

February 24, 2016

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Saskatchewan Ministry of Environment
Environmental Protection Branch
Hazmat and Impacted Sites Unit
102 -112 Research Drive
Saskatoon, Saskatchewan
S7N 3R3

Attention: Mr. Ralph Bock, Manager

via email: ralph.bock@gov.sk.ca

**RE: Corrective Action Plan - Capping of Former Waste Disposal Site and Burn Pit
Agriculture and Agri-Food Canada - Agroforestry Development Centre
Indian Head, Saskatchewan**

EGE Engineering Ltd. (EGE) is pleased to submit the following Corrective Action Plan (CAP) for securely capping a former waste disposal site and burn pit located on federally owned and operated land at the Agriculture and Agri-Food Canada (AAFC) Agroforestry Development Centre (ADC) in Indian Head, Saskatchewan. A completed Corrective Action Plan form is also attached.

1.0 OBJECTIVE

AAFC has retained Public Works and Government Services Canada (PWGSC) Environmental Services (ES) to coordinate the remediation and risk management program on its behalf. PWGSC-ES has retained EGE to act as the Departmental Representative and to provide site supervision during the completion of the remediation and risk management activities at the AAFC Indian Head ADC. The objective of this CAP is to document the proposed risk management activities that will be implemented to securely cap the former waste disposal site and burn pit area at the Indian Head ADC (known as APEC 2).

2.0 CONTACT INFORMATION

Facility Owner and/or Operator	AAFC
Name of Landowner	Government of Canada
Facility Name	Indian Head Agroforestry Development Centre
Facility Address	Box 960 Indian Head, Saskatchewan, S0G 2K0
Phone Number	(613) 773-1000 (General Inquiries)

3.0 FACILITY AND SITE INFORMATION

3.1 Facility and Site History

The Indian Head ADC is located about 2.5 km south of Indian Head, Saskatchewan. The legal description of the site is Section 11, Township 18, Range 13, W2M. The property is square and covers an area of 258 hectares. The property is owned by the Crown and administered and operated by AAFC. There are twenty-seven permanent buildings/structures on the property, generally centralized in the operating yard, which is located in the northeast corner of the property. The majority of the site surrounding the operating yard consists of fields (test planting areas) used to conduct agroforestry research. The Indian Head ADC also includes a network of irrigation lines, three constructed irrigation reservoirs, a two-cell sewage

lagoon and a series of roads and access trails. A public use area that includes a picnic shelter and washroom facility is located north of the operating yard.

Figure 01 (provided at the conclusion of this letter) shows the Indian Head ADC and surrounding areas. Figure 02 shows the former waste disposal site and burn pit area, which is located about 1 km south-southeast of the operating yard area.

The Indian Head ADC lies between 600 and 610 m above sea level and consists of generally flat lying topography with a gentle grade from the southwest to the northeast. The predominant surface water feature on site consists of three man-made reservoirs created by a series of dams and spillways on Sunbeam Creek. The topography at the former waste disposal site and burn pit area is generally flat with a drainage swale located on the south and east sides of the site. There are no catch basins or storm drains on the site.

3.2 Current Land Use

The project location is an AAFC research facility with supporting buildings and infrastructure. The current property use includes commercial land use in the operating yard area and agricultural land use in the remaining land associated with the property, including the former waste disposal site and burn pit area.

3.3 Future Land Use

The AAFC research facility is expected to remain as a commercial/agricultural development. After securely capping the former waste disposal site and burn pit area, the project site will be enclosed with fencing to prevent redevelopment of the area. Signage will also be erected identifying the site as a closed waste disposal ground and that there should be no redevelopment of the area.

3.4 Water Well Search

According to the Water Security Agency (WSA) Water Well Data Portal, there are eight wells within a 1.5 km radius of the property. Six wells were listed as domestic wells and two were listed as irrigation wells. The records show that the wells are either relatively shallow (< 18 m in depth), where a seam of sand can be found or the wells extend into deep layers of water bearing till materials, at a depth of 100 m below grade. Static water levels were reported to range from 7.3 to 8.8 m below grade. There were three wells listed for the Indian Head ADC property, all completed to a depth of 100 m.

The Town of Indian Head utilizes a groundwater supply well for its domestic water source; however, the supply is not located within 1.5 km of the AAFC site.

3.5 Previous Reports

The Site has been the subject of numerous soil and groundwater assessments since 2001. The CAP has been prepared based on the site-specific information presented in the following previous reports:

- Phase I and II Environmental Site Assessment, PFRA Shelterbelt Centre, Indian Head, Saskatchewan (Golder Associates Ltd., June 2001);
- Phase I Environmental Site Assessment, Agroforestry Development Centre, Indian Head, Saskatchewan (DST Consulting Engineers Inc., November 2013);
- Phase II Environmental Site Assessment, Agroforestry Development Centre, Indian Head, Saskatchewan, March 2014 (DST Consulting Engineers Inc.);
- Phase III Environmental Site Assessment for the Agroforestry Development Centre, Indian Head, SK, March 2014 (Franz Environmental Inc.);

- Preliminary Quantitative Human Health Risk Assessment, Ecological Risk Assessment and CCME National Classification System for Contaminated Sites Indian Head Agroforestry Development Center Indian Head, Saskatchewan, July 2015 (Millennium EMS Solutions Ltd.);
- Remedial Options Analysis and Remedial Costs, Agroforestry Development Centre, Indian Head, Saskatchewan, September 4, 2015 (EGE Engineering Ltd.); and
- Data Gap Site Investigation, Agriculture and Agri-Food Canada, Agroforestry Development Centre, Indian Head, Saskatchewan, EGE Engineering Ltd., December 15, 2015.

Based on the findings from the above reports, one area of potential environmental concern (known as APEC 2) has been identified for risk management and is the subject of this CAP. This location (the former waste disposal area and burn pit) is described below and is shown on Figure 02 at the conclusion of this letter.

3.6 Location of Underground Services

Underground utilities have been identified during the course of the previous environmental site investigations. Utility clearances will be completed through Sask 1st Call, and a private locator/AAFC, as necessary, prior to undertaking any site excavation work.

4.0 ASSESSMENT CRITERIA

The site is currently located on federally owned and operated land. Previous environmental investigations have referenced the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), the CCME Canada Wide Standards (CWS) for PHCs, and the Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines (FIGQG). The Health Canada (HC) Guidelines for Canadian Drinking Water Quality (GCDWQ) have also been cited for comparison purposes.

To allow for all future development options for the Indian Head ADC, AAFC requested that remediation targets be in compliance with the Saskatchewan Environmental Code (the Code). However, since the site will be risk managed through the installation of a clay cap, and the area fenced and signed to prevent redevelopment, no final endpoint values under the Code have been selected for the soil quality below the secure cap. The goal of the proposed risk management plan (secure capping, fencing and signage) is to only eliminate the specific exposure pathways identified by the previous risk assessment that exceeded the hazard quotients: inhalation, dermal contact and ingestion.

The previous risk assessment did not identify any requirements with respect to the groundwater; however, any on-going groundwater monitoring at the existing wells surrounding the area will be referenced against the applicable Saskatchewan Tier 1 guidelines.

5.0 DESCRIPTION OF IMPACTED SITE

5.1 Former Waste Disposal Site and Burn Pit Area (APEC 2)

The previous Phase III ESA (Franz, 2015) identified the waste disposal site and burn pit area as being 5,350 m² in size, with an estimated 11,800 m³ of soil that may exceed soil quality guidelines (based on an average impacted soil depth of 2.2 m). The soil quality exceedances of the applicable environmental quality guidelines at this location, using the agricultural land use category, were summarized in the Phase III ESA report as follows:

- Metal concentrations for cadmium, sulphur, lead and zinc at seven test hole locations (MW13-201, TP13-202, TP-13-204, TP13-205, TP13-208, TP13-209 and TP13-210);

- pH concentrations above 8.0 at several locations;
- Benzene, toluene and ethylbenzene concentrations at one location (TP14-201);
- Chloroform concentration at one location (TP14-201), when using the Saskatchewan environmental quality guidelines; and
- Dioxins and furans (total toxic equivalents) at two sample locations (TP13-204 and TP14-202)

The above test hole locations are shown on Plate 01 below.

Groundwater samples collected from the three wells installed in the area reported exceedances for boron, copper, selenium and uranium; however, the copper and selenium concentrations were similar to the background concentrations measured from the site. The location of the existing groundwater wells are shown on Plate 02 below.

The previous Preliminary Quantitative Human Health and Ecological Risk Assessment (Millennium, 2015) predicted hazards or risks exceeding the target levels for human health based on chloroform, and dioxin and furan (total toxic equivalents) concentrations at single sampling locations. Ecological hazard quotients greater than 1 were also present and were associated with some metal concentrations. Population level ecological impacts were not anticipated due to the limited spatial extent of contamination and availability of other habitat in the area.

The previous Remedial Options Assessment / Remedial Action Plan by (EGE, 2015) report for the site identified the applicable remedial and risk management options as:

- Full site excavation and off-site disposal of 11,800 m³ of soil;
- Partial site-excavation and off-site disposal of 5,500 m³ of soil;
- Risk management consisting of capping the area with an impervious cover that is 0.6 m thick, installing security fencing around the area to prevent access, erecting signage to indicate no redevelopment of the site and changing the land use to industrial.

Given the mixture of contaminant classes at the site and fine grained soil, in-situ remediation techniques were not considered practical at this location.

Considering the large cost to remove all of the impacted material from this location, the ex-situ option involving complete site remediation was not recommended unless the planned future property use required no restrictions (i.e. the location of the waste disposal site and burn pit area was to be redeveloped for future improved use). If this was the case, complete ex-situ remediation would be recommended.

Partial ex-situ remediation, while removing the human health and ecological risks, does not eliminate the long-term liability associated with the site nor does it allow for redevelopment of the site, and therefore this option was not recommended.

The risk management option (capping, fencing and signage) was recommended and subsequently approved as the final remedial option, based on the following:

- The location can be segregated from the surrounding agricultural lands, removed from future redevelopment scenarios and considered an industrial site through the installation of perimeter fencing and appropriate signage; and
- Long-term liability and risk can be addressed through the construction of a secure clay cap and treating the area as a closed waste disposal ground.

Corrective Action Plan
 Capping of Former Waste Disposal Site and Burn Pit Area
 AAFC Agroforestry Development Centre, Indian Head, SK
 February 24, 2016

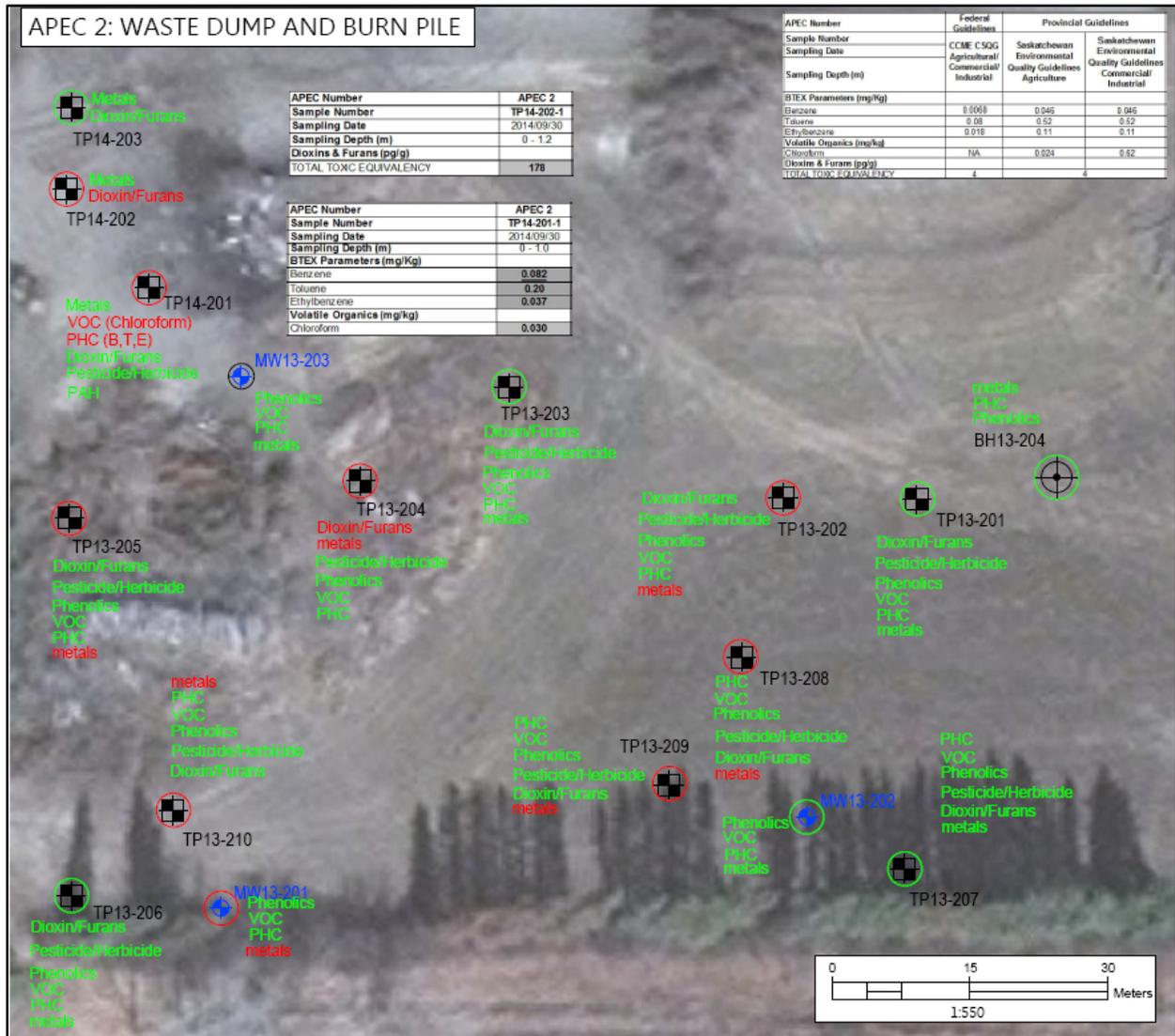


Plate 01: Location of test holes and monitoring wells at the former waste disposal site and burn pit area.



Plate 02: Location of groundwater wells at the former waste disposal site and burn pit area.

6.0 REMEDIATION/MANAGEMENT PLAN

6.1 Qualified Persons and Companies Performing the Work

Owner

Agriculture and Agri-Food Canada
960 Carling Avenue, Building 12
Ottawa, Ontario

Contact: Ms. Lina Salem-Masri, AAFC Project Manager
Phone: (613) 715-5204

Contract Management

Public Works and Government Services Canada (PWGSC) Environmental Services
100-167 Lombard Avenue
Winnipeg, Manitoba

Contact: Ms. Joan La Rue van Es, PWGSC Project Manager
Phone: (204) 509-2334

General Contractor

Project to be tendered in the Spring of 2016 with construction to begin in the Summer of 2016.

Environmental Consultant

EGE Engineering Ltd.
511 Pepperloaf Crescent
Winnipeg, Manitoba

Project Lead: Mr. David Klassen, P.Geo.
Phone: (204) 612-0944

Project Engineer: Mr. Andrew Passalis, P.Eng.
Phone: (204) 791-4938

6.2 Secure Capping

The remediation and risk management work to be completed at the site includes all activities associated with final closure of the waste disposal site and burn pit area, including:

- Sorting and removal of approximately 4 tonnes of surface waste (primarily wood timbers and brush);
- Reshaping and rough grading of the existing waste disposal site surface, including several earth fill stockpiles;
- Decommissioning one groundwater monitoring well;
- Placement, finish grading and compaction of approximately 2,700 m³ of clay landfill cover soil (0.6 m thick landfill cap);

- Grading and construction of approximately 175 lineal metres of perimeter drainage ditching to promote positive drainage away from the capped area;
- Placement of approximately 4,500 m² of topsoil followed by fertilization and seeding; and
- Installation of approximately 250 lineal metres of perimeter fencing.

Figure 03 shows the location of the above works and Figure 04 shows two cross sections of the secure clay cap.

6.3 Sampling

Samples of the clay soil cover material will be submitted for analysis of petroleum hydrocarbons, polycyclic aromatic hydrocarbons and metals. The Contractor will be required to pre-submit one sample in advance of the work being undertaken. A second sample will also be collected from the material brought to the site.

6.4 Reporting

The work is tentatively scheduled to be tendered and constructed in the Spring/Summer of 2016. EGE personnel will be on-site during all construction activities, acting as the departmental representative for PWGSC. A CAP Closure Report, detailing the remediation and risk management activities, will be prepared once all site work is complete.

Should you have any questions or require additional information please contact either Mr. David Klassen at (204) 612-0944 or Mr. Larry Bielus at (204) 226-7378.

Sincerely,

EGE ENGINEERING LTD.

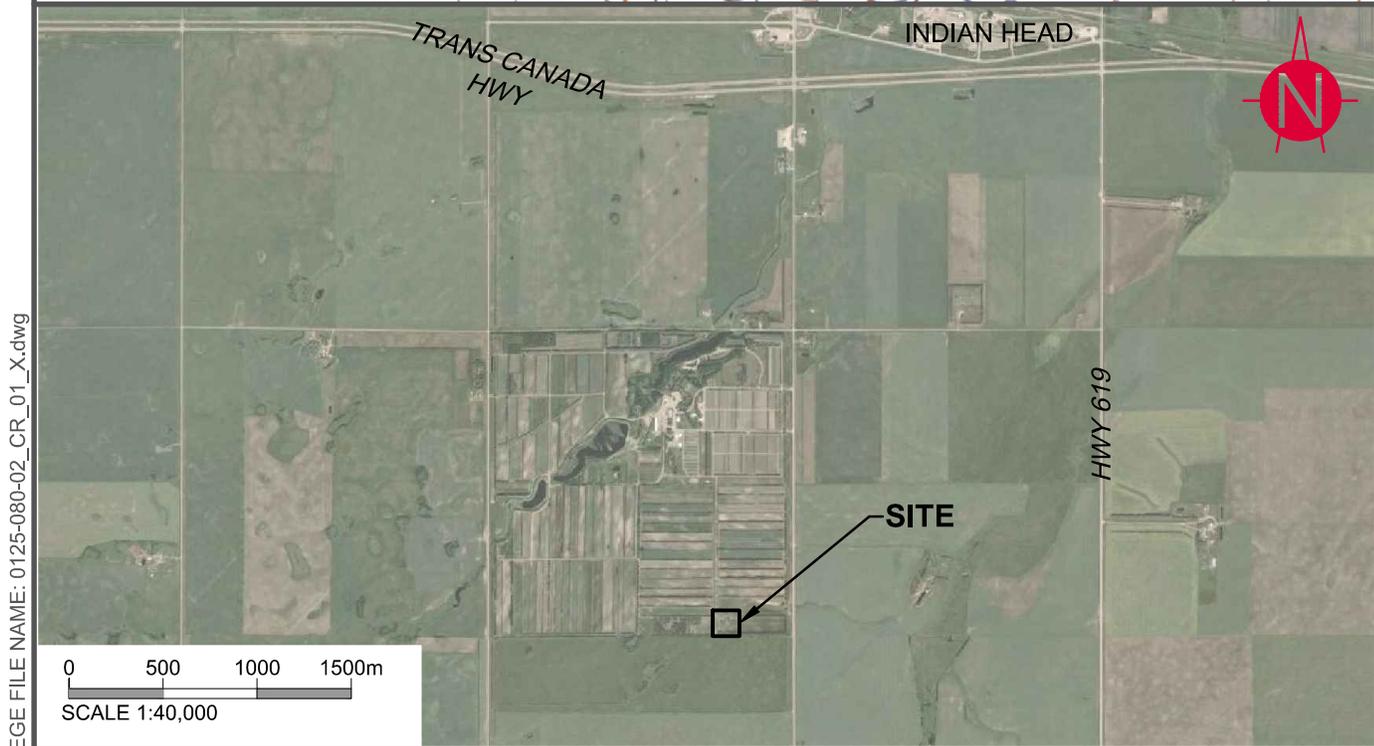
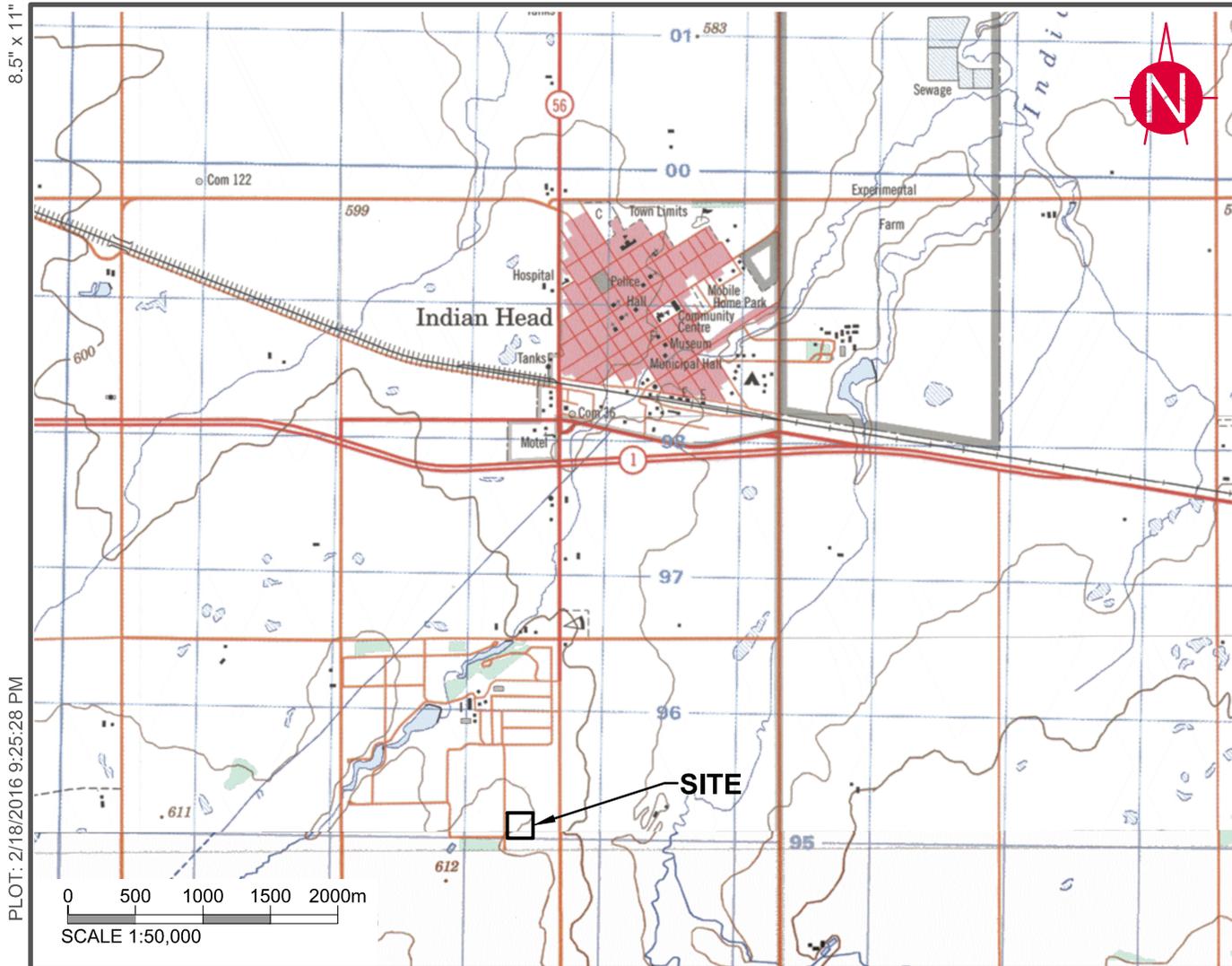
David Klassen, P.Geo.
Project Geoscientist
DK/dk

Larry Bielus, M.Sc., P.Eng.
Manager

cc: Joan La Rue-van Es - PWGSC
Lina Salem-Masri - AAFC



FIGURES



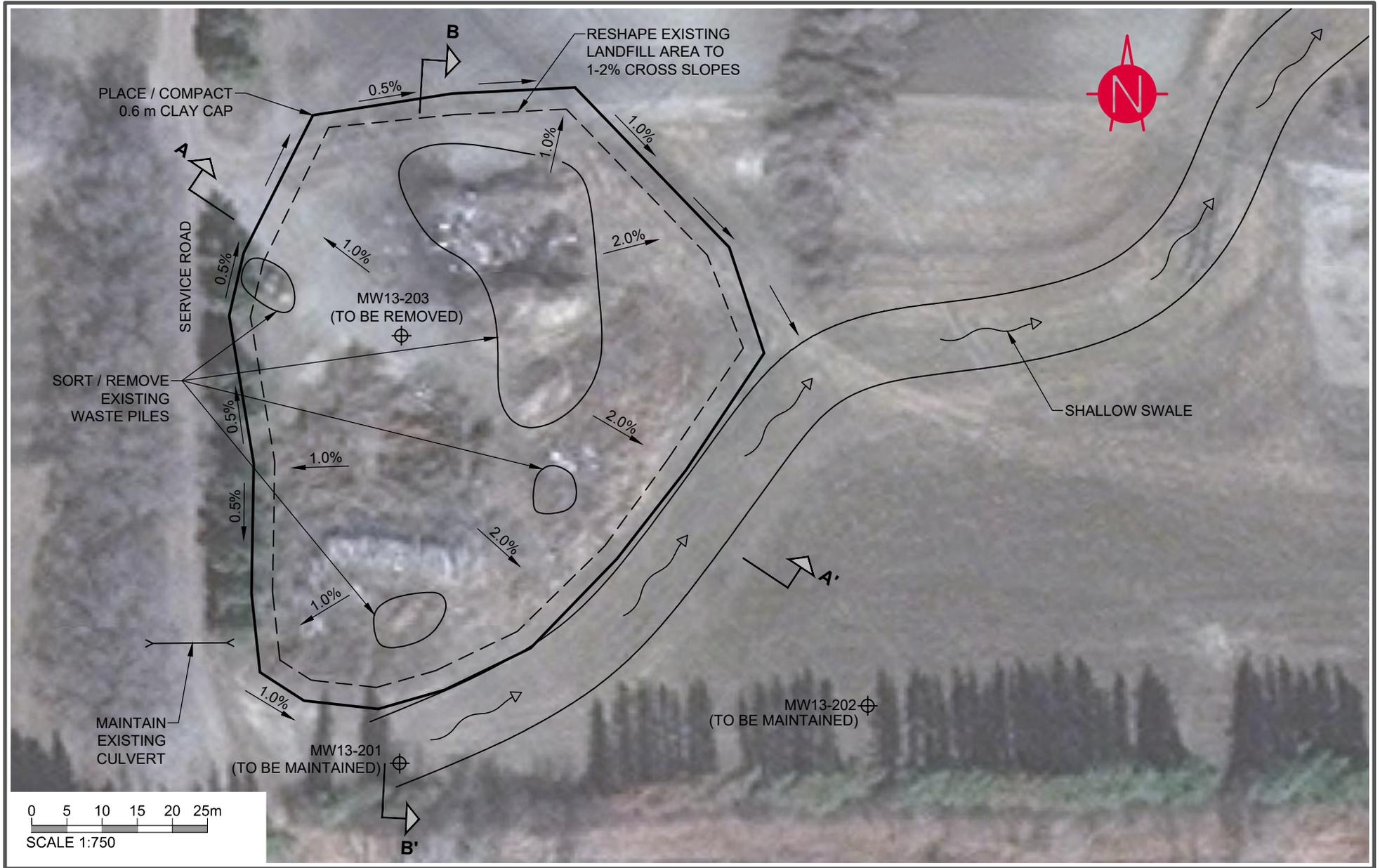
EGE

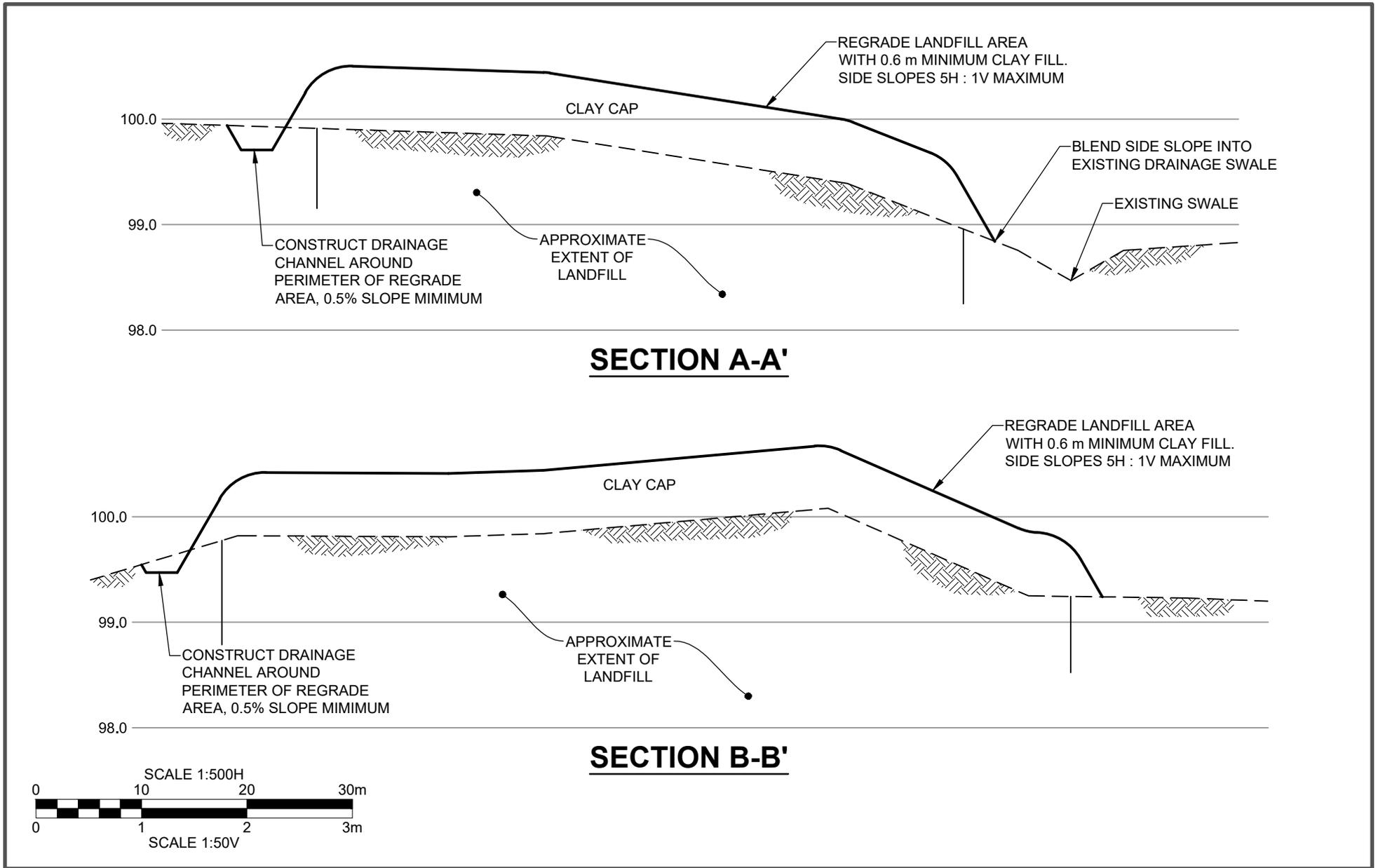
Public Works & Government Services Canada
 AAFC Agroforestry Development Centre
 Indian Head, SK
 Landfill Capping

**Location
 Plan**

Figure 01







ATTACHMENT A
COMPLETED CORRECTIVE ACTION PLAN FORM



Corrective Action Plan

A. Application Requirements

Corrective Action Plan (CAP) should provide general information, facility and site information, assessment criteria/objectives with respect to the governing pathway and remediation/management plans. Ministry approval of the application/cap shall be obtained prior to initiating any remediation work.

All submissions shall be consistent with the *Corrective Action Plan Code Chapter Standards and Guide to Impacted Sites*. The ministry will review the plan, in consultation with the owner and local officials in some cases. If the plan is not acceptable, the ministry will identify deficiencies and require that the plan be upgraded. When the plan is acceptable, the ministry will approve the proposal in writing and the project can begin.

How do I submit the application? You can submit this form along with the Closure Report to the Ministry of Environment using our online services or by mailing a hard copy.

- **Web:** the preferred method is to sign in to our Online Services and submit it through your company's business portal. In the portal you can apply for and receive permission, fill out forms and submit documents online, review documents, and track your interactions with the ministry. Please visit the website: <http://www.environment.gov.sk.ca/online-services>.
- **Mail:** you can complete the report, save and print it, and mail the hard copy to:
 Environmental Protection Branch
 Hazmat and Impacted Sites Unit
 102 - 112 Research Drive
 Saskatoon, SK S7N 3R3

What if I have questions? For assistance completing this application or for more information, please contact our Client Service Office:
 Email: centre.inquiry@gov.sk.ca
 Tel (toll free in North America): 1-800-567-4224
 Tel (Regina): 306-787-2584

B. Type of Report

Is this report as status Update Or a New Corrective Action Plan Please Check one Below.

- | | | | |
|----------------------------|------------------------|---------------|-----------------|
| New Corrective Action Plan | Alteration of Existing | Status Update | Site Monitoring |
| Progress Report | Monitoring Report | | |

C. Person Applying

Company Name

Last Name

First Name Middle Name

Address

Address

City Province Postal Code

Country

Mailing Address Same as above Different from above:

Address

Address

City Province Postal Code

Country

Contact Details

Phone (main) Phone (work)

Phone (mobile) Email

Preferred Method of Contact Phone Email Mail

D. Facility Owner Information

Legal Name	<input type="text"/>		
Business Name	<input type="text"/>	Corporate Branch # / GST #	<input type="text"/>
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Mailing Address	Same as above	Different from above:	
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Contact Details			
Phone (main)	<input type="text"/>	Phone (work)	<input type="text"/>
Phone (mobile)	<input type="text"/>	Email	<input type="text"/>
Preferred Method of Contact	Phone	Email	Mail

E. Facility Operation Information (if known)

Facility Code	<input type="text"/>
Operation Identification #	<input type="text"/>

F. Facility Location Information

Legal Name	<input type="text"/>		
Business Name	<input type="text"/>		
Enter the Latitude/Longitude for center of the site in degrees, minutes, seconds			
<u>Latitude</u>		<u>Longitude:</u>	
Deg: <input type="text"/>	Min: <input type="text"/>	Sec: <input type="text"/>	Deg: <input type="text"/>
		Min: <input type="text"/>	Sec: <input type="text"/>
Address	<input type="text"/>		
Address	<input type="text"/>		
City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Country	<input type="text"/>		
Primary Contact			
Last Name	<input type="text"/>	First Name	<input type="text"/>
Emergency Phone	<input type="text"/>	Business Phone	<input type="text"/>

G. Corrective Action Plan

Please ensure that you have included the following information before submission of your corrective action plan.

Objective

Contact Information

Facility and Site Information

Chosen End Point (choose from list)

Proposed Corrective Actions (choose from list)

Proposed Schedule

Start Date

End Date

H. Conditions

I have read and I fully understand that these conditions must be met before the Ministry of Environment can accept, assess and process my application;

I have read and I fully understand the requirements of this application, and wish to continue with my application and formally apply for this permission, and

I certify that the information I have provided in this application is true and accurate in every respect.

By checking this box I accept these conditions.

Signature of Applicant



Date of Application