Title: Amendment to Ignace Area Borehole 1 Permission		Security Classification: ***Confidential***	
Document No.: **N/A**	Rev: **R0**	Date: December 12, 2017	Page: **1 of 9**

nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Amendment to Ignace Area Borehole 1 Permission

Authorization

Prepared By: Sarah Hirschorn Date: Dec 13/2017.

Reviewed By: Derek Wilson Date: 13-DEC-2017

Approved By: Mahrez Ben Belfadhel Date: Dec 13, 2017

Revision Summary		
Revision Number	**Date**	**Description of Changes/Improvements**
R000	2017-12-12	Initial issue

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1. INTRODUCTION

This request is to amend MNRF/NWMO Permission Agreement (Appendix A) dated October 10, 2017 for the Borehole Drilling Project at the Borehole Drilling Site in the Ignace area (Figure 1).

1.1 Land Use Period

Specifically, this request seeks to amend the Permission Agreement (Appendix A) to extend the land use at the Borehole Drilling Site for a period of up to 5 years.

The longer term land use is required to support a long-term pressure monitoring and water sampling program, as briefly mentioned in step 6 f) of the Permission Agreement. As part of this program, pressure measurements and water samples will be taken from the different intervals along the borehole length on a quarterly basis over a period of up to five years (Section 2 below).

2. DOWNHOLE INSTRUMENTATION AND MONITORING

The downhole instrumentation is planned to be installed as part of a revision to the Borehole Drilling Project. The downhole instrument measures fluid pressure, and allows for collection of groundwater samples, in discrete sections down the borehole.

2.1 Site requirements for Instrumentation and Quarterly Monitoring

In order to install the downhole instrumentation and maintain the site for planned quarterly monitoring for up to five years, the following amendments from the Permission Agreement are required:

1. Retain the drill pad from the drilling program – required when equipment and personnel access the site to collect pressure measurements and water samples, and to conduct maintenance of the system if required. See Figure 2 for an example.

2. Add a 3 m x 3 m x 0.1 m thick concrete pad around the well head. The pad provides a stable base for the enclosure and the setup of the test equipment required during the sampling event – See Figures 3 and 4 for an example.

3. A protective enclosure approximately 1.2 m x 1.2 m x 1.2 m. See Figures 3, 4 and 5 for examples. The enclosure protects the external instruments and monitoring connections.

4. A solar panel may be installed for charging batteries for any data transfer equipment (cellular) if implemented. See Figure 5 for an example.

5. Retain the gated fence to restrict access from public and wildlife.

6. Retain signage and contact numbers

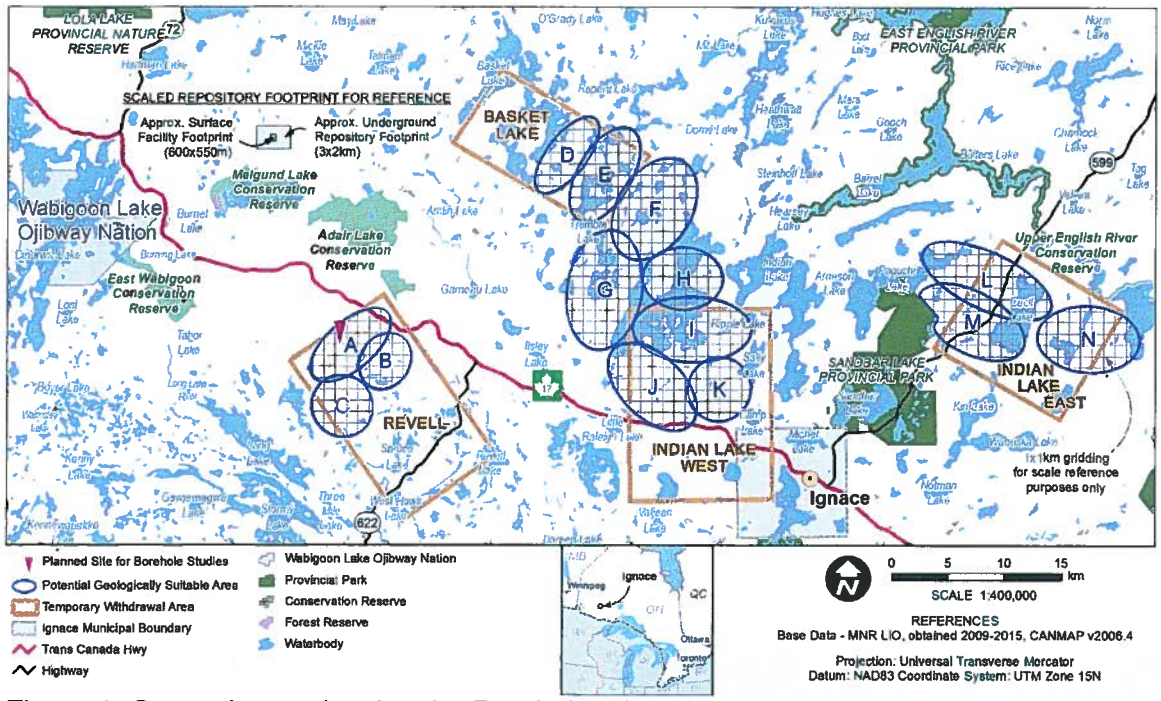


Figure 1: General map showing the Borehole 1 location

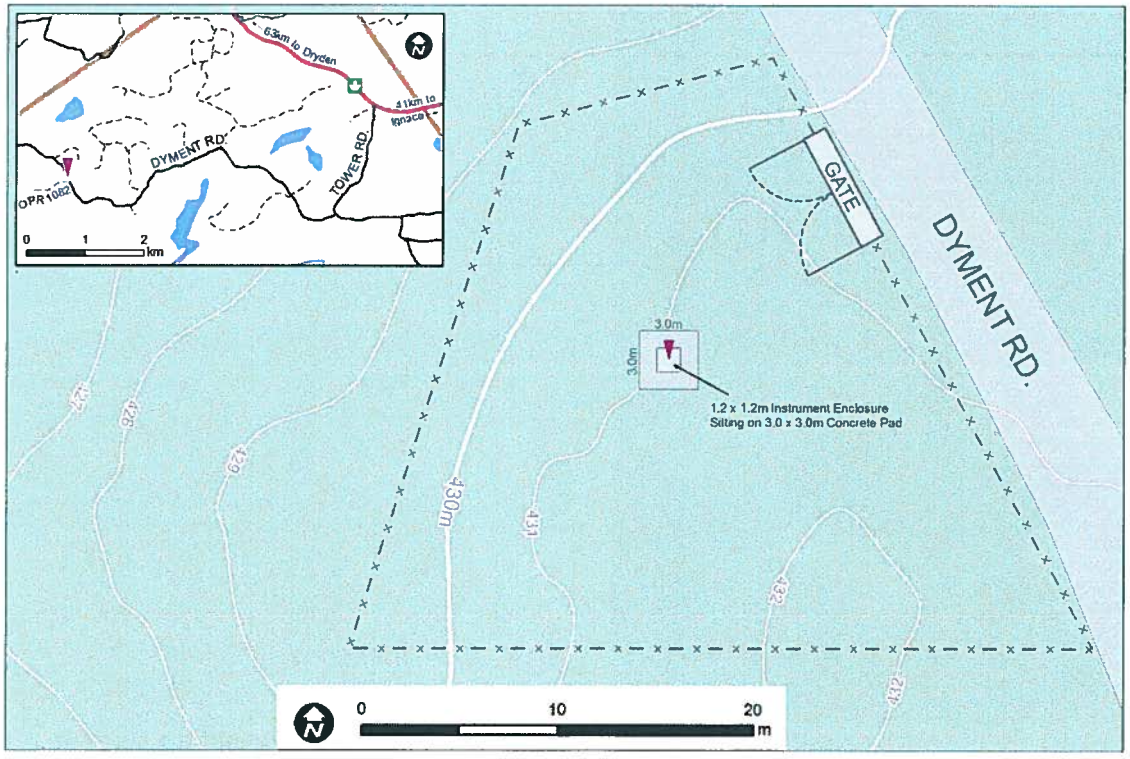


Figure 2: Map showing area to be retained with Concrete pad and instrument enclosure.

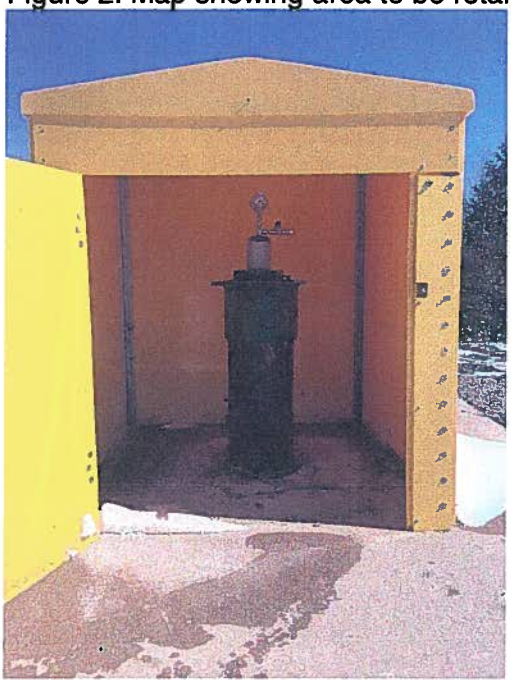


Figure 3. Example of an enclosure placed atop of the instrumented well head.

Figure 4. Example of concrete pad with well head enclosure and temporary test equipment

Figure 5. Example of well head enclosure and temporary test equipment

Figure 6. Example of a solar panel, battery and data transfer equipment (in addition to the well head enclosure)

2.2 Quarterly pressure monitoring and water sampling program

The planned quarterly program, to take place over up to five years, requires access to the site for a pickup truck and trailer.

During the quarterly monitoring, the trailer, containing the test and sampling equipment, will be positioned at the borehole. The sampling monopod and winch are set up over the well head and the MOSDAX sampler is lowered into the well. Starting at the lowest interval, pressure measurements will be recorded at each of the monitoring intervals in the borehole. Following the pressure measurements, groundwater samples will be collected from selected intervals within the borehole. The collected water samples are bottled, labeled and prepared for dispatching to an accredited laboratory for analysis. In-field geochemical analyses (including electrical conductivity, pH and redox potential) will be performed on site. The volume of water removed from the well for groundwater sampling is less than five liters per groundwater sample, not including the volume purged prior to collecting the sample. All purged water will be collected and removed from site for proper disposal.

The monitoring team, consisting of two people, mobilizes to and from the site each day for a several days per quarterly monitoring event. All required materials, tools and equipment are brought to the site for the work, and are removed at the end of the program, including any potential discharge water.

During the winter monitoring event it is expected that a local contractor will be hired to clear the access route and the site of snow.

The pressure data collected from the instrumentation and the results of the water sample analysis are valuable inputs to the hydrogeological descriptive model of the site and the baseline environmental monitoring program.

APPENDIX A – Permission Agreement

AGREEMENT

BETWEEN:

HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO, as represented by the **Minister of Natural Resources and Forestry** (the **"Ministry"**)

AND

THE NUCLEAR WASTE MANAGEMENT ORGANIZATION, as (the "**NWMO**")

(referred to together as the "**Parties**")

WHEREAS the Ministry is the owner of the Crown land located 42km North West of Ignace and approximately 4km South of Highway 17, as described in Appendix A: Borehole Drilling Site Description, attached hereto, defined below as the Borehole Drilling Site;

AND WHEREAS the Ministry and the NWMO executed a Memorandum of Understanding dated March 20, 2017, which in part sets out the process for NWMO to request permission to conduct borehole drilling projects on Crown Land;

AND WHEREAS the NWMO has requested a Permission, as defined below, from the Ministry to conduct a Borehole Drilling Project, as defined below, at the Borehole Drilling Site;

AND WHEREAS pursuant to subsection 2(2) of the *Public Lands Act*, 1990, c. P.43 (*PLA*), the Minister, as defined below, has the authority to enter into agreements with any person for the purpose of carrying out his or her duties under the *Public Lands Act*, including the management of public lands;

AND WHEREAS as a member of the Executive Council of Ontario, the Minister has the common law authority to enter into agreements with respect to the use of public lands;

THIS AGREEMENT WITNESSES that in consideration of the terms and conditions set out herein and such other good and valuable consideration (the receipt and sufficiency of which are hereby acknowledged), the Ministry hereby grants Permission, as defined below, to the NWMO to use the Borehole Drilling Site for the purpose stated herein, and for no other purpose, subject to the following terms and conditions:

1. DEFINITIONS and GENERAL PROVISIONS

1.1 In the Agreement, words in the singular include the plural and vice-versa.

1.2 The headings in the Agreement are for convenience of reference only and do not form part of the Agreement and in no manner modify, interpret or construe the Agreement.

1.3 In the Agreement the following words shall have the following meanings:

"Agreement" means this Agreement including:

- Appendix A – Borehole Drilling Site Description
- Appendix B – Borehole Drilling Project Description and Conditions
- Appendix C – Crown Land Occupation: Occupier's Self Reporting Form
- Appendix D – Environmental Management Plan

"Borehole Drilling Site" means the lands specified in Appendix A on which the NWMO may conduct the Borehole Drilling Project; this also includes the lands containing roads, trails, equipment laydown, staffing areas—all the areas on Crown land that would be used by NWMO for a Borehole Drilling Project.

"Borehole Drilling Project" means the technical and other activities described in more detail in Appendix B, necessary for the NWMO to determine whether the Borehole Drilling Site may be suitable for a long-term underground storage facility for Canada's nuclear fuel waste;

"Indemnified Parties" means each of the following and their directors, officers, advisors, agents, appointees and employees: Ontario and the members of the Executive Council of Ontario;

"Ontario" means Her Majesty the Queen in right of Ontario;

"Minister" means the Minister of Natural Resources and Forestry; and

"Permission" means the permission set out in Article 3.

2. MINISTER'S AUTHORITY AND SEVERABILITY

2.1 The Minister has entered this this Agreement pursuant to both (a) the authority provided by subsection 2(2) of the *Public Lands Act*, and (b) the Minister's common law executive authority to enter into agreements respecting the use of public land as a member a member of the Executive Council.

2.2 Each source of the Minister's authority to enter into this Agreement may be separately relied upon; if any provision of this Agreement is determined by a court to be illegal or unenforceable on account of being outside either (a) the Minister's authority under subsection 2(2) of the *Public Lands Act*, or (b) the Minister's common law executive authority, the remaining provisions of this Agreement shall be severable and enforceable in accordance with their terms.

3. DESCRIPTION OF PROPERTY AND PERMISSION

3.1 The Ministry grants the NWMO Permission to enter and use the Borehole Drilling Site for the Borehole Drilling Project, subject to the terms and conditions of this Agreement.

3.2 This Agreement does not convey any right, title or interest in the Borehole Drilling Site, or in any trees standing growing or being thereon, or in any minerals, sand, gravel or similar materials, in, on or under the land.

4. TERM

4.1 The term of this Agreement shall be from the date signed below by the Minister's Designated Representative to the first anniversary of that date (the "Term").

5. BOREHOLE DRILLING PROJECT CONDITIONS

5.1 The NWMO shall carry out the Borehole Drilling Project in accordance with the terms and conditions of this Agreement, and specifically in accordance with Appendix B – Borehole Drilling Project Description and Conditions.

6. MINISTRY'S PROPERTY

6.1 The NWMO agrees to assume full responsibility for the care of the Borehole Drilling Site during the Term, and to assume all risk of loss, damage, or injury to itself, its servants, agents, employees or licensees.

7. RESPONSIBILITIES

7.1 The NWMO shall be responsible at its own cost and expense for all maintenance directly associated with its use of the Borehole Drilling Site, including, without limitation: janitorial services, garbage removal, access maintenance, snow removal and any necessary rehabilitation of the Borehole Drilling Site as further specified in Appendix B.

7.2 In addition to complying and fulfilling the conditions referred to in Article 7.1, on termination or expiry of this agreement, the NWMO shall remove all the improvements, property or other assets from the Borehole Drilling Site, and remove all garbage and debris that resulted from the NWMO's use of the Borehole Drilling Site during the Term, and leave the Borehole Drilling Site in a clean and safe condition, restored as much as possible to its pre- Borehole Drilling Project. NWMO will be required to submit a *Crown Land Occupation: Occupier's Self Reporting Form* attached as Appendix C to this Agreement. The Ministry will permit the NWMO to access the Borehole Drilling Site for the purposes described above.

7.3 The NWMO shall be responsible for securing the Borehole Drilling Site and restricting public access to it as required to ensure public safety.

8. CONDITION OF THE BOREHOLE DRILLING SITE

8.1 The Ministry makes no representations as to the suitability of the Borehole Drilling Site for the Borehole Drilling Project, and the parties agree that access to the Borehole Drilling Site and the quality of that access is the responsibility of the NWMO.

8.2 The Ministry shall not be responsible for any damage or loss to the Borehole Drilling Site arising from circumstances, acts or conditions beyond the Ministry's control, or due to "force majeure", which is defined as an act of God, war, invasion, revolution, insurrection or other act of a similar nature.

9. ENVIRONMENTAL DAMAGE

9.1 The NWMO will be solely responsible for any environmental damage or adverse effects to the Borehole Drilling Site and any environmental clean-up or rehabilitation that may be required as a specified in Appendix B. The NWMO is not responsible for:

a) any environmental damage to the Borehole Drilling Site caused by the previous occupation of the area of the Borehole Drilling Site by other persons, organizations, or the Ministry;

b) any environmental damage to the Borehole Drilling Site arising during the period covered by this Agreement, where such environmental damage is a consequence of pre-existing environmental damage from previous occupation, or was caused by the activities of the Ministry during the period of this agreement; and

c) any environmental damage to the Borehole Drilling Site caused by any other persons, organizations, or by the Ministry.

10. INDEMNIFICATION

10.1 The NWMO shall indemnify and hold harmless Her Majesty The Queen in right of Ontario and the members of the Executive Council of Her Majesty The Queen in right of Ontario and their directors, officers, advisors, appointees, employees and agents ("Indemnified Parties") from and against any and all liability, loss, costs, damages and expenses (including legal, expert and consulting fees), causes of action, actions, claims, demands, lawsuits and other proceedings by whomever made, sustained, incurred, brought or prosecuted arising out of or in connection with anything done or omitted to be done by NWMO, its subcontractors or their respective directors, officers, employees, agents, partners or affiliates in the course of carrying out any activities under or in connection with the Agreement.

11. INSURANCE

11.1 The NWMO shall obtain and maintain for the Term at its expense with insurers having a secure A.M. Best rating of B + or greater, or the equivalent, all the necessary and appropriate insurance that a prudent person in the business of NWMO would maintain including, commercial general liability insurance on an occurrence basis for third party bodily injury, personal injury and property damage, to an inclusive limit of not less than $2 million Cdn. dollars per occurrence, $5 million Cdn. dollars products and completed operations aggregate, the policy to include the following endorsements:

- the Indemnified Parties as additional insureds with respect to liability arising out of the negligence of NWMO, its subcontractors or their respective directors, officers, agents, employees, partners, affiliates, volunteers or independent contractors
- contractual liability coverage
- cross-liability clause/severability of interest
- contingent employers liability coverage
- NWMO shall maintain or cause to be maintained employers liability coverage (or compliance with the section below entitled "Proof of W.S.I.A. Coverage" is required);
- sudden and accidental pollution (120h)
- coverage for each of the following operations, when part of the work:
- shoring, blasting, excavation, underpinning, demolition, pile driving and caisson work, work below ground surface, tunnelling and grading.
- 30 day written notice of cancellation, termination or material change
- non-owned automobile coverage with contractual coverage for hired automobiles

11.2 If the NWMO or its subcontractors are subject to the *Workplace Safety and Insurance Act, 1997,* S.O. 1997, c. 16, Schedule A ("WSIA"), it shall submit a valid clearance certificate of WSIA coverage to the Ministry prior to the execution of the Agreement by the Ministry. In addition, the Vendor shall, from time to time at the request of the Ministry, provide additional WSIA clearance certificates. The Vendor covenants and agrees to pay when due, and to ensure that each of its Subcontractors pays when due, all amounts required to be paid by it/its Subcontractors, from time to time during the Term, under the WSIA, failing which the Ministry shall have the right, in addition to and not in substitution for any other right it may have pursuant to the Contract or otherwise at law or in equity, to pay to the Workplace Safety and Insurance Board any amount due pursuant to the WSIA and unpaid by the Vendor or its Subcontractors and to deduct such amount from any amount due and owing from time to time to the Vendor pursuant to the Contract together with all costs incurred by the Ministry in connection therewith.;

11.3 NWMO shall obtain and maintain for the Term at its expense automobile liability insurance as per statutory requirement in Ontario and /or other jurisdictions, Ontario Automobile Policy (OAP 1) Owner's Policy Sections 3 and 4, auto liability for a limit of not less than $2,000,000 (two million) dollars per occurrence including Accident Benefits, and where applicable Section 7, Loss or Damage Coverage.

11.4 Proof of Insurance - The Vendor shall provide the Ministry with certificates of insurance, or other proof as may be requested by the Ministry, that confirms the insurance coverage as provided for in Section 11.1, and renewal replacements on or before the expiry of any such insurance. Upon the request of the Ministry, a copy of each insurance policy shall be made available to it. The Vendor shall ensure that each of its Subcontractors obtains all the necessary and appropriate insurance that a prudent person in the business of

the Subcontractor would maintain and that the Indemnified Parties are named as additional insureds with respect to any liability arising in the course of performance of the Subcontractor's obligations under the subcontract for the provision of the deliverables.

12. OCCUPATIONAL HEALTH AND SAFETY

12.1 This Agreement is not a contract for work or services, and nothing in the Agreement shall have the effect of making the Ministry an employer of the NWMO or any of the NWMO's directors, officers, employees, agents, partners, affiliates, volunteers or subcontractors for the purposes of the Ontario *Occupational Health and Safety Act*, R.S.O. 1990, Chapter O.1, as amended, ("OHS Act"), or Part II of the *Canada Labour Code*, R.S.C., 1985, c. L-2, as amended, ("CLC").

12.2 NWMO shall meet all employer obligations and ensure that all work performed by or for NWMO in connection with the Agreement is carried out in accordance with the OHS Act and its regulations to the extent they apply to the Borehole Drilling Project, and in accordance with the CLC and its regulations to the extent they apply to the Borehole Drilling Project.

12.3 NWMO shall take all reasonable precautions to meet and to ensure its subcontractors meet all requirements for the protection of workers set out in the OHS Act and *Canadian Labour Court* and the regulations made under those Acts as applicable. Any health and safety concerns or deficiencies identified by the Ministry's Designated Representative must be addressed and corrected by NWMO immediately.

13. AMENDMENTS AND ASSIGNMENT

13.1 This Agreement may be amended only by written agreement duly executed by the Parties.

13.2 NWMO shall not assign this Agreement or any part thereof without the written consent of the Ministry. Such consent shall be in the sole discretion of the Ministry and subject to any terms and conditions that may be imposed by the Ministry.

14. ACCESS AND INSPECTION

14.1 The Ministry or the Ministry's authorized representatives may enter and inspect the Borehole Drilling Project Site described in Appendix A at any time.

14.2 The NWMO representative who is in charge of the Borehole Drilling Project Site shall produce and show this Agreement to any Ministry representative whenever requested by the Ministry.

15. TERMINATION

15.1 The Ministry may terminate this Agreement upon giving thirty (30) days' Notice to NWMO, or immediately upon the occurrence of an Event of Default.

15.2 Each of the following events will constitute an Event of Default:

a) NWMO, prior to or after executing the Agreement, makes a material misrepresentation or omission or provides materially inaccurate information to the Ministry;

b) there is a material change to the nature, size or scope of the Borehole Drilling Project;

c) NWMO assigns the Agreement in whole or in part without first obtaining the written approval of the Ministry; or

d) NWMO breaches any of its other obligations under the Agreement, including but not limited to the obligation to carry out the Borehole Drilling Project as described in Appendix B – Borehole Drilling Project Description and Conditions, and fails to rectify the breach within thirty (30) days from the date the Ministry notifies NWMO of such breach.

15.3 NWMO may terminate this Agreement upon giving thirty (30) days' Notice to the Ministry, but not prior to receiving a Notice from the Ministry that has determined NWMO has fulfilled all applicable obligations under the Agreement, and such determination will be at the sole discretion of the Ministry.

16. NOTICE

16.1 Any Notice shall be

a) in writing;

b) delivered personally or by pre-paid courier, or sent by facsimile, certified or registered mail; and

c) forwarded to the Designated Representative of the respective Party.

16.2 All Notices shall be effective:

a) at the time the delivery is made if the Notice is delivered personally, by pre-paid courier or by facsimile; or

b) five business days after the day the Notice was deposited in the mail if the Notice is sent by certified or registered mail,

unless the day the Notice is effective falls on a day when the NWMO or the Ministry is normally closed for business or the Notice is sent by facsimile after 5:00 p.m. on a business day, in which case the Notice shall not be effective until the next business day that the NWMO or the Ministry, as the case may be, is normally open for business.

17. DESIGNATED REPRESENTATIVES

17.1 It is agreed that the Ministry and NWMO may act through any designated individual for the purposes of this Agreement.

17.2 For the purposes of this Agreement, for the Minister, the Designated Representative and address are:

. Ray Boudreau
District Manager
Dryden District Ministry of Natural Resources and Forestry
479 Government Street
Dryden, Ontario
P8N 3KN

and, for the NWMO, the Designated Representative and address are:

Mahrez Ben Belfadhel
VP, Site Selection
22 St. Clair Avenue East 6th Floor
Toronto, Ontario
M4T 2S3

17.3 Either Party, through its Designated Representative, may designate a different representative or provide a revised address, from time to time, by providing Notice in writing to the other Party.

18. GENERAL

18.1 This Agreement and the rights, obligations and relations of the Parties shall be governed by and construed in accordance with the laws of the Province of Ontario, and the federal laws of Canada applicable therein. Any litigation arising in connection with the Agreement shall be conducted in Ontario unless the Parties agree in writing otherwise.

18.2 Any failure by the Ministry to insist in one or more instances upon strict compliance by the NWMO with any of the terms or conditions of the Agreement shall not be construed as a waiver by the Ministry of its right to require compliance with any such terms or conditions and the obligations of the NWMO with respect to such compliance shall continue in full force and effect.

18.3 The NWMO shall have no power or authority to bind the Ministry or to assume or create any obligation or responsibility, express or implied, on the Ministry's behalf. The NWMO shall not hold itself out as an agent, partner or employee of the Ministry. Nothing in the Agreement shall have the effect of creating an employment, partnership, or agency relationship between the Ministry and the NWMO.

18.4 This Agreement may be signed in counterparts with the effective date of this Agreement being the later date upon which this Agreement was signed.

19. SURVIVAL

19.1 The following Articles, and all applicable cross-referenced Articles and appendices, will continue in full force and effect for a period of seven years from the date of expiry or termination of the Agreement: Articles 7.2, 9, 10, 18.1, 19.1 of the Agreement, and Section 7 of Schedule B.

IN WITNESS WHEREOF this Agreement has been executed by this 10th day of OCT. 2017, by.

For Her Majesty the Queen in Right of Ontario as represented by the Minister.

Name: [signature]
District Manager RAY BOUDREAU

Date: OCT. 10/17

For Nuclear Waste Management Organization

Name: [signature]

Date: 5-OCT-2017

DEREK WILSON
CHIEF ENGINEER AND
VP CONTRACT MANAGEMENT

APPENDIX A – BOREHOLE DRILLING SITE DESCRIPTION

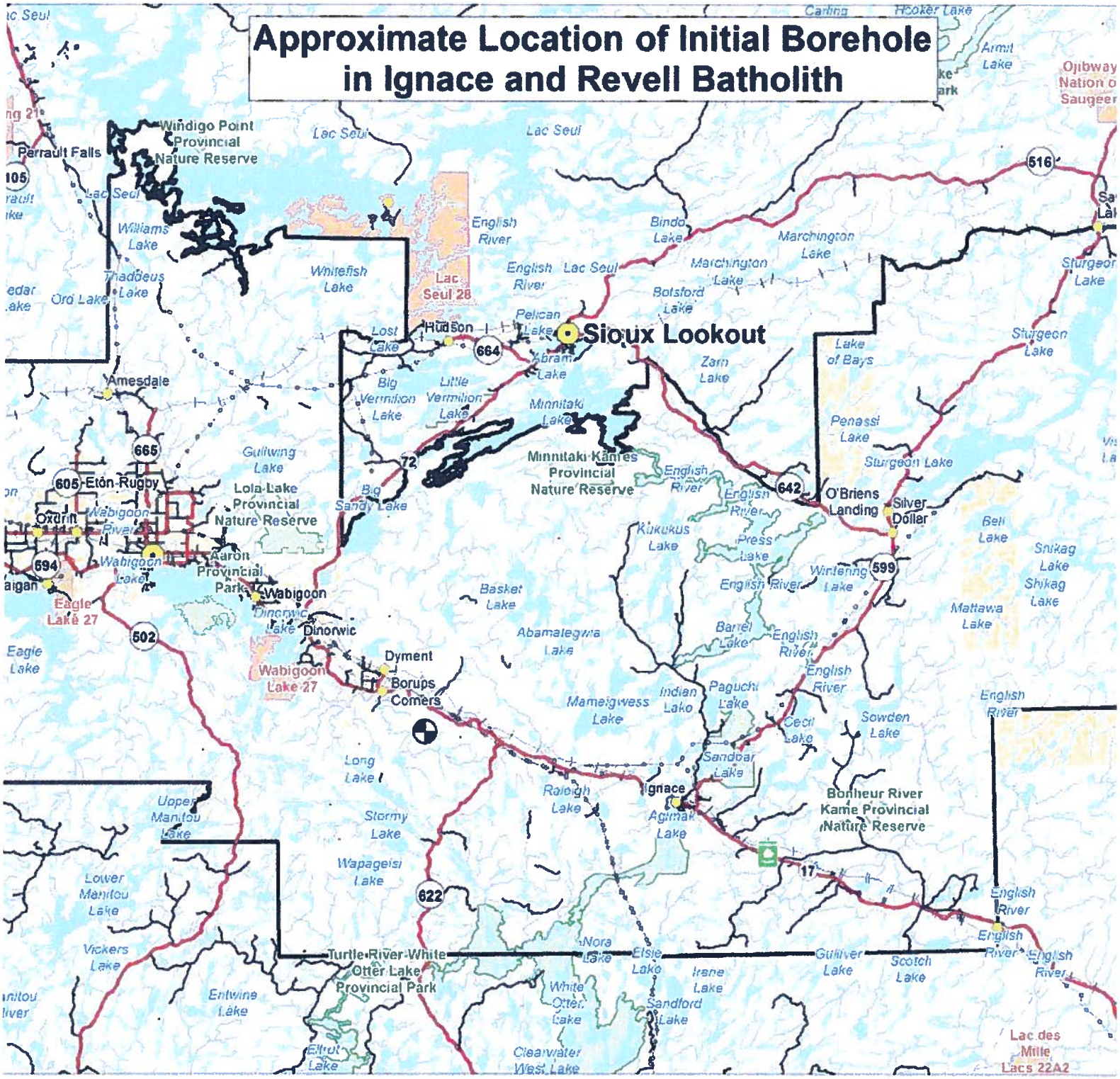
This Borehole Drilling Site Description is taken from the "MRNF Ignace Borehole Drilling Project Submission" received by the MNRF from the NWMO on May 2nd, 2017.

The initial borehole location is planned for: EASTING & NORTHING (UTM Zone 15N, NAD83): E**555944**, N**5486016**.

The borehole location is on the Revell batholith, approximately 5 Km northeast of Mennin Lake, 41 Km northwest of the Municipality of Ignace, 20 Km southeast of Wabigoon Lake Ojibway Nation, and 63 Km southeast of Dryden.

Figure 1 shows the approximate location of the initial borehole in the context of the Ignace region. Figures 2 and 3 show the approximate location of the fenced drill site area (50 m by 70 m yellow rectangle) and initial borehole location (purple marker).

Approximate Location of Initial Borehole in Ignace and Revell Batholith



Borehole Location

Highway
Street
Railway
Transmission Line
Pipeline
Watercourse

MNRF District Boundary
Waterbody

Private Land
Reserve Land
Provincial Park

DRYDEN DISTRICT
Ministry of Natural Resources and Forestry

0 20 40 60
Kilometers
1:800,000

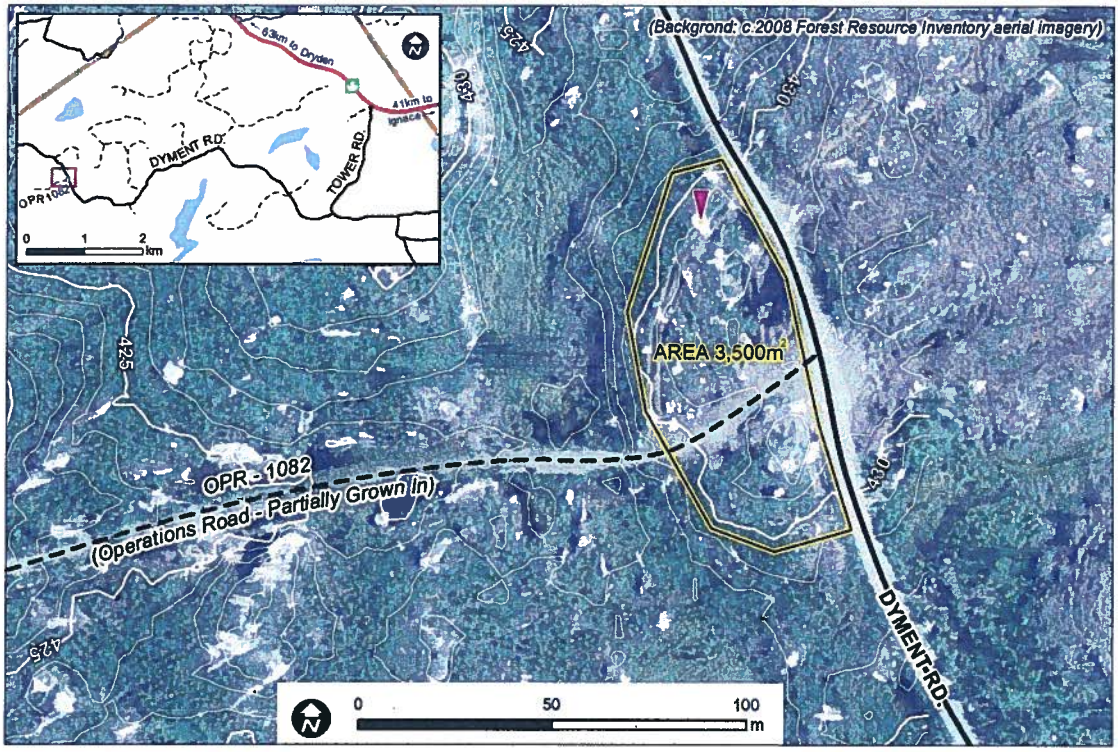


Figure 2: Approximate initial Borehole Location – yellow rectangle represents the fenced drill site location, purple marker indicates location of initial borehole

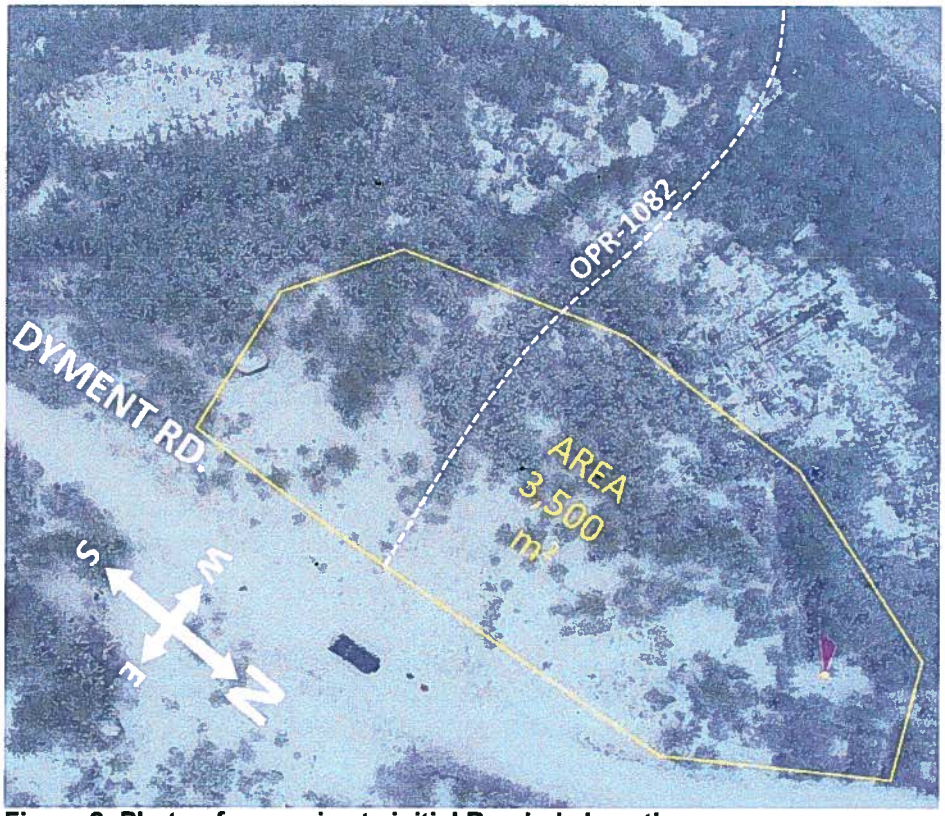


Figure 2: Photo of approximate initial Borehole Location.

APPENDIX B – BOREHOLE DRILLING PROJECT DESCRIPTION AND CONDITIONS

Borehole Drilling Activities:

1. *Construction of permanent and temporary structure*

No permanent structures will be constructed or erected.

Temporary structures will be brought to site and setup on the drill site. These structures may include various sizes of trailers that will serve as offices, storage and work areas.

All drilling, power generation equipment and fuel storage areas will be setup atop of spill containment structures. This is to provide additional spill protection in the event of an accidental spill or equipment failure.

2. *Construction of, or improvements to, infrastructure such as access roads or trails, water crossings, including design specifications, methods, equipment, and materials to be used*

a) Site Access

Access to the site chosen for the initial borehole location was selected in part based on existing road infrastructure and logging roads.

Equipment will be used that can be driven into the sites based on the existing road conditions.

Areas on the roads may be filled with aggregate to level out potholes, large ruts or to smooth the transition where there is a sharp change in road angle.

A short access area may be cleared to the site from the main access (Dyment) road, approximately 30 m long.

b) Site Establishment

The pad (approximately 3500 m^2) will be prepared using aggregate sourced from a local supplier.

The aggregate will be spread out using a skid steer or similar equipment and compacted using a small compacting roller.

The drilling site will be fenced with an 8' high fence to prevent wildlife from entering the site and to limit site spread. The fence will be removed at the end of the planned work at the site.

Equipment used during site establishment may include trucks for towing in the trailers, drilling support equipment and possibly the drill rig (may also be self-propelled), a small mobile crane to remove equipment from the transport trailers and place into final location (if required), pickup trucks and small equipment such as a skid steer.

c) Site Utilities

The site will operate diesel powered generators to provide the electrical power needed support the planned work activities. Power will be for offices, core logging activities, lighting, portable ablution facilities, yard lighting, etc.

Potable and process water will be brought to site.

Designated waste disposal bins will be setup on the site for the collection of all garbage generated during the work program. The garbage bins will be removed from site and taken to a licensed disposal facility located at the nearest town (Dryden or Ignace).

3. *Hazardous materials*

Hazardous materials will be stored according to regulated requirements. As required, and at the end of the planned work, hazardous waste will be removed from site and disposed of at a licensed disposal facility. Hazardous materials are likely to be limited to diesel and gasoline fuel, hydraulic fluid, grease and oil.

4. *Equipment fueling activities, including planned location for re-fueling and any fuel storage on site*

Due to the remote nature of the work location, all fuel for equipment and tools will be brought to site in a certified fuel transportation container and transferred to certified fuel storage containers. These containers will be double walled and stored in a dedicated fuel storage location with additional containment.

Fueling of large equipment will be done at the equipment e.g. the drill rig and power generator. This equipment will be positioned atop of containment. Where required, temporary spill trays will be placed beneath the refueling point to capture any leaks of fuel during the refueling activities e.g. when refueling small equipment such as a skid steer or pickup truck. Refueling of small tools e.g. a chainsaw, will be performed in a designated refueling area or atop of a spill tray. Fuel storage and refueling areas will be set away from temporary offices and drilling equipment.

Hand held fire extinguishers and spill kits will be located at the fuel storage and refueling locations.

5. *Vegetation and ground clearing activities, including equipment and methods to be used and the location and size of area(s) to be cleared*

Prior to the start of any work the Lead Contractor and NWMO will work with the MNRF representative to visit the site and review the planned work so as to minimize the required ground clearing for access and site establishment.

The site indicated in Figures 2 and 3 in Appendix A has been chosen in part to minimize the need for ground clearing and reduce the effects of erosion from water runoff. Where required, the ground will be cleared of small trees and left over wooded material remaining after previous logging activity. This material will be pushed to a suitably agreed area where it will be piled and left at the end of the drilling activity.

Minor clearing of fresh growth may be required if a previously overgrown logging route is to be used. This will likely be completed using a small dozer, skid steer or similar equipment.

6. *The planned activities to be performed once the site is established include:*

a) Drilling and coring – A drill rig will be setup to drill and core either a NQ3 (75.7 mm (3 in)) or HQ3 (96 mm (3-3/8 in)) hole to a maximum depth of 1000 m. Included in the drilling setup will be the installation of conductor casing which will be bedded to a depth of 1 m below bedrock (casing length will be based on overburden depth). Drilling fluids and cuttings will be managed at surface and recirculated. Drilling fluids will be traced using a combination of naturally occurring water isotopes (oxygen, deuterium and tritium) and a fluorescent tracer.

Field measurements will be made regularly in order to maintain consistent drill fluid properties and to identify any component of drilling fluid in the groundwater and pore water samples.

b) Core logging - All core retrieved will be logged, photographed and sampled on site and stored in core boxes. Some core samples will be taken and shipped off-site for laboratory testing. The core boxes, with the remaining core, will be removed from the site and stored in the core laboratory located in Ignace. All core will be logged and labelled for traceability.

c) Geophysical well logging – The well will be logged using the appropriate truck-based equipment that will be lowered down into the drilled hole. At the completion of each activity, the equipment will be retrieved from the hole. One or more of the tests may require a radioactive source. All regulatory requirements for transporting, handling and removing the equipment will be followed.

d) Hydraulic testing – A straddle packer system and accompanying equipment will be used to perform the hydraulic testing to determine the hydraulic conductivity of the rock at regular intervals down the borehole. The test locations will be based on the information gained from the geophysical well logging and core logging activities.

e) Groundwater sampling and testing – If permeable zones are detected during the drilling and coring activities, samples of water from those areas will be collected, prepared for testing and shipped out for further laboratory analysis.

f) Well sealing – At this time, it isn't determined if the borehole will be abandoned, or revisited and instrumented for additional monitoring. Based on the results from the planned program, there may be a requirement to return to the hole to perform additional testing at a later stage. The borehole will be temporarily sealed at surface and between zones that have differing hydraulic pressures or ground water chemistry (if any are identified). The wells may be instrumented to perform longer term data collection. If longer term data collection is not required, the well will be permanently sealed and abandoned according to provincial regulations.

g) Site operation - The site will operate on a 24/7 basis during drilling and certain testing operations. Workers will access the work site on a daily basis as required for their working shift. The number of workers at the site will vary from 1 to an expected maximum of 15 per shift over the course of the work program. NWMO personnel and authorized visitors may be periodically at the site. Workers will drive to and from the work site.

7. *Decommissioning and clean-up of the Borehole Drilling Site*

At the end of the drilling and testing program all equipment and materials will be removed from the site (excluding potential long-term drill hole monitoring instruments). There may be a need to request retaining the prepared pad in the event that further testing is required.

In the event of a contaminant spill, the spill will be cleaned up according to the requirements of the contractor's Environmental Management Plan attached to this Agreement as Appendix D, and the satisfaction of the regulating authority.

8. *Schedule*

The work is planned to begin in October 2017 and be concluded within 6 months. The timing of the initiation of the work could be impacted by social engagement considerations.

Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

APPENDIX C - Crown Land Use Occupation – Occupier Self-Reporting Form
Occupation des terres de la Couronne – Auto-vérification par l'occupant(e)

Instructions:	1) Confirm location and use of improvements shown on the attached site plan by initialing the improvements and or identifying and initialing changes. 2) Complete all applicable sections 3) Sign and date the declaration 4) Return signed form complete with photographs to:
Instructions:	*1) Pour confirmer l'emplacement et l'utilisation des améliorations indiquées sur le plan ci-joint, veuillez écrire vos initiales sur les améliorations et, au besoin, en indiquant d'abord les améliorations.* *2) Remplir toutes les sections applicables* *3) Signer et dater la déclaration* *4) Retourner le formulaire signé avec les photos à*

~~**Note: all photographs must be signed and dated on reverse by the authorized occupier**~~
Remarque : toutes les photos doivent porter la signature de l'occupant(e) autorisé(e) et la date au verso.

Form of Authorization:
Formulaire d'autorisation :

Location:
Lieu :

Occupier:
Occupant(e) :

Occupier Mailing Address:
Adresse postale de l'occupant(e) :

Street
Rue :

Apt:
Appart.:

City/Town:
Ville/village:

Postal Code:
Code postal:

Site Plan – attached (as provided by MNR)
Plan des lieux ci-joint (conforme au plan du MRN)

Authorized Use(s):
Utilisation(s) autorisée(s) :

Solid waste disposal – approved waste disposal site ☐, located
Évacuation des déchets solides – lieu d'enfouissement approuvé ☐, reconnu

Sewage disposal – approved septic system ☐ Class
Évacuation des eaux usées – fosse septique approuvée ☐ Catégorie

Fuel storage facilities – approved system ☐ Type of system
Installation d'entreposage de combustible – système approuvé ☐ Type de système

---

Attach colour photographs covering the following views:
Joindre des photos en couleur représentant :

☐ waterfront viewed from the water body (where applicable)
☐ *le rivage vu de l'eau (le cas échéant)*

☐ all structures
☐ *toutes les structures*

☐ other -
☐ *autre -*

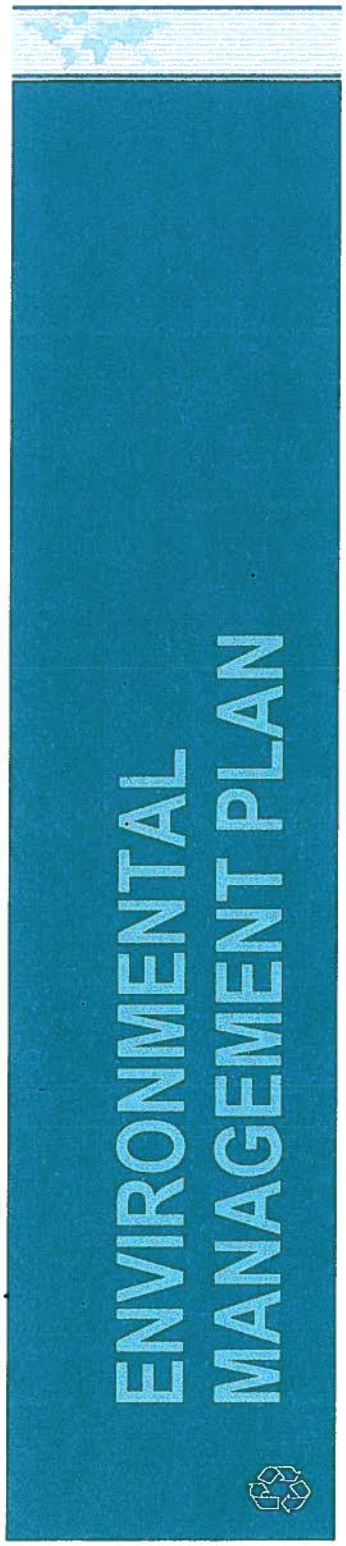
I hereby certify that the information is true and complete and the attached photographs accurately depict the location authorized by as of, 20.

Je certifie par les présentes que ces renseignements sont justes et complets et que les photos ci-jointes représentent précisément le lieu relevant du en date du 20 .

Name of Occupier *Nom de l'occupant(e)*	Signature of Occupier *Signature de l'occupant(e)*	Date *Date*

Personal Information on this form is collected under the authority of the Public Lands Act, R.S.O. 1990 and Ontario Regulation 973 as amended. The information will be used for the purposes of the Act and the regulation. Questions about this information should be directed to the local MNR office at the above note address.

Les renseignements personnels figurant sur le présent formulaire sont recueillis en vertu de la Loi sur les terres publiques, S.R.O. 1990 et du règlement 973 de l'Ontario tel que modifié. Ces renseignements seront utilisés conformément aux dispositions de la loi et des règlements. Prière d'adresser toute question sur ces renseignements au bureau du MRN le plus proche, à l'adresse ci-dessus.



September 2017

PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING - IGNACE AREA

Environmental Management Plan

Submitted to:
Nuclear Waste Management Organization
6th Floor
22 St. Clair Avenue East
Toronto, Ontario, M4T 2S3

Report Number: 1671632

Distribution:

e-copy - NWMO
e-copy - Golder Associates
e-copy - Rodren Drilling

Golder Associates

Article One. ENVIRONMENTAL MANAGEMENT PLAN

CLIENT INFORMATION

Project Name:	Phase 2 Initial Borehole Drilling – Ignace
Area Project Number:	1671632
Client PO Number:	01559 A-TGS
Document Name:	1671632 ignace emp 15sep2017 r2a.docx
Client:	Nuclear Waste Management Organization (NWMO)
Address:	22 St. Clair Avenue East, Sixth Floor
City:	Toronto
Province:	Ontario
Postal Code:	M4T 2S3
Client Contact:	Maria Sánchez-Rico
Castejón Telephone:	647-259-3720
Email:	msanchez@nwmo.ca

Table of Contents

1.1 INTRODUCTION

This Environmental Management Plan (EMP) contains the environmental management procedures and processes proposed by Golder Associates for the drilling of borehole IG_BH01, as part of the Ignace Phase 2 Initial Borehole Drilling and Testing Project ("Project") carried out for the NWMO.

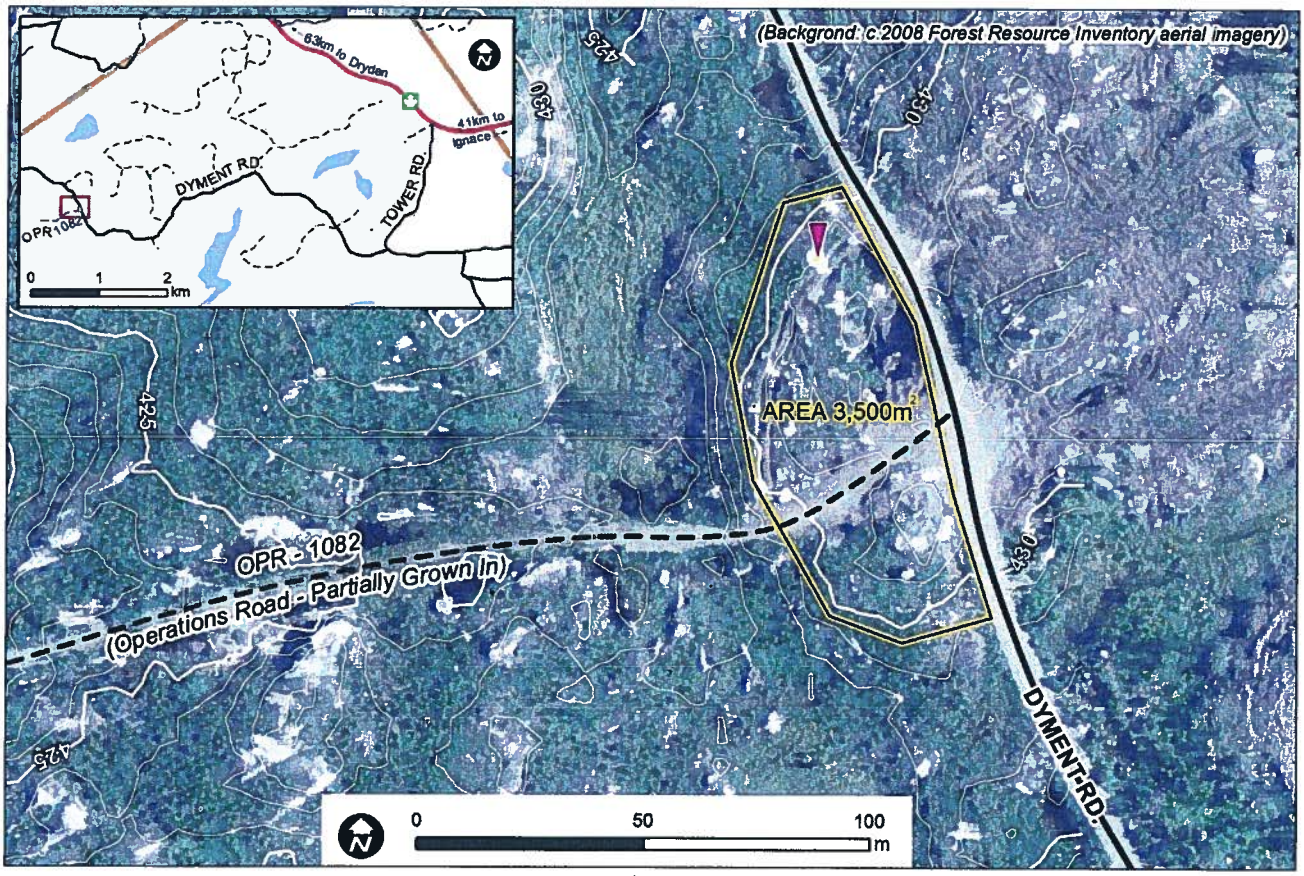


Figure 1: Proposed Drilling Location for IG_BH01

1.2 Project Description

This EMP applies to all eight work packages associated with Phase 2 Initial Borehole Drilling and Testing, as follows:

- WP1 Site Infrastructure;
- WP2 Borehole Drilling and Coring;
- WP3 Core Logging, Photography and Sampling;
- WP4 Core

Testing;

- WP5 Geophysical Well Logging and Interpretation;
- WP6 Hydraulic Testing;

- WP7 Opportunistic Groundwater Sampling and Testing; and
- WP8 Temporary Well Sealing.

A detailed description of work activities for each work package is provided in their respective Test Plan documents, which are available on site in Golder's site office trailer. The proposed general layout of the drill site for IG_BH01 is shown on the figure below.

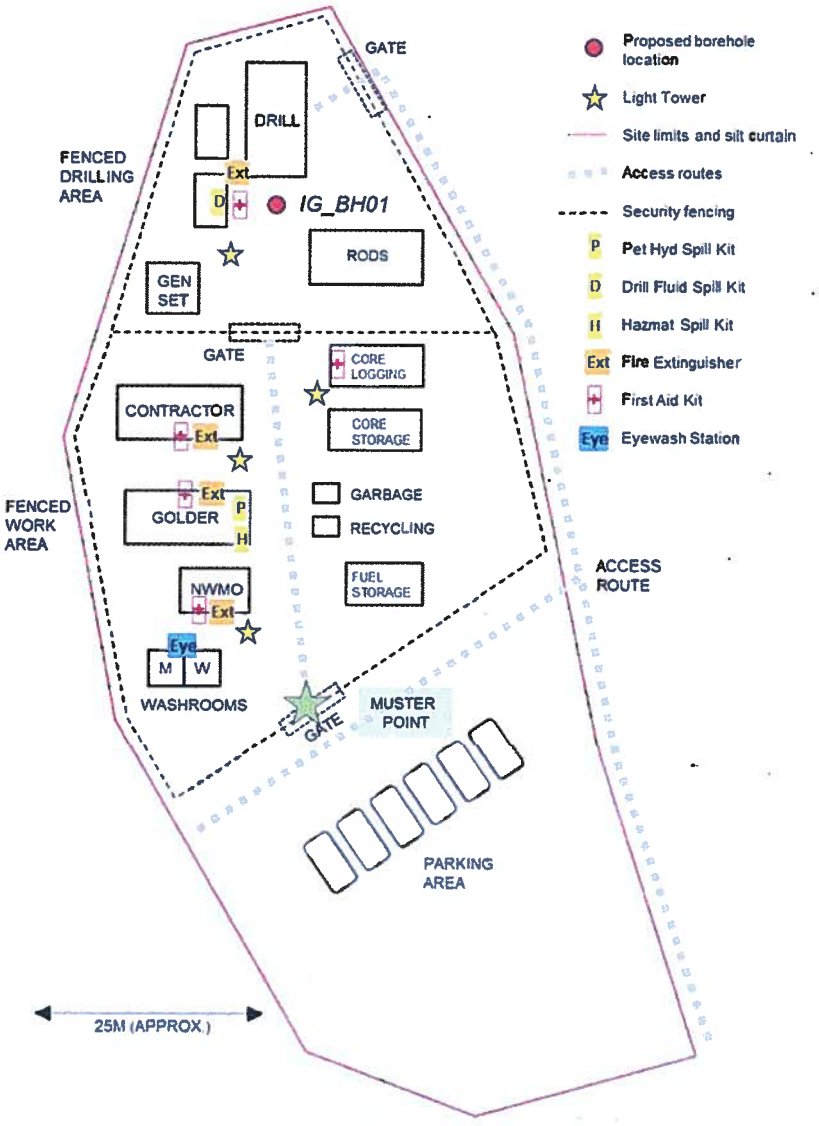


Figure 2: Proposed Drill Site Layout

1.3 Commitment to Environmental Management

NWMO's commitment to environmental management throughout the Project includes:

- Planning and conducting all activities in a manner that meets or goes beyond compliance with applicable legislation, regulations and other codes of practice or programs to which NWMO voluntarily commits; and
- Monitoring, measuring, auditing and actively, transparently and effectively communicating its environmental performance and issues to employees, governments, communities of interest and the public at large.

Golder is also committed to environmental management throughout the Project, with the primary aim of avoiding any adverse impacts on local sensitive receptors. As lead Contractor on this project for NWMO, this includes:

- Managing the environmental impacts of work performed at NWMO workplaces or on behalf of NWMO including ensuring full compliance with legislation, prevention of pollution and protection of the environment
  and public health;
- Having an environmental management plan that meets or exceeds the NWMO requirements; and
- Ensuring its subcontractors have environmental management plans or procedures that are compliant and consistent with Golder's environmental management plan.

Golder's Health, Safety and Environmental Policy is provided as an attachment to the Health and Safety and Environment Plan (HASEP).

1.4 Purpose, Scope and Goals of EMP

The objective of the EMP is to ensure that all environmental management procedures and processes specific to the Project are addressed and all activities are conducted in compliance with regulatory requirements and any mitigation measures, if required, by the Ministry of Natural Resources and Forestry (MNRF) drilling permit.

Golder will ensure that environmental requirements are appropriately communicated to all personnel including Contractors. A copy of the EMP will be kept on site at all times in Golder's site office trailer.

1.5 Laws and Regulations

Golder is committed to upholding environmental laws and regulations, and will make every reasonable effort to help ensure that the project team complies with all applicable environmental laws and regulations during the Project.

Relevant regulatory requirements pertinent to the Project include, but are not limited to:

- Canadian Environmental Protection Act (Environment Canada);
- Environmental Protection Act (Ontario);
- Transportation of Dangerous Goods Act (Transport Canada);
- Fisheries Act (Fisheries and Oceans Canada DFO);
- Migratory Birds Convention Act – MBCA (Environment and Climate Change Canada)
- Species at Risk Act;
- Wildlife Act;

- Land Development Guidelines for the Protection of Aquatic Habitat (DFO);
- Canadian Standards Association (CSA) Z731-03, Emergency Preparedness and Response;
- Environmental Management Act, Hazardous Waste Regulation: provides requirements for authorized containment, storage/handling, disposal and transportation of substances identified as hazardous waste;
- Environmental Management Act, Spill Reporting Regulation: identifies and outlines the reporting requirements when a spill occurs;
- Canadian Council of Ministers of the Environment Guidelines;
- Archaeological Heritage Policy Framework; and
- Canadian Ambient Air Quality Standards.

Article Two. 2.0 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

Golder's responsibility as the lead contractor and Constructor is to ensure that the Project adheres to all regulatory requirements outlined in Section 1.4, and that the proposed work meets all the terms and conditions of the permits, authorizations or recommendations issued for the Project once these have been received. Golder is also responsible for the management, monitoring and mitigation of all environmental aspects of the project identified in the HASEP and EMP.

In meeting the environmental requirements of the Project, Golder will adhere to the following measures:

- Ensure that all field staff and contractors are aware of the environmental requirements and have an appropriate level of training and competence to perform the work;
- Ensure effective communication amongst field staff and contractors to ensure that environmental issues, responsibilities and requirements are understood prior to the commencement of work;
- Implement appropriate work procedures, instructions and controls to prevent and/or reduce adverse environmental impacts; and
- Provide guidance during an emergency or incident response, as required.

2.01 Golder Project Manager

- Responsible for overall management of the Project, oversight of the proposed Project work and environmental performance of the Project;
- Ensure that the EMP is prepared, communicated, accepted and implemented by field staff and contractors (or delegate this responsibility);
- Ensure that the EMP is revised, as necessary;
- Ensure that environmental incidents are addressed and reported; and

- Report to, and advise NWMO on non-conformances with the EMP, difficulties encountered, how they were managed, and effectiveness of mitigation measures being implemented.

2.02 H&S Officer

- Participate in the preparation of the EMP;
- Support Project Manager and/or NWMO in liaising with regulatory agencies, as necessary;
- Ensure that the Site Supervisor has the training necessary to collect environmental data, conduct daily inspections, and prepare Daily Site Reports;
- Evaluate compliance of work activities with applicable laws, regulations and guidelines; and
- Anticipate potential environmental difficulties and provide advice to minimize potential for environmental incidents.

2.03 Site Supervisor

The Site Supervisor is physically located at the drill site and is responsible for the following:

- Assist in addressing all non-conformances with EMP;
- Adhere to work procedures and requirements set out in this EMP;
- Advise regarding need to suspend work activities if environmental damage appears to be occurring. Report to and advise Golder's Project Manager on non-conformances with EMP, difficulties encountered, how they
  were managed, and effectiveness of mitigation measures being implemented;
- Ensuring that all site personnel receive site orientation prior to commencing work;
- Collect environmental data, conduct daily inspections, and prepare Daily Site Reports;
- Communicate environmental responsibilities and requirements of this EMP to all field staff and contractors;
- Verify that emergency spill response materials are available on site and appropriately stocked; and
- Immediately communicate with the Golder Project Manager in the event of an environmental incident.

2.04 Field Staff and Contractors

- Adhere to the requirements set out in this EMP;
- Communicate environmental responsibilities and requirements of this EMP to co-workers;
- Implement immediate response to emergencies and incidents; and
- Notify Golder's Site Supervisor of all spills and other environmental incidents or emergencies.

3.1 SITE SPECIFIC MANAGEMENT PROCESSES

3.2 Proposed Work

The objectives and scope of initial borehole drilling and testing at Ignace is briefly summarized as follows, with details provided in the individual Test Plans for each work package.

2.05 WP1 Site Infrastructure Plan

Site Infrastructure, includes all site establishment and site infrastructure activities, and involves the design and construction of the site facilities that include the drill pad, surface water drainage grading, drill fluid containment system(s), field offices (e.g. core logging, office), electricity and perimeter fencing.

2.06 WP2 Borehole Drilling and Coring

Borehole Drilling and Coring, comprises two separate, but related activities: borehole drilling, coring, and casing installation; and the management of drilling fluids and use of tracers. The main objectives of drilling and coring are to collect high quality bedrock core, which will allow geological and geotechnical core logging and the collection of core samples. Core samples will be used for laboratory testing programs to characterize the bedrock environment. The borehole drilling also provides an opportunity to complete supplementary studies such as borehole geophysical logging, hydraulic testing and opportunistic groundwater sampling while drilling, and allow for future borehole testing.

The main objectives of the drilling fluid management and use of tracers are to optimize drilling to minimize borehole deterioration, to effectively remove any cuttings to maintain efficient drilling, and to trace the drilling fluids in order to recognize drilling fluid contamination of groundwater and porewater samples.

2.07 WP3 Core Logging, Photography and Sampling

Core Logging, Photography and Sampling, comprises the logging, sampling and distribution of rock cores to be collected, logged, photographed and sampled, during the initial borehole drilling and testing program. The main objectives of this task are to describe and document the geological and geotechnical characteristics of the rock encountered in the borehole, to collect and preserve representative samples for petrophysical, geomechanical and porewater testing and analysis, and to archive and store the core for future study.

2.08 WP4 Core Testing

Core Testing, comprises the petrophysical, geomechanical and porewater testing on rock core samples recovered from the borehole, to be performed in contracted laboratories. The overall objective of the laboratory testing is to assess the physical properties of the rock and geochemistry of the porewater at the site, and in particular, at and around the proposed repository horizon (400 – 600 m depth).

2.09 WP5 Geophysical Logging and Interpretation

Geophysical Well Logging and Interpretation, comprises the acquisition, processing and interpretation of borehole geophysical logs. The main objectives of geophysical logging is to help assess the local thickness of potentially suitable rock units, assess the geophysical properties of the rock units at depth, and assess the presence and types of structural features at depth. Geophysical logging is intended to provide high-quality, high-resolution profiles of a number of rock properties.

The suite of borehole logs includes: Natural Gamma, Spectral Gamma, Gamma-Gamma, Neutron, Full Waveform Sonic, Electrical Resistivity / Induction log, Spontaneous Potential, Single Point Resistance, 3-Arm Caliper, Fluid Resistivity and Temperature, High Accuracy Borehole Deviation, Acoustic and Optical Televiewers, Heat Pulse Flow Meter and Magnetic Susceptibility.

2.10 WP6 Hydraulic Testing

Hydraulic Testing, comprises the completion of a straddle-packer hydraulic testing program designed toto measure the hydraulic properties of the rock. Testing will occur after the completion of drilling so that all information collected during earlier stages of the work will be available to help select appropriate test intervals and estimate the anticipated hydraulic conductivity to aid in test design.

The main objectives of the testing activities are to select appropriate target test intervals based on core logging, geophysics, groundwater sampling; achieve adequate sealing of the test interval with packers; and accurately measure hydraulic conductivity down to 10^{-12} m/sec, as well as related hydraulic properties. The main hydraulic properties of interest in determination are hydraulic conductivity, formation pressure, test zone compressibility, borehole skin factor; and specific storage.

2.11 WP7 Opportunistic Groundwater Sampling and Testing

Opportunistic Groundwater Sampling and Testing, comprises the identification of permeable intervals for collecting opportunistic groundwater samples; the collection and preservation of sufficient groundwater sample volumes for geochemical analysis; and the laboratory analysis the samples. During drilling operations, opportunities may arise to collect groundwater samples. In crystalline rock, it is expected that groundwater will be encountered in fractures. Opportunities for groundwater sampling are identified based on observations of drilling performance (e.g., drilling fluid loss or apparent gain) and core logging. Such groundwater samples are referred to as "opportunistic" samples and should be representative of the groundwater within the fractures that have been intersected by the borehole at the specific depth.

2.12 WP8 Temporary Well Sealing

Temporary Well Sealing, comprises the temporary sealing of the borehole to prevent the migration of fluids between zones with significantly different hydraulic pressure or groundwater chemistry. Once drilled, boreholes must either be maintained in safe operational condition or safely abandoned. If a borehole is not being instrumented but it is necessary to maintain an accessible borehole for potential future work, temporary sealing is required to prevent migration of fluids between zones with significantly different hydraulic pressure or groundwater chemistry.

3.3 Potential Environmental Issues

Potential environmental issues that may be encountered during the drilling investigation have been identified in Section 9.2 of the HASEP and are discussed below, including management activities and controls to minimize risk for each potential issue.

3.4 Environmental Management Activities and Controls

3.4.1 Baseline surface water and soil sampling

NWMO's environmental consultant will conduct a baseline surface water and soil sampling program prior to drill pad preparation and site clearing, and upon completion of site restoration. Additional remediation shall be undertaken if upon site restoration the baseline is not restored.

3.4.2 Environmental site surveys

NWMO's environmental consultant will conduct environmental site surveys to determine the presence of flora and fauna on site and determine the need for species-specific mitigation.

3.4.3 Training on NWMO's Environmental Guidelines for Contractors

All contractors will be required to review and acknowledge NWMO's Environmental Guidelines for Contractors which adopts the Leave No Trace principles as part of site orientation.

3.4.4 Site survey with Aboriginal community

NWMO will conduct a site walkover survey with Aboriginal community members prior to start of site clearing to identify and mitigate any potential issues of concern.

3.4.5 Open drill hole as conduit for groundwater contamination

The open drill hole is a potential conduit for groundwater contamination, including rod greases, drilling water and drilling muds/fluids. Mitigation is to minimize the introduction of chemical additives to the drill hole and to strictly manage, monitor and recycle all drilling fluids. The upper part of the borehole will also be cased and grouted to eliminate contaminant pathways from the drill hole to the shallow groundwater system. The drill water source will be tested to confirm it is free of contaminants. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.6 Degradation of surface soils

Compaction/degradation of surface soil and root/seed stock can occur from site clearing and grubbing. Mitigation is to stockpile all surface soils at the start of site clearing and grubbing, preserve root mat where possible, and use surface soils and organics as part of site restoration. Vehicular traffic within the work site will be limited to the parking area and access routes as shown on Figure 2. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.7 Destruction of merchantable timber

Any merchantable timber will be identified and require Crown dues to be paid, as directed by MNRF, and wood shall be piled at the side of the road for public use as firewood, or shredded for use on site as mulch during site restoration. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.8 Introduction of an invasive species

To help prevent the introduction of invasive species, all equipment must arrive washed and free of debris prior to arriving on site. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.9 Animal/plant and natural habitat disturbance

Be aware of endangered flora indigenous to the work site area. Be aware of fauna habitat in the work site area. Isolate endangered flora and habitat (or species that need to be protected) on the work site with snow fencing. Inform all site staff of the areas to avoid. Inspect isolated areas daily to ensure that area is not damaged and species are not adversely impacted. When exiting the work site, remove the warning tape and inspect the isolated areas to verify that species and habitat were not impacted. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.10 Site Creep and Wildlife Encounters

The work area will be fenced to limit wildlife entering the work site and prevent site creep. The integrity of the fence will be monitored daily by the Site Supervisor and documented in the Daily Site Reports.

3.4.11 Drill fluid containment, water contamination, use of high pressure fluids

Drill cuttings and drilling fluid are to be contained at all times and disposed of in accordance with all Regulations. Secondary containment barriers will be used to further reduce the risk of accidental release to the environment.

The driller will undertake daily pre-start check on hydraulic and air systems. The driller will use 'whip checks', pins or similar devices on all water hoses as the pressure can result in them 'snaking'. This will be verified by the Site Supervisor and documented in the Daily Site Reports. Additional guidance contained within the Drilling HSE D&G provided as an attachment to the HASEP.

3.4.12 Fuel or chemical spill prevention / containment

All vehicles will be refuelled at commercial or designated fuelling sites. Replace and seal fill cap after refuelling. Use a spill containment system for any on-site refuelling. Have a spill kit available on site.

All bulk fuels will be stored in double-walled tanks. Tanks shall be constructed, inspected, maintained and filled in accordance with the Liquid Fuels Handling Code. Tanks and all equipment using diesel or gasoline fuel or hydraulic oil will have secondary containment barriers to prevent leaks or spills to the environment. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

Figure 3: Typical secondary containment barriers for equipment (UltraTech International Inc.)

Reference D&G CANHSE224 Chemical Safety provided as an attachment to the HASEP. A list of chemicals stored and used on site is provided in the HASEP. Understand the characteristics and hazards of each particular chemical. Consult Safety Data Sheets (SDS), labels and other available information. Determine material compatibilities. Label all containers as per WHMIS regulations. Follow procedures for use of the chemical. Minimize quantities stored and in use. Use secondary containment when transferring or handling hazardous chemicals. This will be verified by the Site Supervisor and documented in the Daily Site Reports.

If a spill or release occurs, follow the Spill Response Plan in Appendix C of the HASEP.

3.4.13 Waste and hazardous materials management

All waste materials produced as part of the Project will be appropriately stored in garbage receptacles and recycling containers on the work site and disposed of at approved facilities in compliance with all applicable laws. An appropriate quantity and placement of garbage receptacles and recycling containers will be used to promote work site cleanliness and sustainable practices. The dumping or burning of waste materials is not permitted. Regular clean-up and disposal of waste materials will be conducted to prevent the unnecessary accumulation of waste materials.

Hazardous materials including "Dangerous Goods" and "Controlled Substances" used during the Project will be stored and handled to avoid loss and to allow containment and recovery in the event of a spill.

Hazardous chemicals stored on the work site will be placed within appropriate containers that are clearly labelled and controlled in accordance with the Workplace Hazardous Material Information System (WHMIS) and the Transportation of Dangerous Goods Regulations. These hazardous material containers will be regularly inspected for signs of leakage.

Regular inspections (minimum frequency is daily inspection, and/or at shift change as required) will be undertaken to ensure that all personal protective equipment and emergency response equipment are in place.

The safety data sheets (SDS) for hazardous materials used in the Project will be available in the Golder site trailer office, and all personnel involved in the Project will be made familiar with guidelines for safe handling, storage and use of chemicals.

Categories of hazardous wastes generated as a result of this Project may include, among other things, used containers of hydraulic and motor oils. These and all hazardous wastes will be kept separate from non-hazardous wastes and refuse, and disposed of in compliance with regulatory requirements.

The above activities will be verified by the Site Supervisor and documented in the Daily Site Reports.

3.4.14 Air, dust and noise

The following steps will be taken to minimize any light, air, dust or noise emissions:

- All lighting equipment will be focused on working areas to minimize offsite light pollution.
- All equipment with combustion engines will be in good working order meeting applicable exhaust emission regulations.
- All mufflers on combustion engines will be in good working order.
- Equipment will be positioned where possible, to minimize noise to workers on site.
- If noise levels exceed 85 dB at the site fence, sound barriers will be put in place along the site fence.

There is no planned use of volatile chemicals on the site that have the potential to significantly affect air quality, except for fuel.

There is little potential for the generation of dust on site, except for the possible generation of dust due to vehicular traffic. In the case of dust due to traffic, water will be applied to the road surface as needed to reduce or supress dust generation.

The above activities will be verified by the Site Supervisor and documented in the Daily Site Reports.

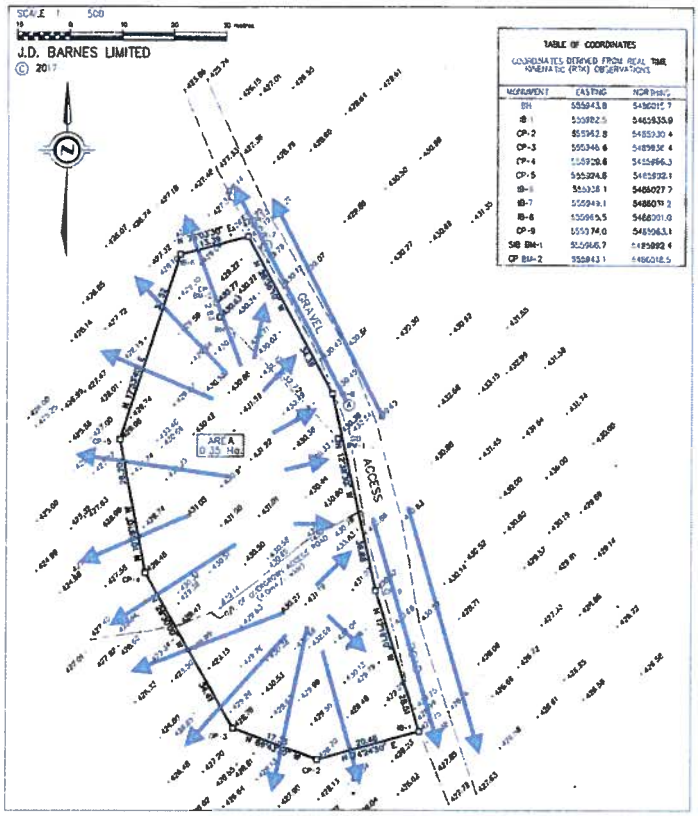


Figure 4: Drill site topography and drainage for IG_BH01

3.4.15 Surface water runoff, erosion and sediment control

The drilling site for IG_BH01 was surveyed in July 2017 and the survey results used to assess the topography and drainage of the site and surrounding lands, as shown on Figure 3, with topography shown as points labelled with their elevation in metres above sea level (masl) and the inferred direction of surface water runoff shown with blue arrows.

Topography within the site (i.e. the proposed fenced area) varies from 432.09 to 428.10 masl. The site is generally a topographic high and surface water runoff is inferred to drain gently off the site in all directions (i.e. radially), particularly to the south, west and north, where the surrounding lands are lower. Runoff to the east is intercepted by a small ditch along Dyment Road and is conveyed to the north and south along the ditch as shown. Topography indicates that runoff from off site to on site is unlikely to occur.

The following steps will be taken during site setup and operation to minimize the impact of surface water runoff, minimize erosion, and contain sediments:

- Prior to mobilization of equipment, Golder will carry out a site walkover with NWMO and MNRF representatives, to review the site infrastructure plan, finalize the site layout and confirm areas for clearing and grubbing.
- A geotextile silt curtain will be installed around the entire perimeter of the site prior to clearing and grubbing;
- Clearing and grubbing will then take place on the site, and then site security fencing will be installed around the entire site perimeter, about 1 m inside of the silt curtain;
- Site infrastructure will be set up as agreed upon with MNRF and NWMO and erosion and sediment control measures will be monitored and maintained, as required, for the duration of the field work.

Because the topography is gently sloping in a radial pattern from within the site, runoff during precipitation events is expected to result in diffuse surface flows in multiple directions, rather than channelling in a particular location or locations, and the directions and magnitude of runoff will essentially be the same as it was under original conditions, as clearing and grubbing will not alter the site topography significantly. The potential for off site erosion is therefore minimal, and the silt curtain will ensure that sediments generated during runoff are contained within the footprint of the site.

Winter work will include snow clearing. Snow will be cleared for safety and work access, and piled in multiple smaller piles or berms to minimize the risk of soil erosion and due to runoff.

Monitoring of erosion and sediment control measures will be undertaken by Golder (the Constructor) on a daily basis. Any required maintenance will be completed by the site infrastructure Contractor, under the supervision of Golder, as appropriate. Results will be documented in Daily Site Reports, with supporting photo documentation.

If monitoring suggests that the erosion and particulate control measures are not operating per their design or performance requirements, then Golder will review the issue with NWMO and make recommendations regarding an alternative approach.

3.4.16 Vehicle-animal collisions

Be alert for wildlife or domestic animals near the road, particularly at dusk, dawn and night. Look ahead across the road from shoulder to shoulder. If you see wildlife on the road, slow down and pass carefully, they may suddenly bolt onto the road. Watch for wildlife warning signs that indicate an area of increased animal population. Take extra precaution when traveling through these areas. Use high beams whenever possible and watch roadside ditches for animals or for reflections from animal eyes. Be aware some animals move in groups and more may be near the road than can be readily seen.

If the animal enters the path of the vehicle, do not swerve into the ditch or into on-coming traffic in an attempt to avoid a collision. Brake firmly if an animal is standing on, or crossing the road. Do not assume the animal will move out of your way. In the event of a collision, contact local MNRF office or OPP if the animal is still alive or if the carcass is a danger to traffic. Note that this hazard also applies to smaller animals, like reptiles and amphibians, particularly during the summer period when there is an increase in animal migration between water bodies.

3.4.17 Wildlife within fenced area

If wildlife enters and becomes trapped within the fenced area, local MNRF authorities will be contacted, and steps taken to safely capture and relocate the animal(s) by qualified persons, as may be required.

Article Three. 4.0 ENVIRONMENTAL ORIENTATION AND TRAINING

The Project Manager and Site Supervisor are responsible for ensuring that all site personnel receive site orientation prior to commencing work, which will include a review of the HASEP and the EMP. The Project H&S Officer and Project Manager will ensure that the Site Supervisor is trained to perform and document daily site monitoring as required in the EMP.

5.1 COMMUNICATION AND REPORTING

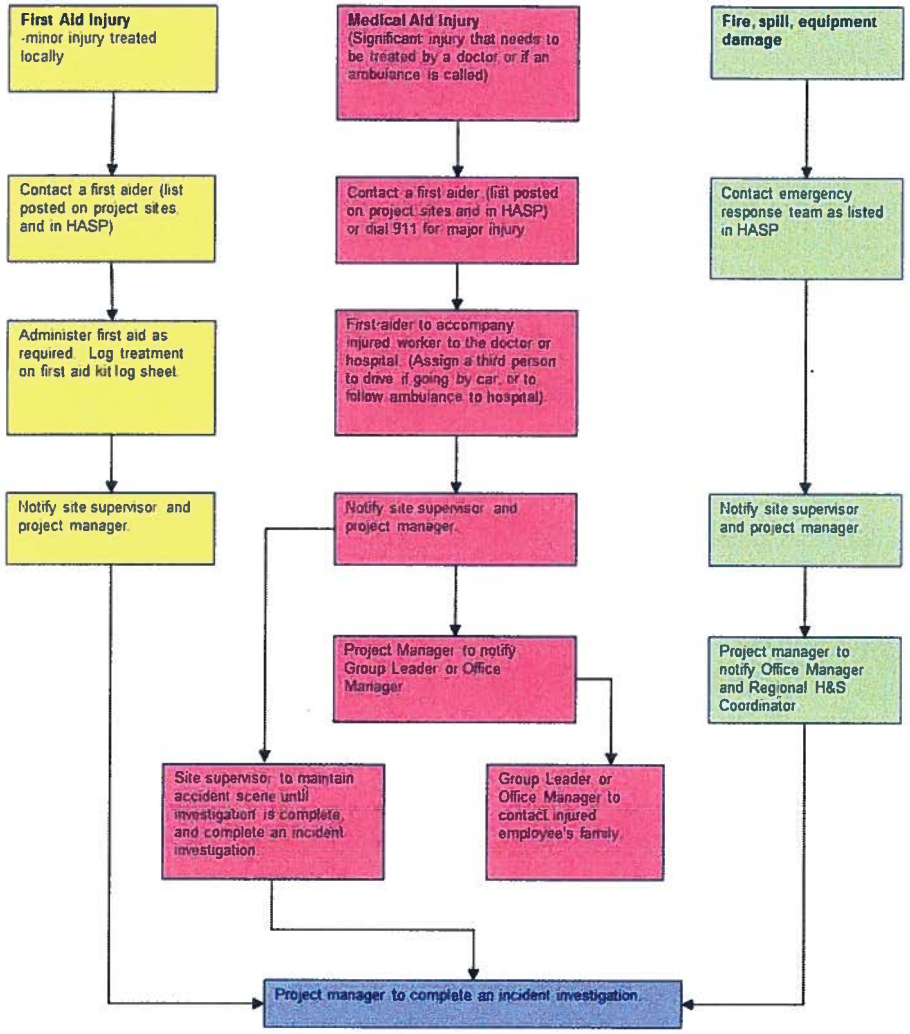


Figure 5: Incident reporting flowchart (environmental incidents shown in green)

5.2 Communication Processes

The figure above identifies the communication steps for incident reporting and associated responsibilities and communication protocols for the Project. Additional information is found in Section 13.0 of the HASEP.

5.3 Daily Site Reports

Daily Site Reports will be prepared by the Site Supervisor and provided to the Project Manager and NWMO. These reports will note any environmental issues observed, and document the monitoring of erosion and sediment control measures. Observation of a significant environmental issue or a spill would trigger incident reporting, which is documented separately and is discussed below.

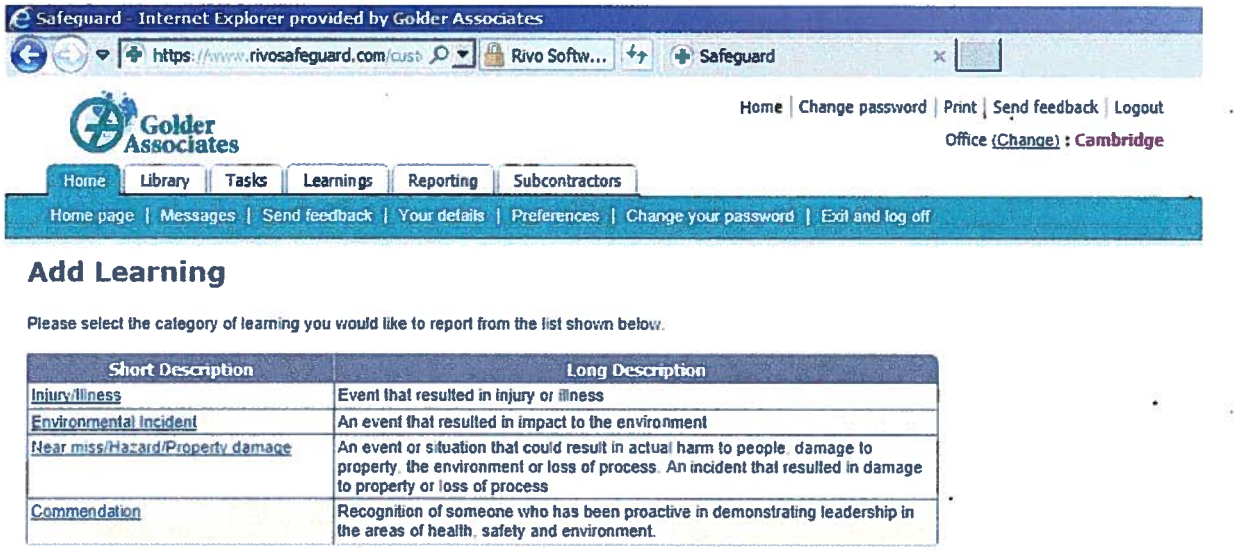
5.4 Incident Reporting

Incident reporting will follow the procedures outlined in Section 13 of the HASEP for reporting health, safety and environmental incidents.

The Project Manager is responsible for reporting incidents or accidents to the NWMO and authorities (e.g. MNRF). The Site Supervisor is responsible for securing the scene and conducting an initial investigation. A follow-up investigation will be conducted by the Project Manager, or Health and Safety Officer.

Incident investigation involves the methodical examination of an undesired event that did, or could, result in damage to the environment. **Incident investigation procedures are described in Section 4.3 of the GAL Health, Safety and Environmental Management System Manual.**

Incident reporting, investigation and correction is managed through a Global Learnings System found here: https://www.rivosafeguard.com/custom/golder/sso.aspx?token=zrir2zthi1ggsagwb84bx0boxtr1htop4qh93vxi1u2d d764oxrmqzz2b4phnxamtk8npxc1s&R=&CoGUID



5.5 Emergency Response

Refer to the spill response plan (appended to the HASEP) for response to inadvertent releases or spills of fluids, oils or chemicals to the natural environment.

5.6 Emergency Contacts

The personnel below will be contacted in case of an environmental emergency:

3.01 Emergency Contacts

Contact	Number
MNRF	Dryden Office: (807) 223-3341

Golder Media Relations	(604) 296-6845
Spills Reporting (MOE)	(800)-268-6060

Golder Contacts

Contacts	Name	Office	Cell
Project Manager	George Schneider	(519) 620-1222 x6532	(647) 203-5838
Technical Manager	Joe Carvalho	(905) 567-4444 x1312	(647) 280-7378
Project Coordinator	Aynsley Neufeld	(905) 567-4444 x2558	(416) 455-7468

Client Contacts

Contacts	Name	Number
Client Project Manager	Maria Sánchez-Rico Castejon	(647) 259-3720
Client Alternate Contact	Sarah Hirschorn	(647) 259-3037
Client Safety Contact	John Van Heerden	(647) 259-3703

Subcontractor Contacts

Name	Subcontractor key staff	Phone
Rodren Drilling Ltd.	Eric Pacquin (Foreman)	(204) 339-1668
DGI Geoscience Ltd.	Alejandro Rojas (Lead)	(416) 361-3191
Weatherford	David Tipping (Field Operations Manager)	(519) 683-2010
Taranis / WLON	Sean Chamberlain (Estimator / Project Manager)	(807) 474-4463

Article Four. 6.0 NON-CONFORMANCE AND CORRECTIVE ACTION

Non-conformance and corrective action will follow the procedures outlined in Section 13 of the HASEP for health, safety and environmental incidents.

Any deficiencies or non-conformances identified or arising from an envioromental incident shall be reported to the Site Supervisor and corrected in a timely manner in accordance with the **Corrective/ Preventative Actions as described in Section 4.4 of the GAL Health, Safety and Environmental Management System Manual.** The Project Manager is overall responsible for ensuring that corrective actions are recorded, tracked and confirmed completed.

Additionally, the NWMO procedure for nonconformance and corrective and preventative action (NWMO-PROC- QA-0001) will be followed. Details of the procedure and associated form (NWMO-FORM-QA-0001-R003) are provided as an attachment to the HASEP.

7.1 RECORDS MANAGEMENT

7.2 Records of Environmental Performance

Daily site reports and any documentation related to environmental incidents or corrective actions will be retained by Golder for 7 years after the completion of the work.

7.3 Management of Procedures and System Documents

Environmental procedures and system documents will be retained by Golder for 7 years after the completion of the work.

7.4 On-site Records Requirements

Copies of all permits, environmental management plans and programs will be maintained in the site binder at the work site.

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