the April 4, 2022, meeting be accepted as amended.
   Carried

   Additions to the agenda under Other were Jabawong Story Telling Festival, Christmas in Kagawong, Remembrance Day and Old Mill outside artifacts.

3. **Pecuniary Interest**
   None

4. **Adoption of the Minutes – November 1, 2021**
   Motion by Dianne Fraser, seconded by Deb Flaxman
   That the minutes of the November 1, 2021, meeting be accepted as presented.
   Carried

5. **Financial Report**
   Motion by Dianne Fraser, seconded by Deb Flaxman
   That the financial report be accepted as presented.
   Carried

6. **Old Business**
   - **Donor Wall**
     The donor wall sign is at Beacon Images and needs to be picked up. Brad plans to have the sign up in the next week or so.

   - **Signs**
     The new signs have all been purchased and delivered.

7. **New Business**

   Covid 19 Update
   The museum will be opening under whatever protocols are in place.

Resignation
Sabine Huege has resigned from the committee. Council accepted the resignation at the March 22 council meeting.

Opening
The opening date for the Heritage Centre is May 21, which is the long weekend.

Summer Student
Hanako Hubbard-Radulovich will, again, be the summer student. She will be working June, July and part of August (date to be confirmed)

Exhibits – Empress of Ireland
All the exhibits are to stay the same as last year. The Post Office Museum will remain closed for 2022 but is planned to be open in 2023.

Store
There are two full boxes of 12 and one box of 9 hawberry jelly. Four more boxes are needed for this year.

History Day
History Day will be August 11, 2022**.** There will be 2 shows, one at 3:30 and one at 7 p.m. Guy will be doing a power point presentation and the second presentation will be by a Salvation Army historian.

Other
Jabawong Story Telling Festival
The Jabawong Story Telling Festival will be held July 16, 2022. The museum committee has been asked to have a barbeque at the event. A suggestion was made to see if Ethel would have a market during that day, as it attracts a large crowd. The committee said that they would be able to do the barbeque. They require two tables.

Christmas in Kagawong
Christmas in Kagawong will be held on November 18th and 19th and is being hosted by the EDC. Diane Larocque said that the committee could do the lunch. Rick is to contact Sharon Alkenbrack for a table for the event.

Remembrance Day
The Cenotaph Board and the Museum Committee will work together organizing the event.

Old Mill Artifacts
The Old Mill Artifacts are currently in front of the "island" in front of the municipal building. They need to be relocated and restored. As well they need to be placed on a proper foundation. There should be signage explaining the artifacts and directing people to the Heritage Centre. Brad MacKay suggested that the committee could do fundraising for the project. Kathy is to confirm the new location of the artifacts and then Brad will get pricing for the foundation. The restoration can be completed later.

8. **Council Updates**
   Michael Hunt presented an update on Council.

9. **Next Meeting**
   May 2, 2022

10. **Adjournment**
    The meeting was adjourned at 8:00 p.m. on a motion by Brad MacKay.

Township of Billings
Accounts for Payment for April 19, 2022

Date	CK #	Name	Total Due	
Jan 28 2022	7215	Central Manitoulin	3,808.08	Replacement Cheque for Lost Cheque
April 13 2022	7216	A.J. Stone Co Ltd	572.64	
April 13 2022	7217	Beautiful Field Farm	251.97	
April 13 2022	7218	Becks, Floyd	192.88	
April 13 2022	7219	BJ'S & Addison's OK Tire	519.80	
April 13 2022	7220	Brendan Addison Mobile Mechanical	12,006.83	
April 13 2022	7221	Bridal Veil Variety	274.45	
April 13 2022	7222	Encompass IT	274.59	
April 13 2022	7223	G. Stephen Watt LLB	1,226.05	
April 13 2022	7224	Grand & Toy Ltd.	115.86	
April 13 2022	7225	Liam Campbell	50.00	
April 13 2022	7226	Lisa / Darren Hayden	924.00	
April 13 2022	7227	Maria Diebolt	50.00	
April 13 2022	7228	Marshall Kruger	150.00	
April 13 2022	7229	McDougall Energy Inc.	1,679.00	
April 13 2022	7230	Minister of Finance (Policing)	18,098.00	
April 13 2022	7231	Pinchin Ltd	2,491.65	
April 13 2022	7232	Receiver General for Canada	1,539.28	
April 13 2022	7233	S P I Health and Safety	1,640.70	
April 13 2022	7234	Sean Patterson	235.41	
April 13 2022	7235	Thomson Reuters	180.60	
April 13 2022	7236	Tiana Mills	466.96	
April 13 2022	7237	UCCM Castle Building Supplies	224.36	
April 13 2022	7238	Workplace Safety & Prevention Services	904.00	
		Total	47,877.11	

Pre-Authorized Paymen

April 1 2022	DD	Manitoulin-Sudbury District Services Board	30,545.33
April 5 2022	DD	Hydro One	7,490.40
April 12 2022	DD	OCWA - Contract	9,904.00
April 18 2022	DD	GFL Environmental Inc.	6,795.01
April 19 2022	DD	Superior Propane	79.10
April 19 2022	DD	Superior Propane	31.97
April 23 2022	DD	Superior Propane	1,625.23
April 23 2022	DD	Superior Propane	1,194.98
		Total Pre-Authorized	57,666.02

Total Accounts for Payment **$ 105,543.13**