Stand Alone Abandonment and Restoration Plan
Iqaluit Airport, Nunavut
Water License Number 1BR-LTU1419

Prepared by:
Transport Canada

REVISED
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1.0 Scope of Work

Transport Canada is required to meet the required Petroleum Hydrocarbon criteria under the Water License issued: Number 1BR-LTU1419, Nunavut Environmental Guidelines (most current edition), CCME Petroleum Hydrocarbon Guidelines (most current edition) and the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (most current edition) remediation criteria for coarse grain soil, industrial zoned sites. Once the LTU has been sampled and shows PHC levels are below the required criteria, the facility will be decommissioned and restored back to its original state. Appendix I identifies the locations of the four (4) landfarms. Landfarm B was decommissioned in 2013, while landfarm C and D remain active. Landfarm A will need to be assesses and sampled to determine if the soil has been remediated fully at this time. This decommissioning plan applies to all landfarms at this location.

The decommissioning will be done by removing the treated soil from the liner and removing the liner from the LTU. Using a gas Photo Ionization Detector (PID) or similar equipment to monitor hydrocarbon vapours, random samples of the material below the liner will be tested to ascertain if any contamination leached beneath the liner. In addition to the portable hydrocarbon vapour testing, 10 soil samples will be taken from under the liner area and sent to a certified laboratory for analysis for the parameters outlined in the water license. The liner itself will be taken to an approved landfill site for proper disposal. If contaminated soil is found below the LTU, this material will be removed and placed in an adjacent LTU that TC is operating on site.

The treated soil will be used to backfill the LTU excavation to match the surrounding soil conditions. All monitoring wells will remain in place for future sampling until it is determined no contamination exists (approximately one year). Once this is completed the monitoring wells will be removed and sealed with bentonite using accepted standards under the Environmental Protection Agency (EPA).

Finally, once the LTU area has been replaced with the treated soil, the soil and berms shall be leveled and compacted to match the surrounding conditions, unless the Airport Manager wishes for a different land use for the area. The former LTU area will be re-seeded with vegetation that is natural and noninvasive to the area (to be determined). The estimated time frame to complete the restoration plan is 10 to 12 days.

The LTU's are located at the Iqaluit Airport 63 degrees 45' 26.99"N 68 degrees 32' 59.72"W. The 2 active LTUs are approximately 55m X 45m and 90m X 40m. The construction of the LTUs were initiated and completed in the fall of 2006. TC anticipated constructing one large LTU cell on site; however, the topographic conditions and airport operations made this difficult due to restriction related to

the runway and the adjacent taxiway and apron. Therefore, TC constructed two smaller LTU cells (C & D) adjacent to the previously constructed LTU cells (A & B) that will be decommissioned in the near future. Cell D is approximately 55m X 40m and cell C is approximately 90m X 40m. Both cells were constructed to the same specifications as described in the water license application and as the engineered drawing indicates.

In addition, a geofabric was placed overtop of the liner material as extra protection from tears and punctures from rocks, branches and equipment. Clean remediated soil from cell B was used as ballast material for both cells since no contaminated soil was placed in cell C and D in 2006. TC anticipated remedial works at the airport for future years that would require the use of the LTU. Each LTU is constructed to hold a maximum depth of 1m of material. Therefore, cell D has the potential capacity of 2200m^3 and cell C has the potential capacity of 3600 m^3. The nearest building is the Airport Maintenance Garage approximately 400m to the northeast, the Air Terminal Building approximately 1000m to the southeast and the nearest drainage channel is located adjacent to the airport runway approximately 155m to the southwest of the LTU site. The nearest water body is the Arctic Ocean located approximately 3.0 km to the southeast. The topography of the site is flat and approximately 50m above sea level.

2.0 Decommissioning

Upon closure of the facility the following tasks will be completed:

- Soil located in the facility will be tested to ensure the water license guideline criteria are met identified in Table No. 1 – Remediation Requirements in the license.
- Water will be tested in the sump to ensure it meets the remediation guidelines under the water license Section D Part 4.
- The soil will be removed from the facility and stockpiled adjacent to the liner
- The liner will be removed and sent to an approved licensed facility outside of Nunavut for disposal.
- The soil below the liner will be sampled and tested to ensure contamination did not breach the liner.
- Any contaminated soil identified below the liner will be removed and placed in an adjacent landfarm.
- The stockpiled soil will be used to fill in the excavation to match the surrounding topography.

3.0 Effective Period of Project/Schedule of Abandonment

The requested temporal scope of the project is 15 years, commencing in April 2006 and finishing in June 2021. The scope will allow for the continued operation of the existing facility, which has been in operation for 14 years. The estimated timeframe is dependant on many uncontrolled factors such as contamination levels, weather conditions and hiring contractors.

4.0 Project Description

The following terms of reference will be used to abandon and close the site once the contaminated soil has been remediated:

4.1 TITLE & PREFACE

Land Treatment Unit Decommissioning, Iqaluit, Nunavut

Environmental Affairs, Programs, Transport Canada, Prairie and Northern Region, is requesting interested contractors to submit proposals for the supply of materials, equipment, and labour that are necessary to conduct the required 'Environmental Work' at the Iqaluit Airport as described in the following request for proposal.

4.2 INTRODUCTION

Prior to July 1, 1995 Iqaluit Airport was owned by the Government of Canada and operated by the Quebec Region of the Department of Transport. From July 1, 1995 until April 1, 1999 the airport was owned by the Government of Northwest Territories and operated by the Arctic Airports Division of the Department of Transportation. Since April 1, 1999 the airport has been owned by the Government of Nunavut and operated by the Nunavut Airports Division of the Nunavut Department of Community Government, Housing and Transportation.

As a condition of the Arctic A Airport transfer agreement (July 1995) between GNWT and Transport Canada, the environmental issues, which existed prior to the airport transfer, are to be remediated as well as any items identified by the GN within six years of the transfer date. Works identified under this document address some of the issues identified in the Transfer agreement as well as post transfer issues.

Transport Canada is obligated to remediate all hazardous substances that are the department's responsibility that do not comply with the applicable environmental laws.

Remediation of the former Fire Training Area (FTA) was initiated in July 2000. The landfarms, with a 60 mil - one piece OR-PRE oil resistant reinforced polyethylene liner, were constructed on site to contain the contaminated soil. Monitoring wells were installed down gradient of the landfarm location to facilitate future monitoring of these sites. The site was backfilled with clean fill that was excavated during landfarm construction. The landfarm requires a soil sampling program as well as decommissioning to complete the project.

4.3 SCOPE OF WORK

The following details the methodology the contractor is to perform to complete each of the project tasks. The methodology may be adjusted through a change order authorized by TC if the changes result in a more practical and/or cost effective and/or timely approach.

- The first objective is to conduct a comprehensive soil sampling program for the LTU to ensure the soil meets the remediation criteria for closure of the landfarm.

The contractor will obtain ten (10) composite soil samples and a sample from each of the three (3) monitoring wells from the LTU for submission to a certified laboratory for analysis. The contractor will be responsible for designing the sampling and analysis program, which must be submitted to the Project Manager for approval. All sampling procedures must be in accordance with the standards contained in the CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Volume I &II. The contractor must provide details of the field and laboratory QA/QC program for review in the final report. As a minimum the QA/QC program must include:

- Use of trip, field and equipment blanks;
- Use of duplicate and spiked samples;
- Proper sample containment, preservation, handling and transportation; and
- Due regard for necessary health and safety precautions.

All soil samples will be analyzed for the following parameters and compared to the Tier 1 Level of the CCME PHC Guidelines (most recent edition):

- The concentration of F1 – F4 fractions in petroleum hydrocarbon contaminated soil, according to the CCME *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* that is entering the Land Treatment Unit from all sources and excavations.
- BETEX – Benzene, Toluene, Ethylbenzene, Xylene
- TPH – Total Petroleum Hydrocarbon
- HM - Heavy Metals including AL, As, Cd, Co, Cu, Fe, Pb, Mo, Ni, Se, Ag, Ti, Zn
- PAH - Polycyclic Aromatic Hydrocarbons

All monitoring wells and water standing in the sump must be sampled and analyzed for the following parameters:

pH	Conductivity
Total Suspended Solids	Ammonia Nitrogen
Nitrate – Nitrite	Oil and Grease (visual)
Total Phenols	Sulphate
Total Hardness	Total Alkalinity
Sodium	Potassium
Magnesium	Calcium
Chloride	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	Total Phosphorous
Total Aluminum	Total Manganese
Total Cobalt	Total Arsenic

* TPH - Total Petroleum Hydrocarbons
* BTEX - Benzene, Toluene, Ethylbenzene, Xylene
* HM - Heavy Metals including AL, As, Cd, Co, Cu, Fe, Pb, Mo, Ni, Se, Ag, Ti, Zn
* PAH - Polycyclic Aromatic Hydrocarbons
* The concentration of F1 – F4 fractions in petroleum hydrocarbon contaminated soil, according to the CCME *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* that is entering the Land Treatment Unit from all sources and excavations.
* Polychronitaed Biphenils (PCB)
* Total Petroleum Hydrocarbons (TPH)

- The results of the laboratory analysis are to be compared to the Environmental Protection Service, Department of Sustainable Development, Government of Nunavut Environmental Guideline for

Site Remediation, CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (most current edition) and the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (most current edition) remediation criteria for commercial/ industrial zoned sites. The results are to be presented in table form highlighting non-compliance with both federal and territorial regulations.

- Standing water in the landfarm may not be discharged until it is sampled / tested and meets the discharge water requirements of the water license. Discharge guidelines must meet the following perameters:

Parameter	Maximum Allowable Concentration (ug/l)
pH	6 to 9 (pH units)
Oil & Grease	5000
Lead (dissolved)	1
Benzyene	370
Toluene	2
Ethylbenzene	90

- The second objective of the project will be to decommission the landfarm, if the soil tests indicate all of the soil has reached all of the mandatory limits of contamination. The decommissioning will be done by removing the soils from the liner and removing the liner from the LTU and backfilling the LTU excavation with the treated soils and compacting, if necessary, to match the surrounding soil conditions. All monitoring wells will remain in place.

- Using a gas Photo Ionization Detector (PID) or similar equipment to monitor hydrocarbon vapours, the contractor must take random samples of the material below the liner to ascertain if any contamination leached beneath the liner. In addition to the portable hydrocarbon vapour testing, 10 soil samples will be taken from under the area and sent to a certified laboratory for analysis of the same parameters as listed above on an expedited basis. **The liner itself will be taken to an approved landfill site for proper disposal (possibly sent outside of Nunavut to a southern location if required). The location of disposal will be determined by the contractor.**

- The fourth objective is to landscape the LTU area once it has been replaced with the treated soil. The soil shall be levelled and compacted to match the surrounding conditions including smoothing out the berms to match the surrounding topography, unless the Airport Manager wishes for a different land use for the area.

If a project scope change is anticipated, the Contractor must notify the Project Manager in writing immediately. No additional or supplemental work shall be undertaken or in substitution of the work specified unless approved in writing by the Contracting Authority.

Preparation of a report detailing works completed as a result of this scope of work.

4.4 PROJECT SCHEDULE AND INITIAL PROJECT MEETING

Ten (10) working days after the selected contractor has been notified of bid acceptance, the contractor is to submit to the Project Manager a detailed project schedule that will outline the time frames for each associated project work activity. After contract award an initial site start-up meeting will be organized by the Project Manager with the Iqaluit Airport Manager and the contractor in order to review and finalize the contractor's project schedule, associated work activities and review airport safety and security requirements. This meeting may also be accomplished through a teleconference from the Project Manager's office to the Iqaluit Airport Manager at the discretion of the Project Manager. All personnel, materials and equipment must be on site to facilitate a start date to be determined after contract award, as negotiated between contractor and Project Manager.

4.5 CONDITIONS FOR PROJECT WORK

Mandatory Items To Be Submitted In the Proposal

With Their Proposal, Bidders <u>Must</u> Submit The Following:

- A 'Work Plan' which includes the following:

  a. The Consultant must provide a qualified site superintendent, with a minimum of 10 years relevant practical experience, who will manage site contractual activities, the coordination of work, provide daily progress reports to the Project Manager and shall remain on the job site when the project is in progress.

  b. The name and credentials of the on-site supervisor. The site supervisor will not be replaced without prior **written** approval from Transport Canada.

  c. A detailed breakdown of the work to be completed by the Contractor under this contract.

d. A detailed description of how each of the tasks will be carried out, ensuring compliance to all applicable legislation and regulations.

e. A list of all consultant/contractor/subcontractor personnel that will be directly involved with the work under this contract, and their relation to the project.

- A project schedule; a detailed schedule is required 10 days after contract award. A proposed schedule for the completion of the work must be provided with your submittal. This schedule should identify the timing of tasks associated with the various project tasks and activities, including required report submissions. The Contractor shall adhere to the detailed schedule established in their proposal.

- A site specific 'Health and Safety Plan' (HASP) which includes, as a minimum, a document complying with Nunavut WCB guidelines, outlining the following:

a. The major hazards that will be encountered on site.

b. The precautions that will be taken to minimize the hazards (Personal Protective Equipment, signage, barriers, etc.) All cost associated with monitoring and conflict control shall be born by the consultant/contractor.

c. Medical emergency procedures that will be followed by the consultant/contractor in case of accident or incident requiring medical attention, including a contact list of hospitals, fire department, etc.

d. A fire safety program that includes fire prevention, fire protection and fire reporting procedures and requirements. Details of the program must be included in the plan of operation that addresses safety and security at the site according to regulatory requirements.

e. A safe work procedure plan for active airports.

Note: a more detailed version of the HASP will be made available to the Project Manager for review prior to the start of work. Transport Canada wants to ensure the bidders are aware of the site-specific conditions and take the time to read and prepare a site-specific document, and not include a generic form or section.

A complete equipment list detailing the year, make and model of the equipment to be used.

During the onsite work phase of the project, the contractor must comply with the following:

- Changes to the personnel list will not be permitted once the contract has been awarded without consultation and written approval by the Project Manager; copies of their CV are required and will be reviewed prior to final acceptance.

- Do not disrupt airport business except as permitted by the Airport Manager;

- Provide barricades and lights where required;

- Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling and storage, and disposal of hazardous materials;

- Observe construction safety measures of the Nunavut Workers Compensation Board and municipal authority provided that in any case of conflict or discrepancy the more stringent shall apply;

- The Project Manager must be notified immediately by the contractor should there be problem areas encountered that are in addition to those covered by this Request for Proposal; and

- Personnel qualifications are to be provided as per Section 5.1(e) to demonstrate their capability to conduct the required field sampling of soil and water for formal laboratory analysis and compaction testing.

4.6 AIRSIDE SECURITY ACCESS REQUIREMENTS

The LTU is located in a restricted area of the Iqaluit Airport. To access the LTU in the airport restricted area authorization and/or restricted area passes are required from the Iqaluit Airport Manager for contractor's personnel. As well, airside vehicle restrictions are also in place. The contractor will be responsible for obtaining and fulfilling the necessary Airport airside /access requirements from the Iqaluit Airport Manager's office. If the Airport Manager decides that an escort is required, the contractor will be responsible for those costs.

4.7 PROTECTION OF BURIED INFRASTRUCTURE

While the work is in progress the Consultant will protect all utility lines and buried services, water, sewer, gas, electric, telephone and other utilities and structures

encountered. If any utilities are damaged, the Consultant will restore them to original or better condition unless directed otherwise. If any previously unknown underground services are discovered during this project, report the find to the TC Project Manager and discuss with them on how to proceed.

4.8 POST CONSTRUCTION ACTIVITIES

Upon completion of the project works, the Consultant's site superintendent will notify the TC Project Manager to arrange for a contractual final acceptance to be conducted by Transport Canada.

A TC departmental representative will inspect all work. Work not done to the satisfaction of the departmental representative will be redone to the same and the Consultant will incur the cost.

Failure to carry out work to the satisfaction of the departmental representative may result in the termination of the contract and full payment of the contract may be suspended.

4.9 REPORTING

The Contractor will provide reports, and associated documentation including all annexes, tables and photographs as per deliverable format outlined below.

The Contractor will be responsible for the cost of processing the project reports using the Contractor's own or contracted typing/word processing facilities.

The Contractor shall maintain contact with the Project Manager throughout the contract including the report writing phases. Draft and Final reports shall be submitted to the Project Managers. Submissions include two (2) hard copies & one (1) electronic copy (Adobe Acrobat pdf) of the Draft Reports, and two (2) hard copies & one electronic copy on CD in pdf format of the Final Reports. All report figures and final site survey are to be in AutoCAD format.

The Contractor will provide Draft Documents for review by the Project Manager within four (4) weeks of completion of fieldwork to provide Transport Canada ample time to comment on the contents of the document. Project Manager will provide comments within two (2) weeks of submission. If required, the Consultant will provide written response to Project Managers comments for each review.

The final report is required two (2) weeks after receipt of comments.

Final copies are to be submitted to:

Superintendent, Environmental Affairs, Programs
Transport Canada

Prairie and Northern Region
1100-9700 Jasper Avenue
Edmonton, Alberta T5J 4E6

The report will include as a minimum:

- A Table of Contents
- An executive summary;
- A description of the scope of work;
- Description of field methods, construction activities, and disposal methods;
- Drawings indicating the location of site characteristics and infrastructure;
- Photos of the LTU prior to, during and after completion of the work;
- Drawings and photos of the locations where samples are collected;
- Conclusions based on the field and laboratory results; and
- Appendices containing, analytical methods, lab analysis and certificates.
- Reports will be in Ariel 12 font, on 8 ½ by 11 paper, single spaced, double sided; drawings can be on larger paper.

4.10 CONTRACT WORK SCHEDULE

The following scheduled milestones must be met in order to coincide with site operations:

- Proposal Due Date
- Submission of Contractor complete and detailed Site Specific Health & Safety Plan – 2 weeks prior to field work
- Field work to be completed by
- Completion of Draft Report
- Completion of Final Report - 2 weeks after receipt of client comments

4.11 REGULATORY FRAMEWORK

The contractor must observe the most recent published/current edition of applicable Federal, Provincial and Municipal legislation, regulations, guidelines and codes of practice (including all amendments), including but not limited to the following:

- Federal Guidelines for Land farming Petroleum Hydrocarbon Contaminated Soils remediation criteria for commercial/ industrial zoned sites;
- Current Occupational Health and Safety Regulations;
- Canadian Environmental Protection Act;
- Transport of Dangerous Goods Act;
- National Fire Code, plus amendments;
- National Building Code (with all current amendments);
- CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites;

- Work Site Hazardous Material Information System Regulation (WHMIS);
- CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (most current edition);
- CCME Environmental Quality Guidelines (most current edition);
- Canada Wide Standards for Petroleum Hydrocarbons in Soil (with amendments); and
- The regulations and standards of any other local governing agencies.

In case of conflict or discrepancy, the more stringent requirement shall apply. The contractor must meet or exceed requirements of contract documents, specified standards; codes and referenced documents. The contractor must ensure that all on site personnel are familiar with the mitigative measures included in the contractor Health and Safety Plan should a spill on site occur.

No on-site work will be undertaken prior to receipt of written approval of the Occupational Health and Safety Plan from the Project Manager.

The Consultant will be responsible for and must implement and maintain the plan of operation, which addresses safety and security at the site according to the direction received from the Airport Manager as part of his Aerodrome Operations Certificate.

The Consultant must observe and enforce the following safety measures, including but not limited to:

- Canada Labour Code,
- National Fire Code of Canada,
- Worker's Compensation Board,
- All applicable Health and Safety regulations, and Provincial and Municipal authority, provided that is any case of conflict or discrepancy the more stringent requirements shall apply.
- Workplace Hazardous Materials Information system (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and provision of material safety sheets acceptable to Labour Canada and Health and Welfare Canada.
- Deliver copies of WHMIS data sheets to Project Manager on delivery of applicable materials.

4.12 IMPOSED CONSTRAINTS

Conflict of Interest

The contractor, the team or team member carrying out this contract is expected to identify any conflict of interest, declare them early in the performance of the work and act in accordance with the instructions provided by TC to resolve them.

Standards of Conduct and Confidentiality of information

The successful contractor agrees to hold as confidential and shall not disclose to any person or firm any information gathered through assignment (s) or the knowledge of pending assignments. The only exception is if and only if that disclosure of such confidential information is necessary for the performance of the duties of the contractor, as agreed by the Department.

All information data, material, etc. gathered as part of this project shall be treated as confidential, the property of Transport Canada and shall only be discussed with the Project Manager and Transport Canada personnel unless otherwise directed and authorized.

Language of work

The language of work will be English.

Location of Work

The work as described in this Terms of Reference will be performed at the Iqaluit Airport, Iqaluit, Nunavut.

Appropriate Law

This contract awarded shall be governed by and construed in accordance with the laws in force in the Territory of Nunavut, Canada.

Travel

The contractor and/or their personnel will be required to travel to Iqaluit, Nunavut. Travel arrangements will be the contractors responsibility and travel costs will be reimbursed in accordance with the terms and conditions described in Appendix "H".

4.13 CONTRACTOR'S USE OF SITE

The contractor must comply with the following:

- Do not unreasonably encumber the site with materials or equipment.
- Move stored products or equipment, which interfere with operations of the airport.

- Obtain and pay for use of any additional storage or work areas if required by the Airport Manager.

PERSONNEL PROTECTION

The contractor must comply with the following:

- Personnel entering the area must be equipped with steel-toed work boots, hard hats, hearing protection, and safety glasses as required by the Occupational Health and Safety Act.
- Workers must be equipped with appropriate personal protective gear. Should contamination be encountered and exposure to hazardous materials be encountered the worker must use or wear such gear as appropriate and necessary.
- Excavation team may be required to wear respirators as directed by Transport Canada if vapour levels exceed regulations for exposure limits. Ensure that all contractor personnel are instructed for the proper use and maintenance of respirators. All personnel must be fit-tested as well.
- If in a high traffic area, high visibility vests must be worn.
- Use barricades and warning signs where necessary.
- Avoid skin contact and inhalation of hydrocarbon products.
- Promptly wash hydrocarbon contaminated soaked cloths and avoid using soaked leather goods. Properly dispose of any soaked rags.
- Keep work areas clean and well ventilated.
- Shore and brace excavated slopes and banks according to applicable regulations.
- Clean up spills promptly.
- Precautions must be taken to eliminate all potential sources of ignition from the area (i.e. smoking materials and non explosion-proof electrical and internal combustion equipment).
- Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- Fires and burning of waste or materials are not permitted on-site.
- Prevent accumulation of vapours at ground level.
- Report fires immediately by fastest means as possible; report all fire incidents to Contractor's site supervisor, Airport Authorities and local fire facilities.
- Maintain fire extinguishers in sufficient quantity to protect, in an emergency, work in progress and personnel on site.
- Smoking is not permitted on work site.

Appendix I

Location Map Iqaluit Airport LTU, Nunavut

Figure 1: Location Map Iqaluit Airport LTUs

Scale 1:10,000

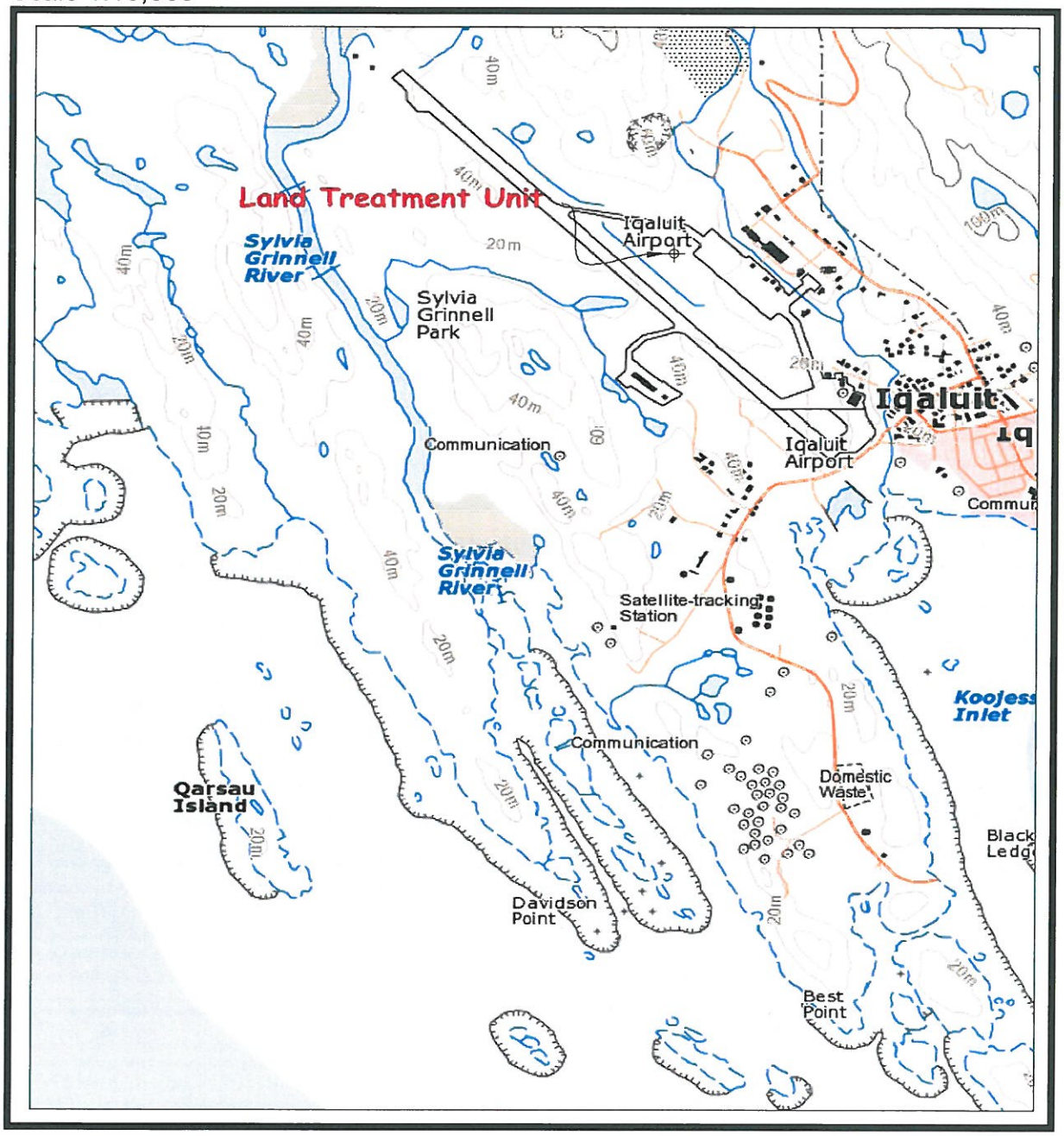
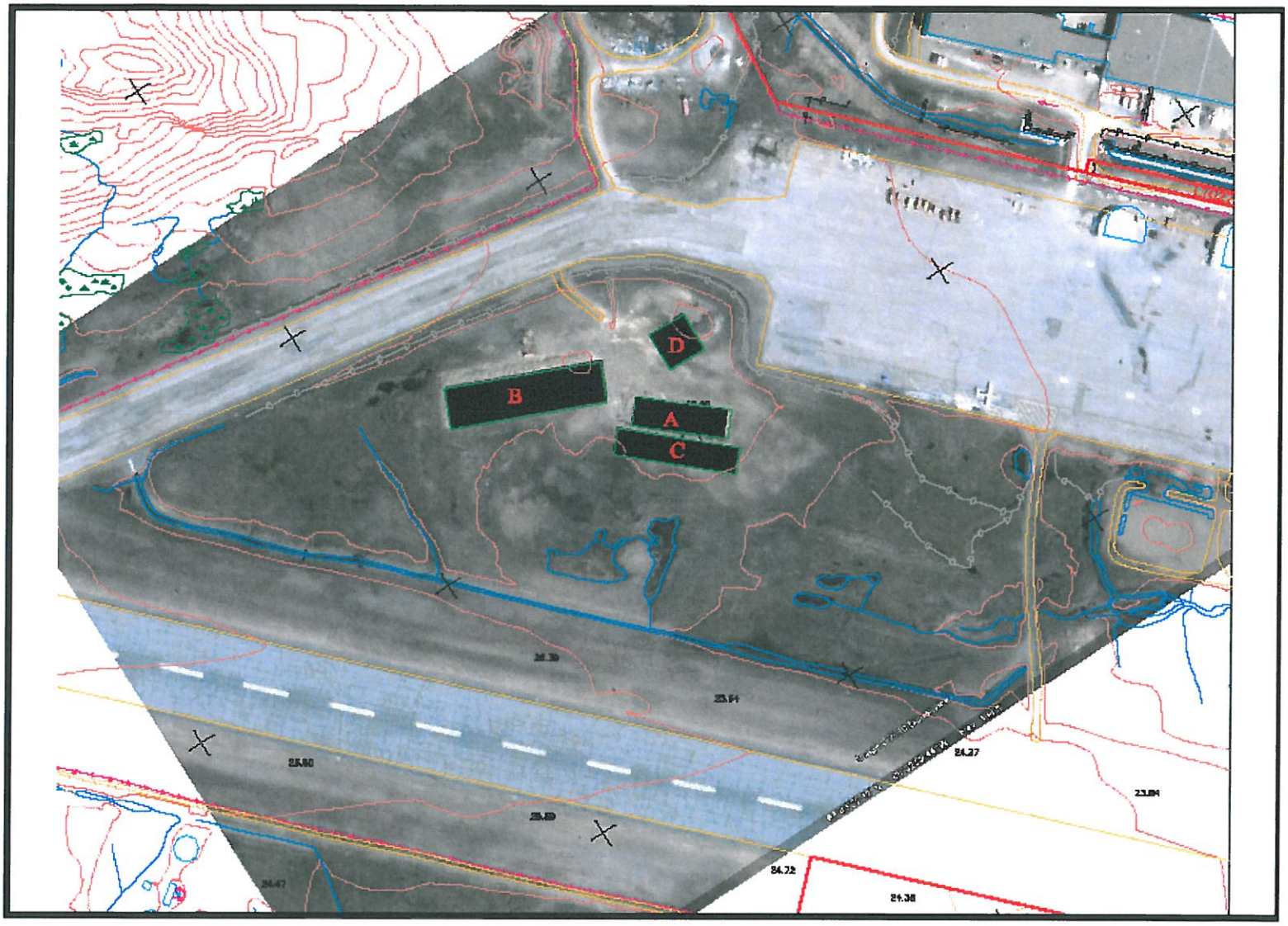


Figure 2 : Location map of LTUs at Iqaluit Airport, Nunavut

Note: LTU A and B are historic and will be decommissioned. LTU C and D were constructed in 2006 under NWB License # 1BR-LTU1013.

Scale 1:2000



Appendix II

Site Photos