



Water Licence Application Questionnaire
for
Municipal Undertakings

‘To provide for the conservation, development and utilization of waters in a manner that will provide the optimum benefit for all Canadians and in particular, for the residents of the Inuvialuit Settlement Region.’

October 2014

The purpose of this questionnaire is to solicit supplemental information from an applicant to support his/her application for a water license (or its renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Inuvialuit Water Board having to solicit additional information after an application has been submitted. This information will also be useful during the review of your application, which must be undertaken prior to development and approval of a water license.

The applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to the operation undertaking, the applicant is requested to indicate "N/A" (Not Applicable).

NOTE: If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or an attachment.

If any questions arise while completing the questionnaire, the applicant may wish to contact the Inuvialuit Water Board at (867) 678-2942.

This questionnaire can be sent with the application for a new licence or the renewal of an existing licence to the following contact information:

Executive Director
Inuvialuit Water Board
P.O. 2531
Inuvik, NT, Canada
X0E 0T0
Email: info@inuvwb.ca

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SECTION 1: GENERAL

Date: September 15, 2022

Applicant:

Hamlet of Sachs Harbour

(Company, Corporation, Hamlet, Town)

Ms. Betty Haogak, Senior Administrative Officer

(Person to contact and its position)

PO Box 90, Sachs Harbour NT, X0E 0Z0

(Postal address)

867-695-4351

(Telephone number)

867-690-4802

(Facsimile number)

Community Status

City ☐ Village ☐ Town ☐ Camp ☐
Other ☐ Hamlet

Population (according to most recent census results), and the Estimated Growth Rate over next five years or Camp Maximum Capacity:

2022- 105, 2027 - 120

Indicate the status of the municipality's license on the date of application.

New Application: Yes ☐ No ☒

If No, please submit your Water Licence Number and the date the licence was issued.

Renewal of Water License Number: N7L3-1531 Date of Issuance: November 21, 2017

Has any baseline data been collected for the main water bodies in the area?

Yes ☐ No ☒ Unknown ☐

If yes, please attach:

- All data gathered on the physical, biological and chemical characteristics at each sampling location;
- A summary or program details indicating sampling locations, description of waste at each location, sampling frequency, and parameters analyzed;
- An outline of Quality Assurance/Quality Control methods being applied to sampling, preservation and analysis within the program.

Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g., wildlife, soils, air quality) in addition to water related information requested in this questionnaire?

Yes ☒ No ☐ Unknown ☐

If yes, please attach copies of reports or cite titles, authors and dates (prepared by, title and completion date).

Guidelines for the Design and Assessment of Tundra Wetland Treatment Areas in Nunavut, 2016,

If no, do you plan on doing such studies? If you do plan on doing such studies, please describe the proposals.

The Hamlet of Sachs Harbour has attached the manual for the Surveillance Network Program (SNP). The annual SNP sampling requirements for SNP stations 1531-2 and SNP 1531-3 are also shown in figure 5 & 6. Historical SNP sampling results from 2011 & 2017 have been summarized in the attachment on Figure 6.

Attach detailed maps which show the relative locations of the:

- raw water intake;
- water treatment facilities;
- fuel & chemical storage;
- sewage treatment facilities;
- wastewater treatment area and discharge outlets;
- solid waste disposal areas and drainage patterns;
- hazardous waste disposal area;
- transportation access routes; and
- existing waterbodies/courses and any changes to these water bodies/courses which have or may occur as a result of water use of waste disposal facilities, locations of environmental monitoring sites.

Maps with containing the information are included in figures 1-13 in the attachment

Attach detailed scale plan drawing(s) of the proposed (or present) sewage treatment system. The drawing(s) must be stamped by an engineer registered in NWT and include the following:

- details of pond size and elevation;
- precise details of all retaining structures (dimensions, materials of construction, etc.);
- details of the drainage basin, and existing and proposed drainage modifications;
- details of all decant, siphon mechanisms etc, including sewage treatment facilities;
- details regarding direction and route followed by wastewater flow from the area;
- indications of the distance to nearby major watercourses, and fish bearing waters;
- location and construction of liners;
- leachate and groundwater collection systems; and
- control structures.

There are no engineering drawings for the sewage lagoon which is situated in a natural wetland. The sewage enters the lagoon through a chute and after treatment discharges to the wetland in the northwest. The sewage lagoon covers an area of approximately 18 Hectares. This is shown in Figures 5-7 in the attachment.

Attach detailed scale plan drawings of the proposed (or present) solid waste disposal area. The drawings must include the following:

- precise details of all retaining structures (dimensions, materials of construction, etc.);
- details of the drainage basin, and existing and proposed drainage modifications;
- details regarding direction and route followed by wastewater flow from the area;
- indications of the distance to nearby major watercourses, and fish bearing waters;
- all sources of seepage presently encountered in the vicinity of these areas;
- the volume of each seepage flow (m³/day); and
- the direction of each flow.

Solid waste is contained within a bermed area on the South, West, and North sides of a disposal cell. Figures 9-13.

Attach the present or proposed contingency plan which will be used for each portion of the waste control system in the event it fails to operate properly.

The Hamlet will supply granular and equipment to repair any damages to the berms.

Attach the present or proposed spill contingency plan which will be employed in case a spill of hazardous materials occurs. Describe courses of action, mitigative methods and equipment available for use.

A spill contingency plan was approved by the IWB on March 31, 2021. There are no changes to this plan at this time.

NOTE: Individual detailed large scale drawings of all facilities (dam, decant system, ditch, dike, water treatment plant, etc) constructed or proposed must be attached. Specific details with regard to the methods of construction, materials used, etc. are required.

SECTION 2: WATER SUPPLY

Volume of water use (m³/day) ¹¹

Type of source

Lake: ☒ River: ☐ Well: ☐ Other:

Name of raw water source and alternative, if any

Water Lake

Usual break-up & freeze-up months

Break-up: Freeze-up:

Please provide short descriptions for the following

Freshwater intake facility:

The freshwater intake extends approximately 130 m from the water treatment plant. It rests approximately 7m below the surface and approximately 1 m off of the bottom of the lake. There is a pump at the end of the intake pipe that draws water into the water treatment plant. The engineered drawings for this have not changed and are available on the public registry (see pages 133-137 in the 2004 Final Design Report)

Operating capacity of the pumps used:

The normal treatment capacity of the pumps would not exceed 200 L/minute. In an emergency the fireflow pumps can pump untreated water at a rate of 1,000 L/minute.

Type of water storage facility (ie: Reservoir, storage, tank, none. For other, please provide a description)

There is not storage facility in this system it treats the water as it flows directly into the delivery truck.

What is the capacity of the water storage facility? m³

not applicable

What is the rate of withdrawal from the source? (m³/day)

The daily consumption averages out to approximately 11,000 L a day however on Mondays the delivery truck might be expected to delivery as much as 30,000 L to the community.

Is water drawn from the source?

Yes

If yes, during what month(s) is it drawn? And for what period of time is it drawn (days/weeks/months)?

The Hamlet of Sachs Harbour routinely draws and delivers water three times a week, but is occasionally called out to deliver water when there is a shortage or an unusual demand.

What is the rate of flow of source (if river) or size (if lake)?

The flow into the lake is not known however previous reports indicate that water levels and sufficient supply has never been an issue.

At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

Over the decades there have been no observable effects on Water lake due to water usage.

General condition of

Water supply facility: Satisfactory ☒ Unsatisfactory ☐

If unsatisfactory, explain:

Storage facility: Satisfactory ☐ Unsatisfactory ☐

If unsatisfactory, explain: not applicable

Distribution system: Satisfactory ☒ Unsatisfactory ☐

If unsatisfactory, explain:

Are there any changes planned in the water supply system?

Yes ☐ No ☒

If yes, please attach a copy of the plan, or describe changes.

SECTION 3: WATER TREATMENT

Indicate the quality of the raw water prior to treatment & distribution and give a description

Good ☒

Fair ☐

Poor ☐

Description: Water lake has very low sediment and the quality of the raw water is considered very good.

Indicate the capacity of the treatment facility (L/minute)

200 L/minute

Type of water treatment facility (ie: Filtration & Chlorination, Chlorination only, UV, None. If other, please describe)

Filtration and Chlorination.

Raw water passes through a series of three micro filters before chlorine is added at the final stage before being pumped into the truck. Due to the low sediment in the raw water no flocculation or coagulation is required.

Describe in detail the method of water treatment (ie: backwash, flocculation, sedimentation, chemicals used) and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram if possible.

The file that is uploaded to the registry in 2003 titled "Final Preliminary Design Report 2003" is still relevant and describes the water treatment system in detail.

Have there been any problems or health and environmental concerns with the water treatment facilities?

Yes ☐ No ☒

If yes, please describe:

The facilities have been operating as designed.

Are there any changes planned in the water treatment facilities?

Yes ☒ No ☐

If yes, please attach a copy of the plan or indicate change

Planning is underway for ultrafiltration and treated storage on-site. No drawings are currently available.

SECTION 4: SEWAGE DISPOSAL

Indicate the level of treatment the sewage will be receiving (primary, secondary or tertiary. If other, please describe)

The sewage receives primary treatment in the sewage lagoon

Pre-treatment (if applicable)

Screening ☐

Maceration ☐

Lagoons (if applicable)

The sewage lagoon

Anaerobic ☐

aerobic ☒

facultative ☒

Indicate the capacity of the sewage treatment facility (m³)

At an average depth of 2 m the sewage lagoon can conservatively be estimated to contain 35,000 m³ of water.

There are no berms to contain the sewage as the lagoon continuously discharges with rising and falling water levels.

Indicate the retention time of the sewage while in the treatment facility (days)

The retention time would vary throughout the year as it is a natural wetland. Sewage goes through periods of freezing, spring thaw, and lower periods of flow that are likely correlated to low precipitation.

Indicate the estimated rate of discharge of wastewater

same as above.

Indicate the location of the discharge point

The sewage lagoon is believed to discharge to the Northwest at SNP 1531-2 as shown in Figures 3, 5 & 6 in the attachment.

Will the discharge be seasonal or continuous?

continuous

If seasonal, during what month(s) will it occur?

The lagoon freezes over in October and unthaws in June.

What is the duration of the discharge (days/weeks/months)

The discharge occurs for a period of five to six months.

Comment on the general condition of the:

Sewage collection system

The Hamlet of Sachs Harbour routinely collects sewage with a vacuum truck from residents and non-residential buildings within the Hamlet.

Discharge control system

The collection truck discharges the raw sewage through an elevated chute (e.g. culvert) that extends overland and deposits the sewage into the water of the sewage lagoon.

Dams, diversion, dykes or berms

There are no other control structures.

Have there been any problems or health and environmental concerns with the sewage disposal facilities?

Yes ☐ No ☒

If yes, please describe:

The average depth of the wastewater lagoon is (2 meters)

What is the design freeboard? (meters)

Is there any harvesting of fish or shellfish in the waters where waste is discharged?

Yes ☐ No ☒

If yes, please indicate species harvested, and estimate amounts.

Will the municipality be using a honey bag pit?

Yes ☐ No ☒

If yes, describe its location, drainage and operation & maintenance

Are there any sources of commercial or industrial liquid waste being discharged or deposited to the municipal system which may affect the quality of the effluent or leachate produced?

Yes ☐ No ☒

If yes, please describe:

Have any spills occurred in the past five years?

Yes ☐ No ☒

If yes, please submit a list of all spills with the date of the spill, the type of spill, the quantity spilled, the location of the spill, the method used to clean the spill and the results of the clean-up.

There have been no reported spills associated with the sewage lagoon in the past 5 years.

Have there been any operating problems with the lagoon?

Yes ☐

No ☒

If yes, please describe:

Are there any changes planned in the sewage disposal facilities?

Yes ☐

No ☒

If yes, please describe and if possible, attach a copy of the plan:

There are no changes and the approved Sewage Disposal Facilities Operations and Maintenance Plan on file is still representative of current activities.

SECTION 5: SOLID WASTE DISPOSAL

Indicate the capacity of the disposal area (m³) 4,000 cubic metres

The average depth of the solid waste disposal site is (1.5 meters)

Are there any sources of commercial or industrial solid waste being deposited in the municipal system which may affect the quality of the effluent or leachate produced?

Yes ☒

No ☐

If yes, please describe:

Municipal solid waste includes regular solid waste from the Industrial, Commercial, and Institutional sectors in any community. This includes the Coop, Hamlet Garage, demolition waste, power plant and tank farm. No hazardous waste from these sectors.

Briefly describe how the solid waste will be picked up & delivered to the disposal area

Municipal Solid Waste is collected from the community twice a week by municipal staff to the solid waste site that is 8 km West of the Hamlet. The community residents also have access to the solid waste site to haul their own MSW outside of regular collection. (See Figures 12 & 13)

Is the solid waste site fenced?

Yes ☒

No ☐

Will the municipality be using a dead animal pit?

Yes ☐

No ☒

If yes, please describe its location, drainage and operation & maintenance:

For animals that are not disposed of on the ice, the animals are disposed of in the domestic cell however a special area is excavated and covered immediately.

Will the municipality be using a bulky metal waste disposal area?

Yes ☒

No ☐

If yes, please describe its location and operation & maintenance:

The bulky metal area is described in the attachment, approximately 4,000 square metres. Metal will be segregated by vehicles, appliances, refrigerant, heating oil tanks, and groups of light, and heavy steel. (See Figure 12)

Will the municipality be using a hazardous waste disposal area?

Yes ☒

No ☐

If yes, please describe its location, structure and operation & maintenance:

The household hazardous waste area is described in the attachment. Containers are kept upright on pallets or other secure containers such as pails, drums, bins.

Are there any hazardous commercial wastes entering the solid waste disposal system?

Yes ☒

No ☐

If yes, please describe (source, volume, special handling and disposal methods for these wastes):

The Hamlet is participating in Clean Up & Clean Start where historical stockpiles are removed, and future stockpiles are prevented by refusing hazardous waste from the ICI sector. Historic stockpiles of hazardous waste from the industrial, commercial and Institutional (ICI) sectors are present in the solid waste site and are slated for removal.

If any natural watercourse may gain access to the proposed solid waste disposal area, what methods will be used to decrease the amount of runoff water entering these areas? Indicate the volume of water which may enter these areas from the source(s) in question and attach all pertinent details of proposed diversions

There is virtually no chance of flooding however surface water runoff from surrounding snow melt can be prevented by constructing swales and ditches around the solid waste site. This has not been required because the solid waste site is elevated in relation to its surroundings.

Please describe the nature of any diversions of watercourses

The solid waste site is located at an elevated location in relation to its surroundings.

Have there been any problems or health and environmental concerns with the solid waste disposal facilities?

Yes ☒

No ☐

If yes, please describe:

Yes due to its elevation it is more susceptible to windblown debris blowing into the tundra.

Are any changes planned in the solid waste disposal system?

Yes ☒

No ☐

If yes, please describe and, if possible, attach a copy of the plan:

The Hamlet of Sachs Harbour is constrained within its current boundaries to dispose of municipal solid waste at the solid waste site. Based on solid waste volume projections the Hamlet will either need to berm up around the existing domestic disposal cell and then mound solid waste, move northward into the area of existing stockpiles.

The Hamlet of Sachs Harbour plans to remove the stockpiles of hazardous waste and substantially reduce the volume of scrap metal on-site. This will allow for continued use of the disposal site for the community within its existing boundaries for the term of the licence.

A supplementary solid waste disposal facilities operation and maintenance plan is provided in the application.

SECTION 6: ABANDONMENT AND RESTORATION PROGRAM

List and describe the locations of abandoned or restored water treatment facilities.

none

List and describe the locations of abandoned or restored sewage treatment facilities.

none

List and describe the locations of abandoned or restored solid waste disposal facilities.

Residents and Hamlet staff have knowledge of old solid waste sites southeast of Icicle Inn and on the west side of the Hamlet. The exact locations have not been plotted. Debris from the old Icicle Inn can still be found scattered in the creek below that are buried under gravel.

Do you have an abandonment and restoration plan?

Yes ☐

No ☒

If yes, please attach a copy of the plan.

SECTION 7: WATER QUALITY MONITORING PROGRAM

Briefly describe the methodology that is presently used to sample the raw water supply

The Northwest Territories sets the standard for drinking water sampling and testing requirements. Raw water is regularly tested prior to treatment for turbidity, e.coli, and total coliforms. On an annual basis the raw water supply is tested for 28 parameters including metals, alkalinity, colour, cyanide, fluoride, nitrate, pH, sulphate, total hardness, total dissolved solids, total organic carbon, dissolved organic carbon, total suspended solids, and turbidity.

Briefly describe any monitoring that is done on wastewater effluent and leachate

Waste Water Effluent and leachate are to be monitored according to the SURVEILLANCE NETWORK POINT (SNP) MANUAL FOR WATER LICENCE N7L3-1531. It is attached as supplementary information.

Recognized laboratory performing analysis of samples

Name of the laboratory: Taiga Laboratory

Contact name: Laboratory Manager 1-867-767-9235 ext. 53150

Postal address: Environment and Natural Resources, 4601 - 52nd Avenue Yellowknife, NT X1A 2L9

Telephone number: 1-867-767-9235 ext. 53153 Facsimile number: Fax 1-867-920-8740

Are any changes planned in the water quality monitoring program?

Yes ☐ No ☒

If yes, please describe

Pending the terms and conditions of the new licence.

SECTION 8: ENVIRONMENTAL ASSESSMENT AND SCREENING

Has this project ever undergone an initial environmental review, including previous owners?

Yes ☐

No ☒

Unknown ☐

If yes, by whom and when?

Has approval been obtained or sought from the Department of Fisheries and Oceans for using any fish bearing water bodies for containment or disposal of waste?

Yes ☐

No ☒

Are there any environmental studies ongoing or planned?

Yes ☐

No ☒

If yes, please provide a list of these studies.

Prepared by:

Betty Haogak

Printed Name




Signature

Senior Administrative Officer

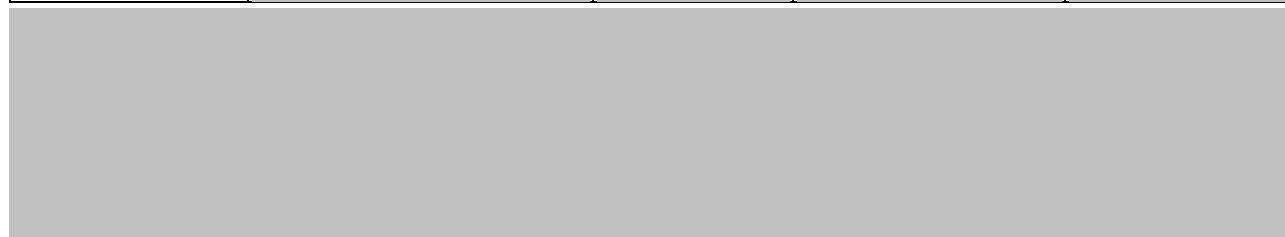
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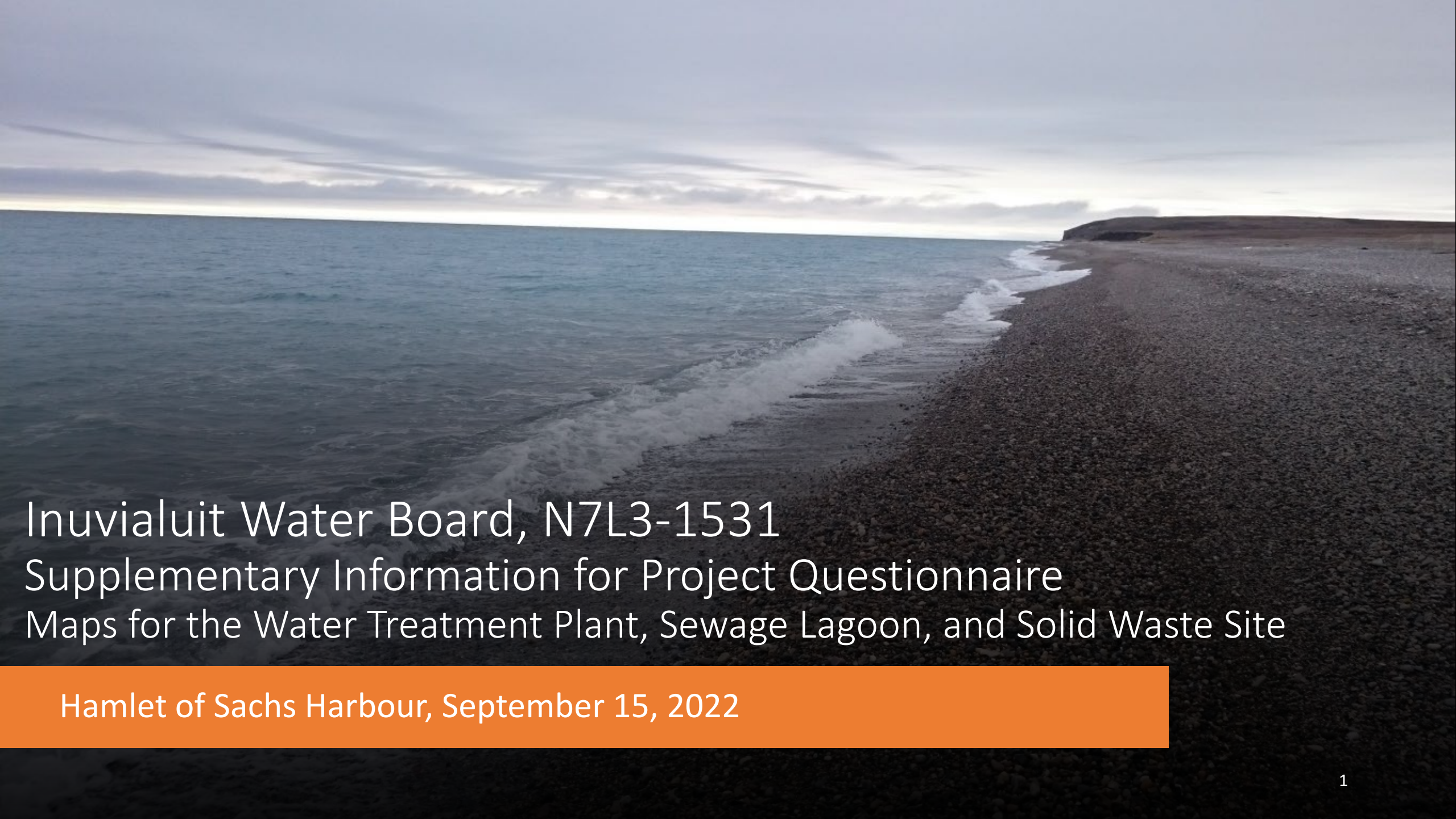
August 30, 2022

Completion Date

 Sept. 15, 2022

SECTION 9: LIST OF ATTACHMENTS

[illegible]



Inuvialuit Water Board, N7L3-1531
Supplementary Information for Project Questionnaire
Maps for the Water Treatment Plant, Sewage Lagoon, and Solid Waste Site

Hamlet of Sachs Harbour, September 15, 2022

Figure 1: Hamlet of Sachs Harbour Water and Waste Infrastructure Locations 1 : 50,000

Figure 2: Hamlet of Sachs Harbour Water and Waste Infrastructure Locations 1 :25,000

Figure 3: Estimated Surface Water Drainage Pattern

Table 1: Summary of Surveillance Network Program Data

Figure 4: Hamlet of Sachs Harbour Water Lake and Location of Water Treatment Plant

Figure 5: Hamlet of Sachs Harbour Sewage Lagoon

Figure 6: Hamlet of Sachs Harbour Tundra Wetland Treatment Basin

Figure 7: Discharge Chute into the Sewage Lagoon

Figure 8: Solid Waste Site Estimated Surface Water Flow

Figure 9: Solid Waste Site, Hydrography and Elevation pattern

Figure 10: Solid Waste Site Size and Boundaries

Figure 11: Solid Waste Site, 645 m from the Ocean

Figure 12: Solid Waste Site Layout and Estimated Area

Figure 13: Solid Waste Site Domestic Disposal Area with Berms and Perimeter Fencing

Figure 1: Hamlet of Sachs Harbour Water and Waste Infrastructure Locations 1 : 50,000

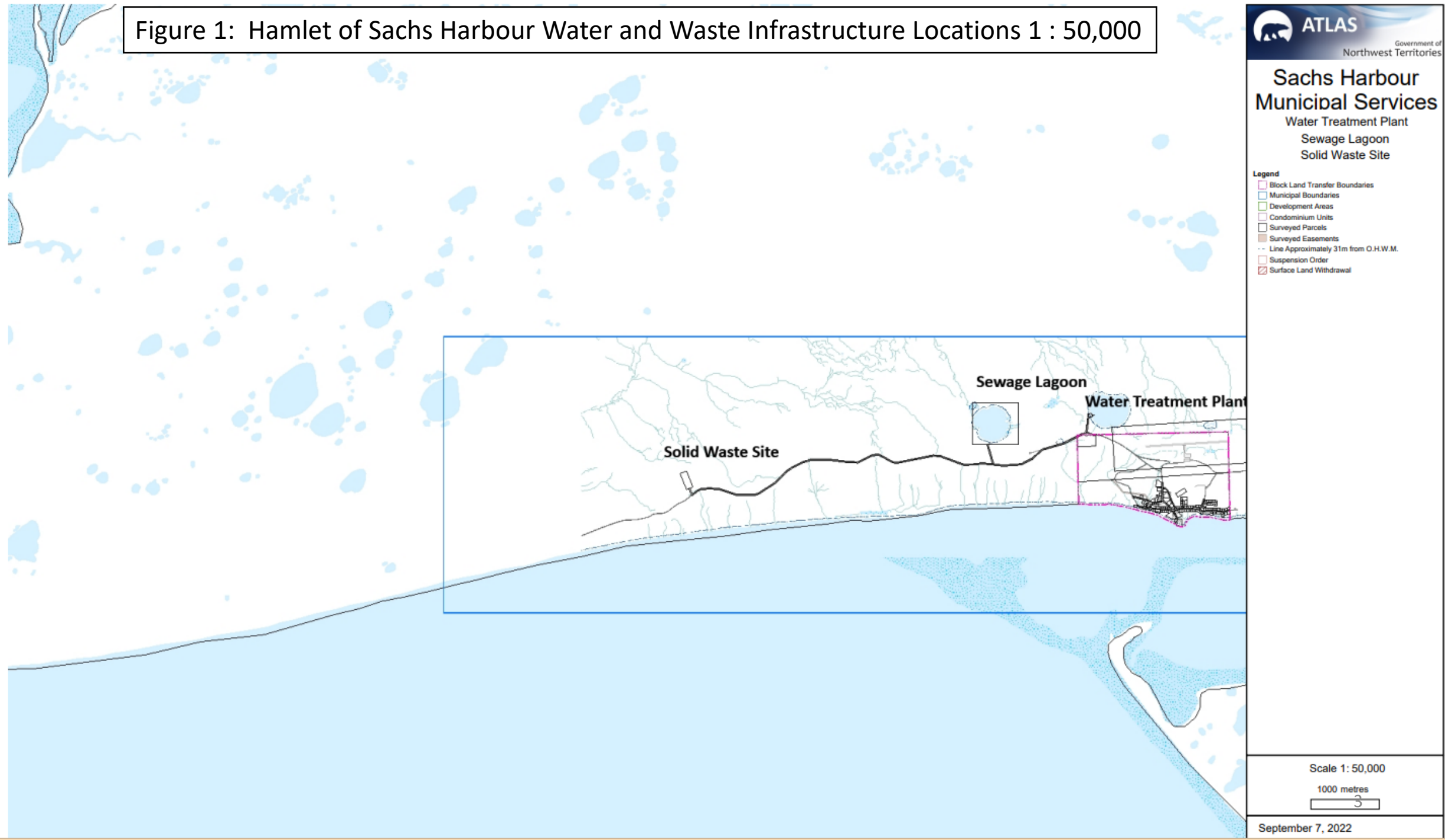


Figure 2: Hamlet of Sachs Harbour Water and Waste Infrastructure Locations 1 :25,000

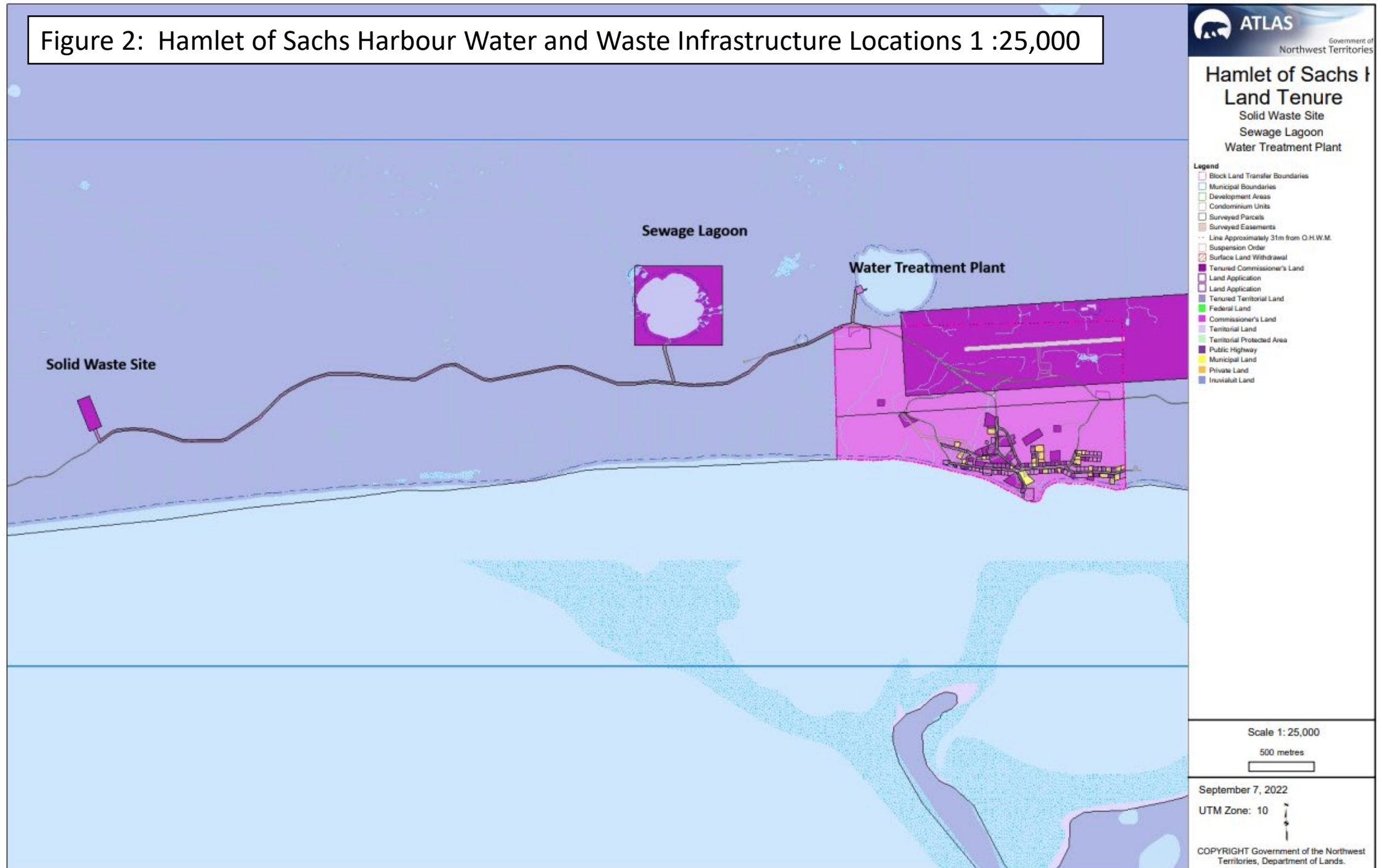


Figure 3:
Sachs Harbour:
Estimated Surface Water
Drainage Pattern

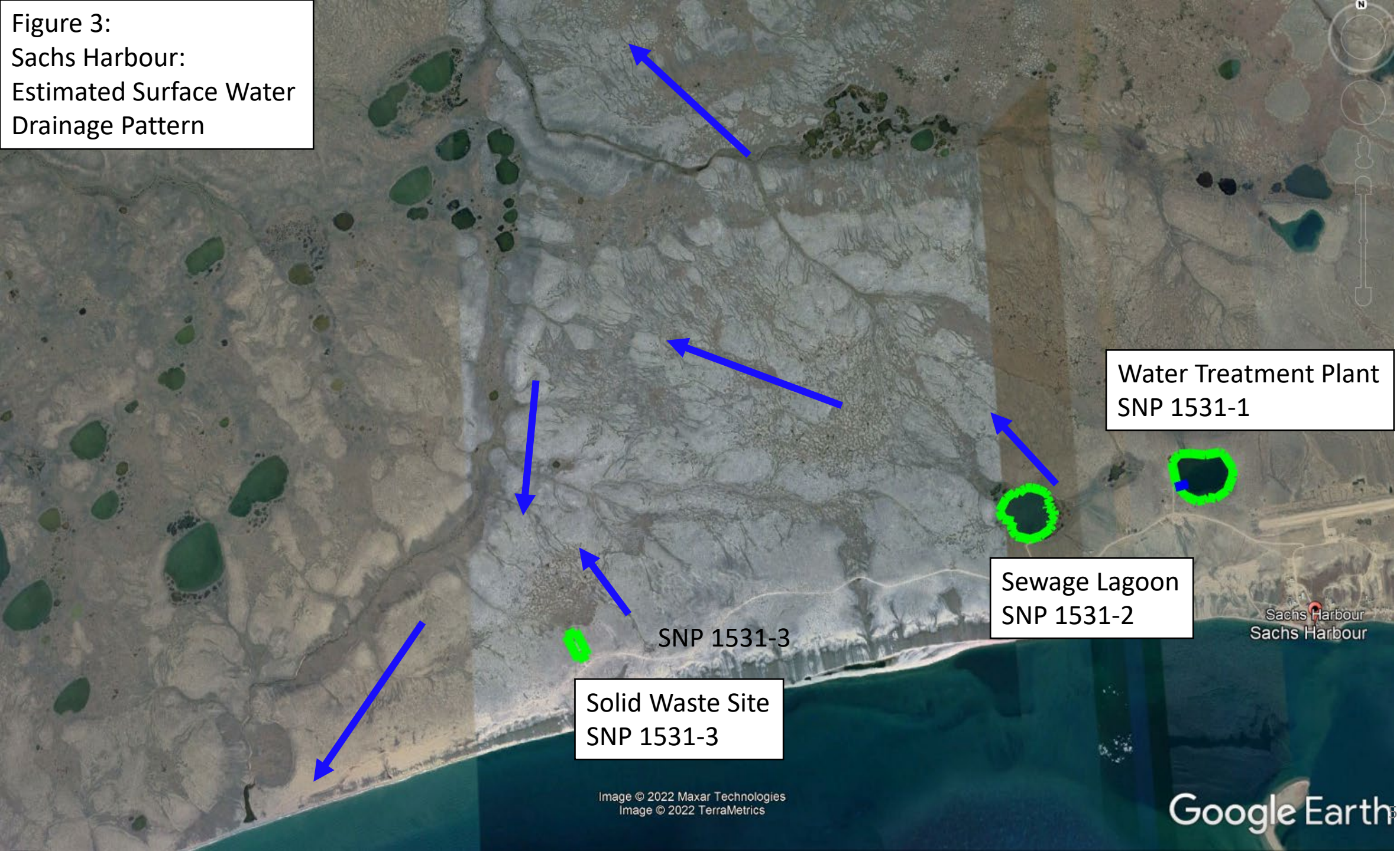


Table 1: Summary of Surveillance Network Program Data

Hamlet of Sachs Harbour Sampling Results for SNP Station 1531-2					
Date	CBOD5	BOD5	TSS	FC	pH
	mg/L	mg/L	mg/L		
14/09/2017			21		7.57
27/09/2011	3	5	6		8.26
AVERAGE at LAGOON OUTLET	3	5	13.5		7.915

Sachs Harbour

Location: 71°59'N/125°14'W

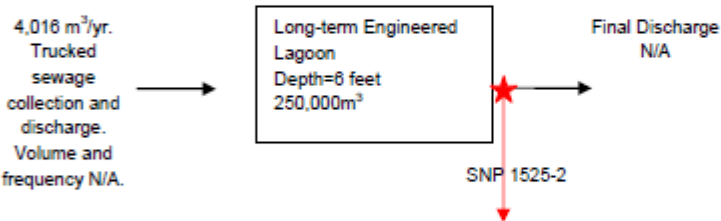
Population: 119 (2005)

Current Sewage Generation (2005 estimated, 2000 reported): 4,016 m³/year, 4,277 m³/year

Annual Days Min>0°C / Max>0°C / Degree Days above 0°C: 110 / 55.9 / 456.1

Receiving Water Body: N/A

Wastewater Treatment System:



Wastewater Discharge System:

- TBD

Water License Requirements		
Sampling Point	Frequency	Parameters
1525-2 Lagoon effluent at outlet.	4 times during decant	SS (180mg/L) BOD ₅ (120 mg/L) pH (6-9) Fecal Coliform (10 ⁵ CFU/100mL) Ammonia-N Oil and Grease (no-sheen)

Figure 4: Hamlet of Sachs Harbour Water Lake and Location of Water Treatment Plant

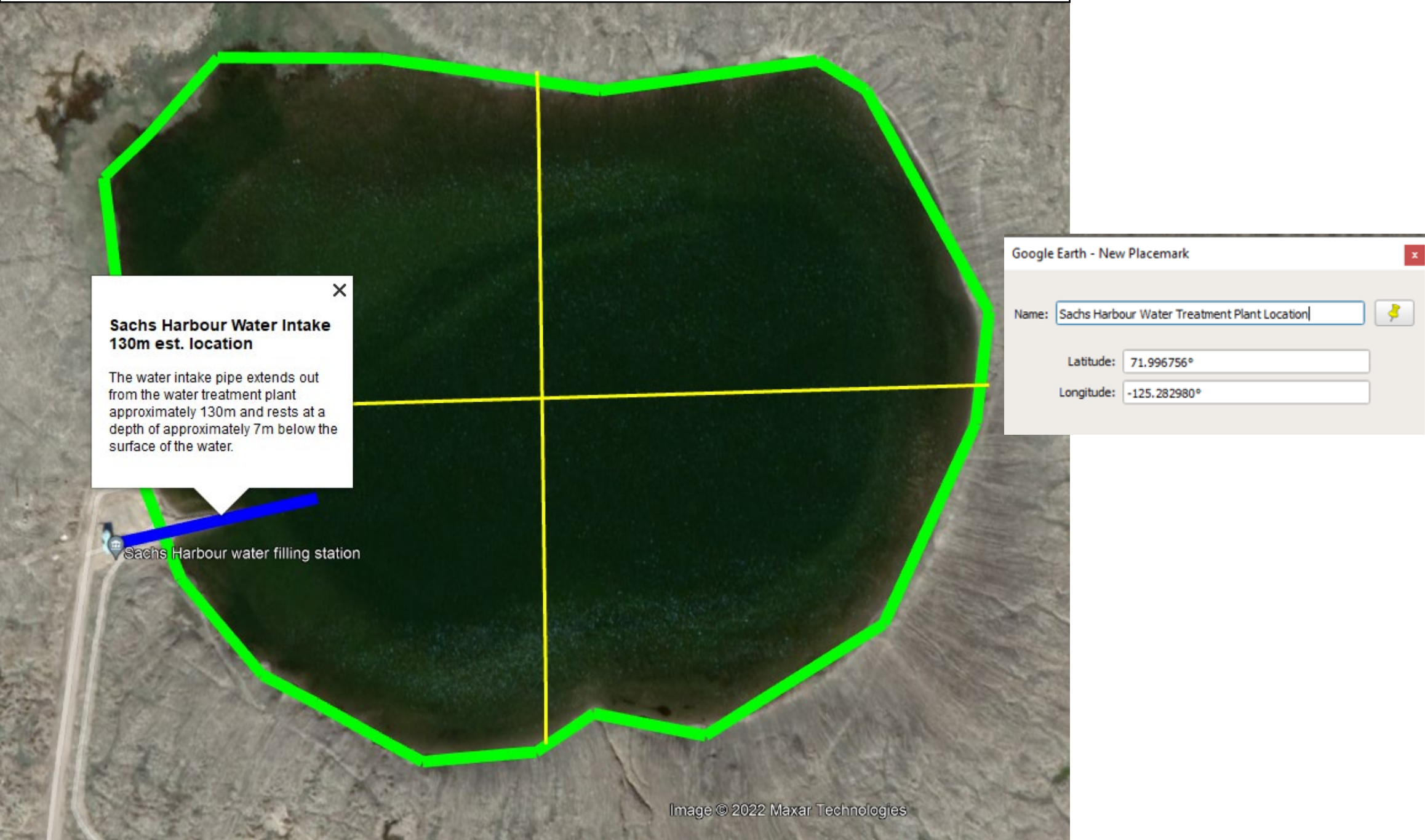


Figure 5: Hamlet of Sachs Harbour Sewage Lagoon

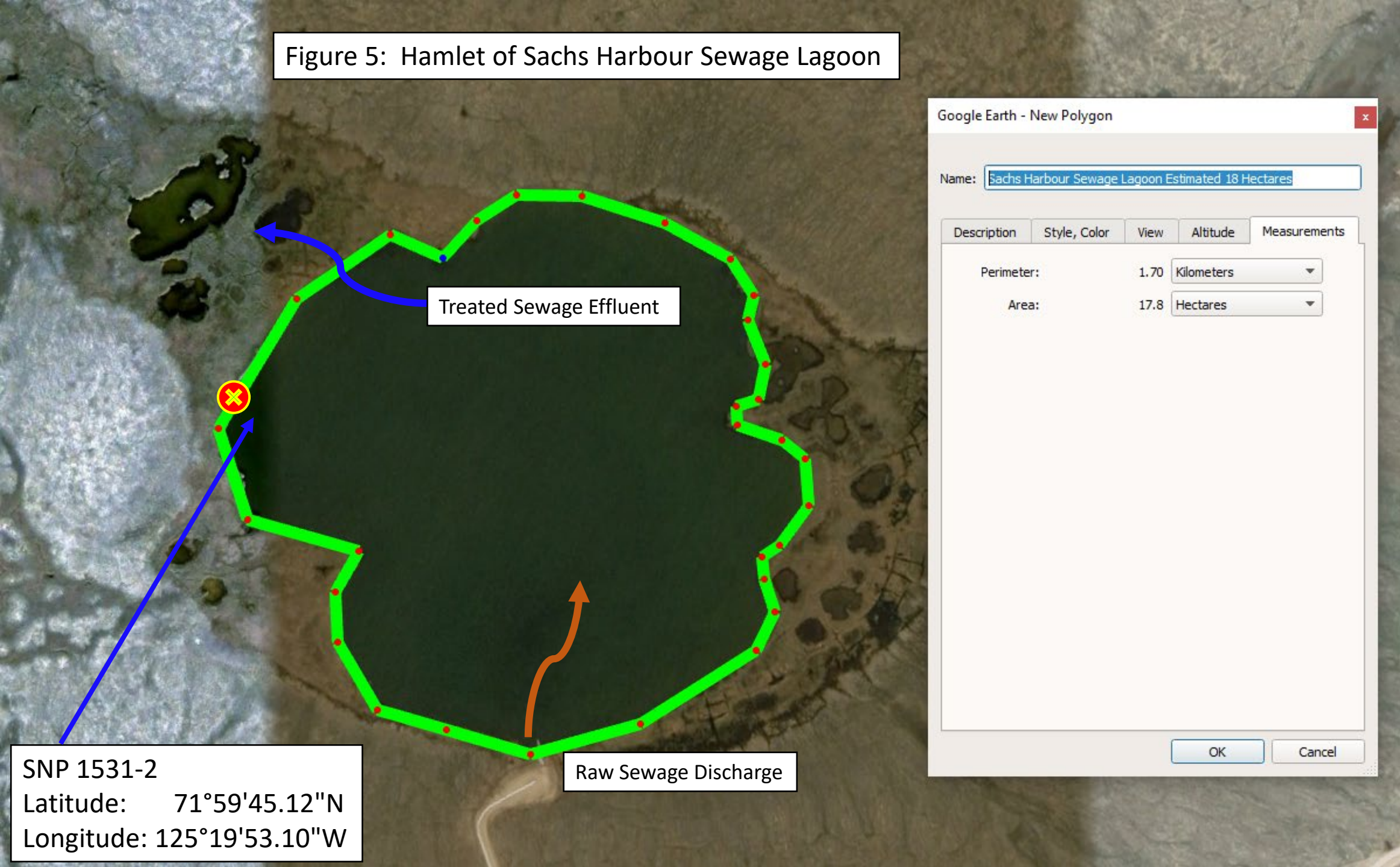


Figure 6:

Tunda Wetland Treatment Basin

Sachs Harbour Sewage Lagoon

Flow from the Lagoon is presumed to travel in a Northwest direction

Legend

Google Earth

© 2020 Google

Image © 2020 Maxar Technologies

4000 ft

N

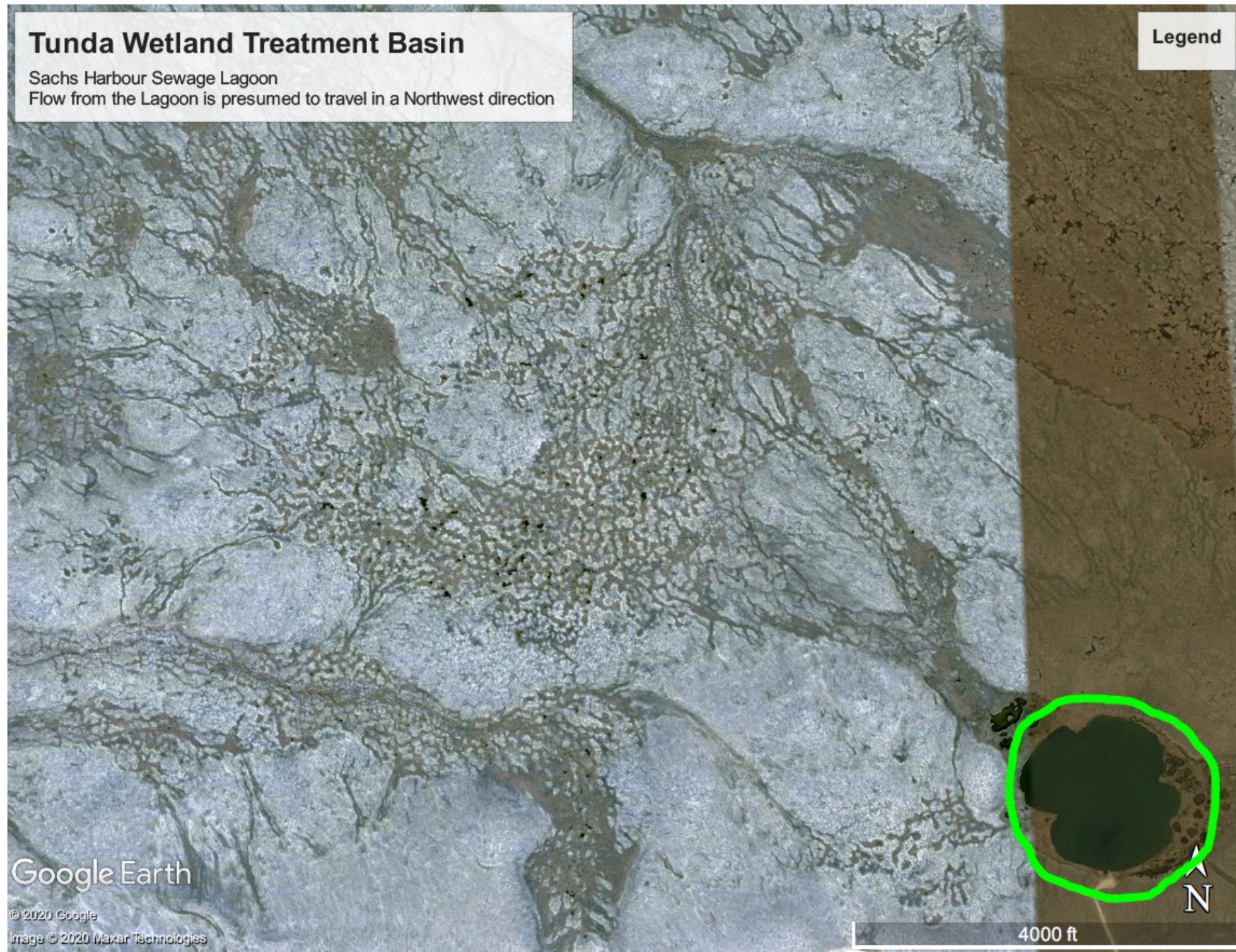


Figure 7: Discharge Chute into the Sewage Lagoon



Figure 8: Solid Waste Site
Estimated Surface Water Flow

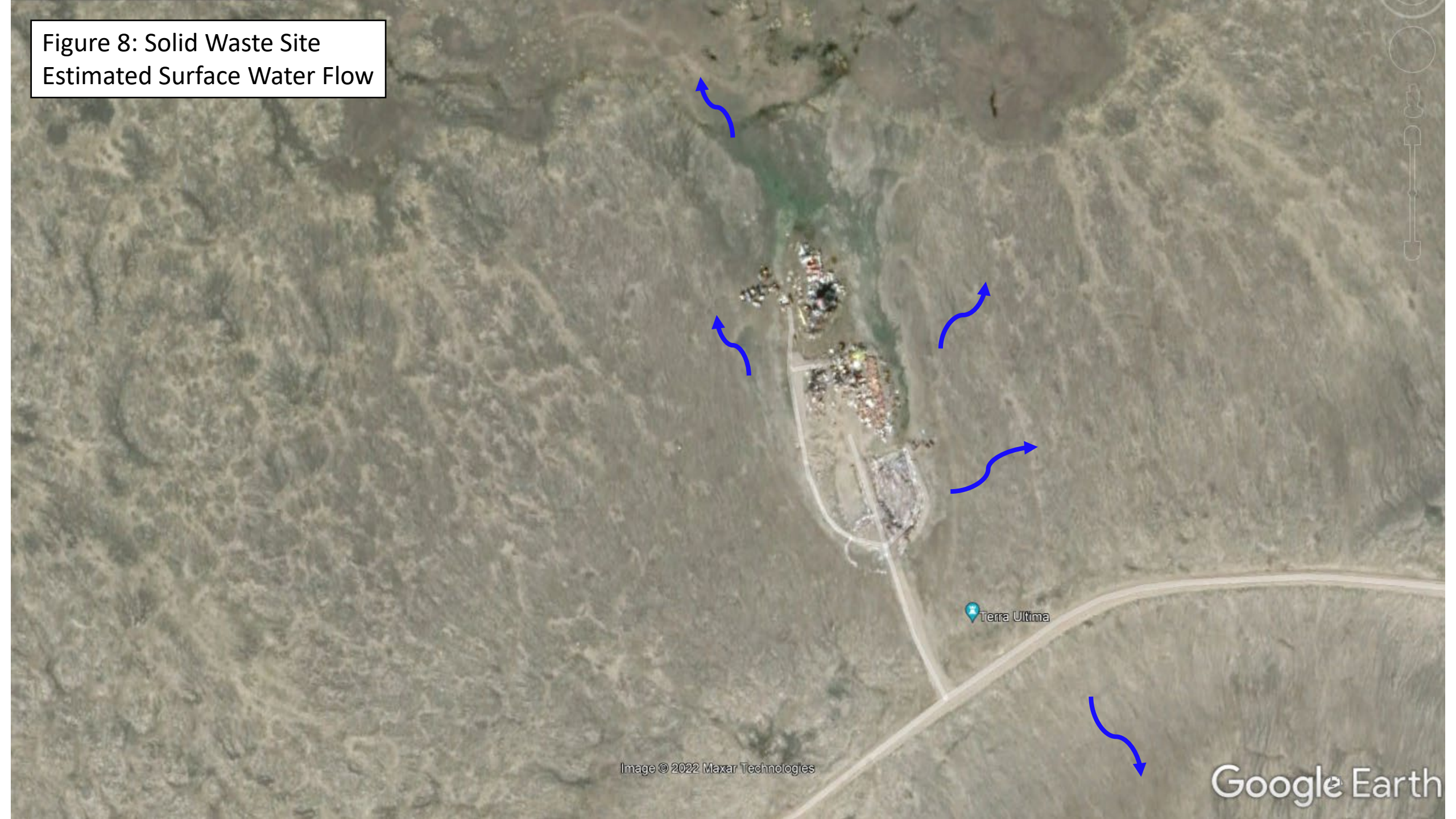


Figure 9: Solid Waste Site, Hydrography and Elevation pattern

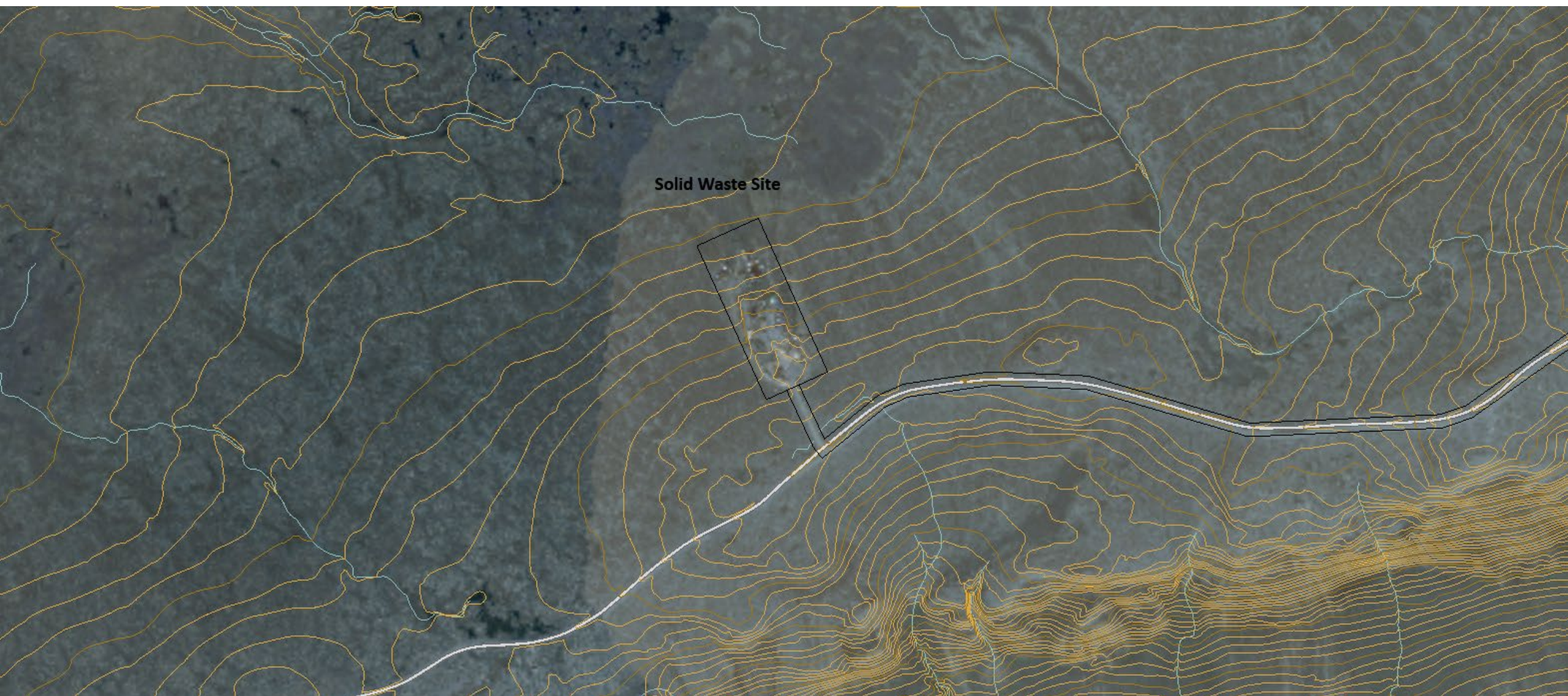


Figure 10: Solid Waste Site Size and Boundaries

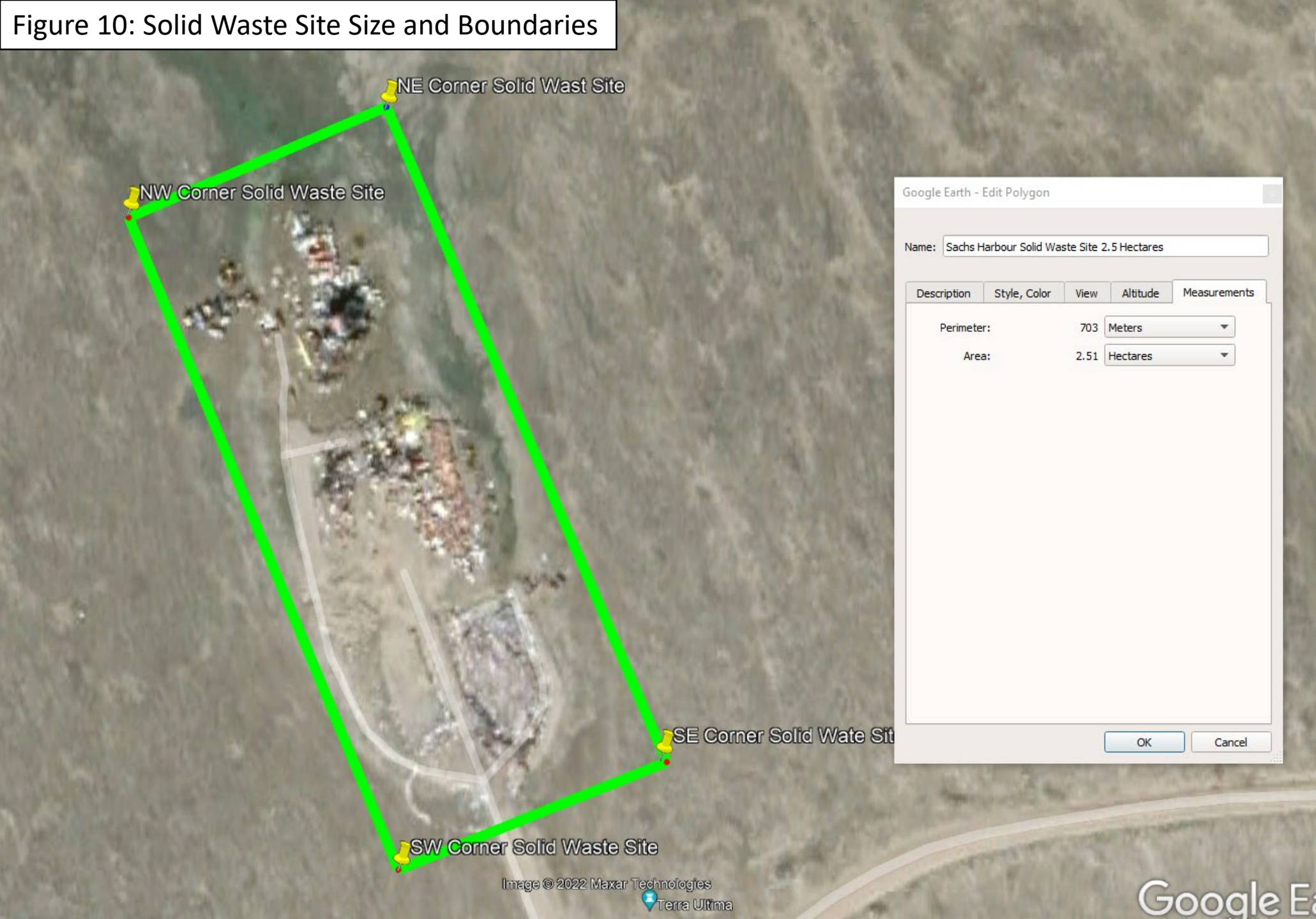


Figure 11: Solid Waste Site, 645 m from the Ocean

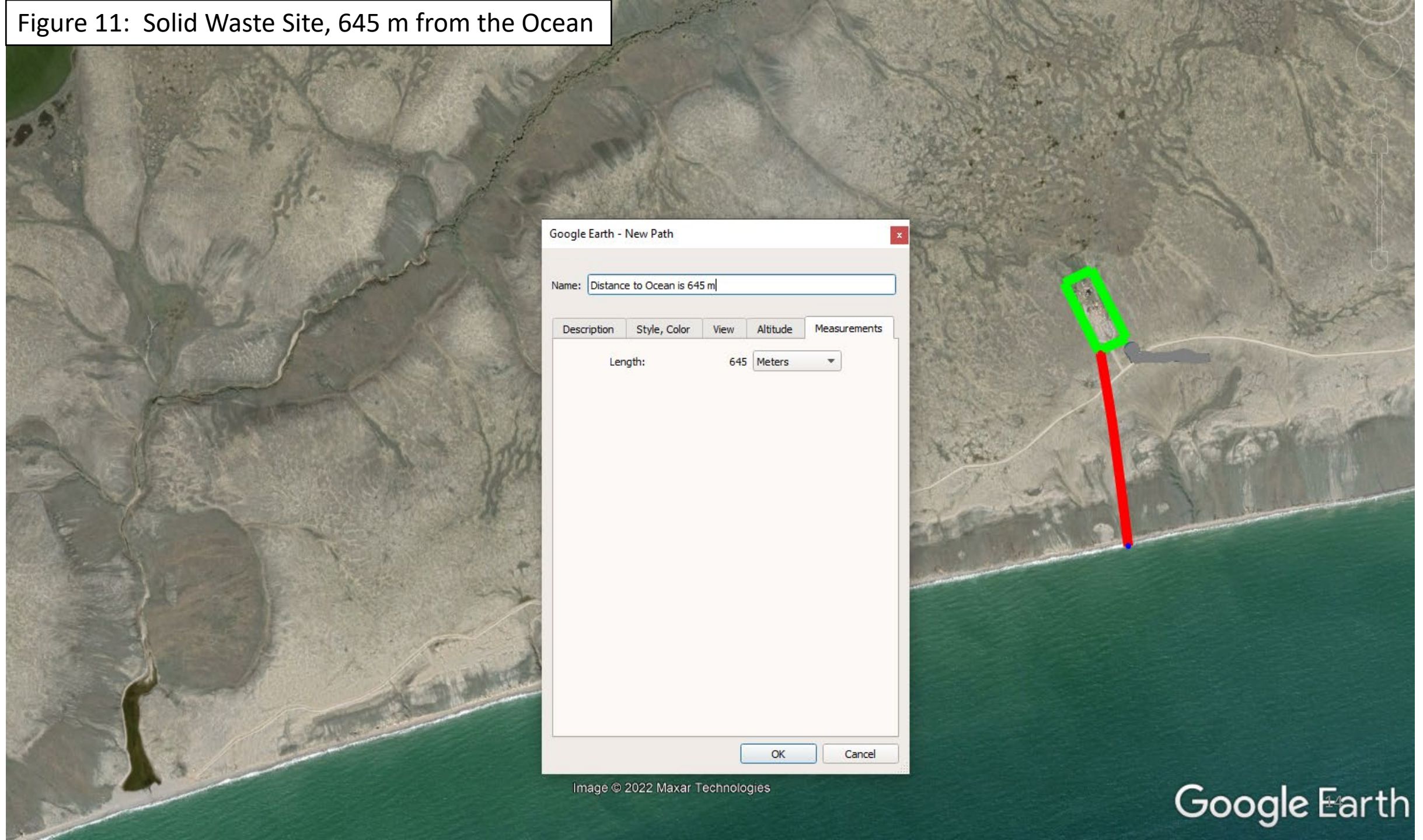
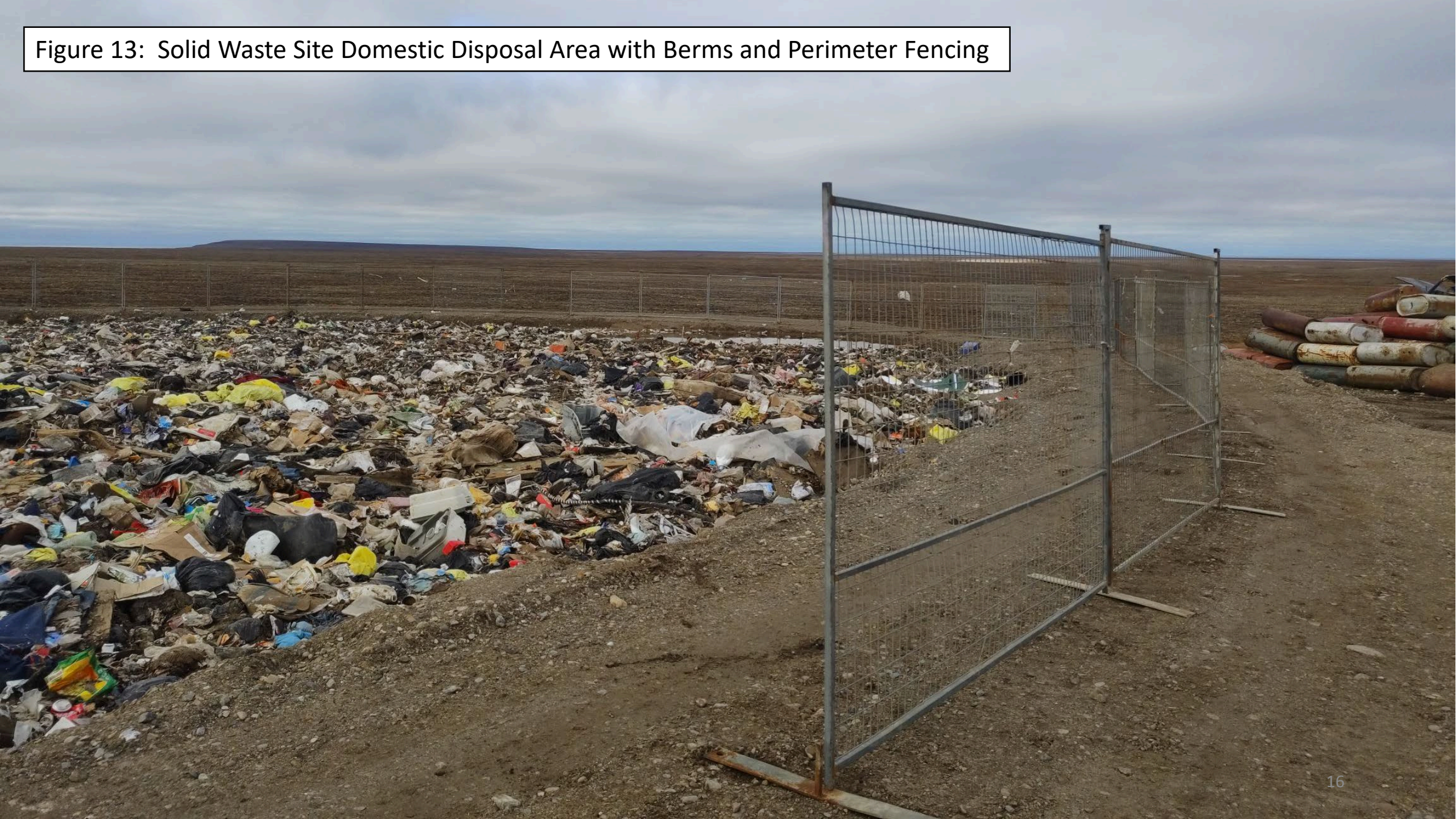


Figure 12:
Solid Waste Site
Layout and
Estimated Area



Figure 13: Solid Waste Site Domestic Disposal Area with Berms and Perimeter Fencing



HAMLET OF SACHS HARBOUR
Solid Waste Facilities
Operations & Maintenance Manual



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1.0 Introduction

1.1 Purpose

The purpose of this manual is to assist the Hamlet of Sachs Harbour personnel in the proper operation and maintenance of the Hamlet's solid waste disposal facility.. The manual has been developed according to the requirements of the Inuvialuit Water Board water license (N7L3-1531).

The challenges facing the community to address the multiple risk factors at the solid waste site need to be mitigated by several measures and planned out by adopting a model of continuous improvement as outlined in the Environment Canada Guide for Solid Waste Management for Northern and Remote Communities (http://publications.gc.ca/collections/collection_2017/eccc/En14-263-2016-eng.pdf).

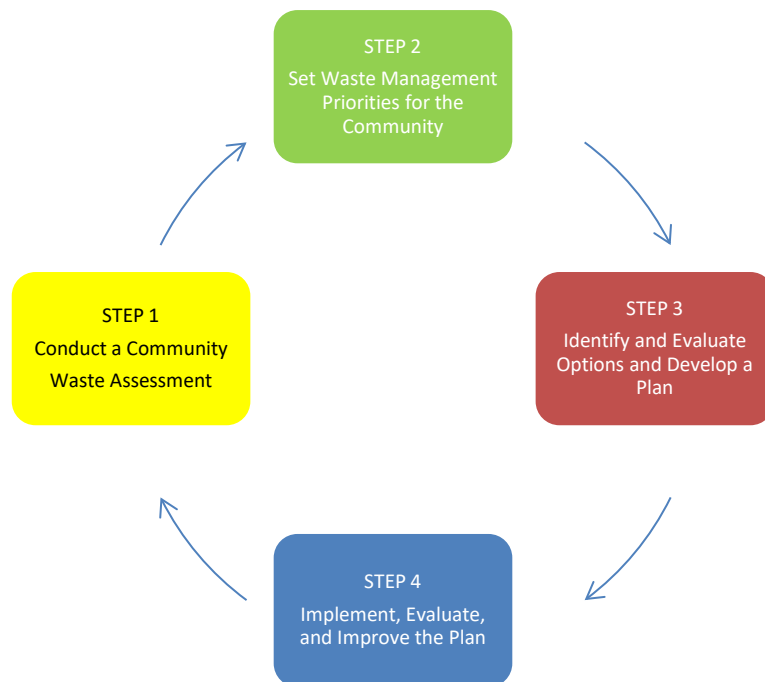


Figure 1: Continuous Improvement Approach to Waste Management Planning

1.2 Site Setting

Sachs Harbour (Jkahuak) is the northernmost settlement of the Northwest Territories, home to a small Inuvialuit community of approximately 117 people. It is located on the southwest coast of Banks Island in the Amundsen Gulf at 71°58' N and 125°14' W, 523 km northeast of Inuvik and 1158 km northwest of Yellowknife. The terrain around Sachs Harbour is comprised primarily of fine sands and sandy gravels which are susceptible to erosion during freshet. Thin tundra grasses and moss wear quickly underfoot, leaving little protection of the subsoils in occupied areas.

Sachs Harbour lies well within the zone of continuous permafrost. The mean annual air temperature is - 12.8°C. The climate is cold and dry, with February and July mean temperatures of - 28.3°C and 6.6°C respectively. Total annual precipitation is 151 mm. Snowfall averages 97.7 mm per year, while rainfall accounts for 58.3 mm of total precipitation.

The current solid waste disposal is located 8 km west of the Hamlet, past the water treatment plant and lagoon. The site is accessed via a well-developed road that runs about 12 km along the coastal hills, extending from the Hamlet center to the communities' picnic site near the mouth of the Mary Sachs Creek. The road supports both the trucked collection of solid waste and sewage, hence it is graded in the summer, plowed in the winter and is generally well maintained. The solid waste site lies 150 m north of the road.

1.3 Hours of Operation

There is a gate at the entrance at the site to control access to the landfill. Public access to the site is open 24 hours a day throughout the year.

1.4 Contact List

The individuals responsible for the operation of the solid waste facilities in Sachs Harbour are the following:

Table 1: Contact List

Title	Name	Contact Number
Senior Administrative Officer (SAO)	Mr. Stephen Wylie	(867) 690-4351
Public Works Foreman	Mr. John Elanik	(867) 786-0120
Landfill Site Operator	variable	

2.0 Background and Design Data

2.1 General

Solid waste is collected twice a week and transported to the solid waste facility 8 km from the community. General domestic waste is placed in the active landfill cell while larger waste items are generally segregated and stored in fenced off area's separate from the domestic disposal area.

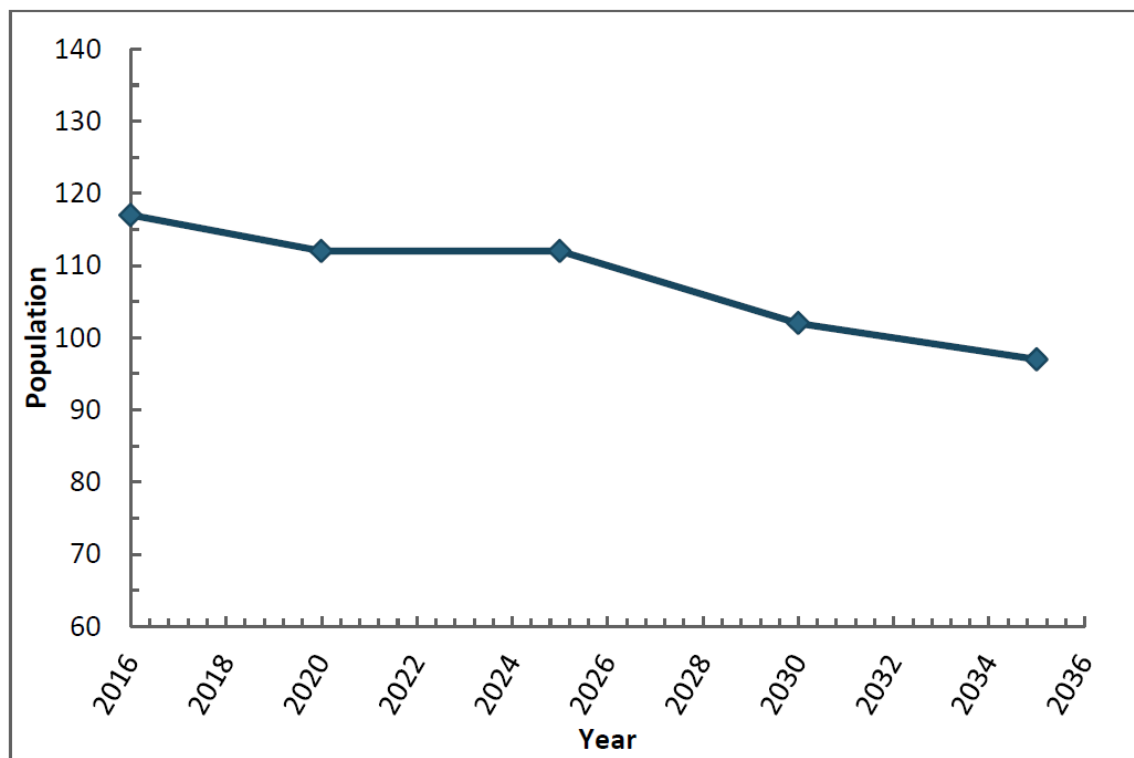
The landfill uses the area method for disposing waste. Due to limited capacity, the landfill has been expanded twice, and is currently facing another modification or potential expansion. The site is comprised of sandy soil with the surrounding terrain being largely characteristic of a polar semi-desert with localized areas of lush plant cover.

The site lies within the Mary Sachs River watershed and is in close proximity to several water bodies, including the Mary Sachs Creek (1.5 km) and Thesiger Bay (800 m). The site slopes northward towards a wet area (50 m) that drains into the creek to the northwest. Warmer temperatures and extended periods of precipitation during the summer months have resulted in soft ground conditions and areas of ponded water around the site.

2.2 Population Projections

Population projections for the community of Sachs Harbour have been developed using information from the [NWT Bureau of Statistics](#). The projected population for the next 20 years (Figure 2) is based on data available in November 2016.

Figure 2: 20-year Population projection for Sachs Harbour (NWT Bureau of Statistics)



2.3 Solid Waste Production

Two community solid waste volume models have been commonly used in the NWT: one to estimate uncompacted solid waste volume generation (m^3) in any given year, and another for a given planning horizon. Section 2 of the “Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT” (MACA, 2003) contains the formulas for estimating the volume of solid waste produced annually by a community based on population. The formulas used are shown in **Table 2** displays the resulting solid waste generation projection for the Hamlet of Sachs Harbour to 2040.

The projection is for uncompacted waste only. The estimated compaction rate for a modified landfill is 3:1 (Heinke and Wong, 1990). In practice, this rate varies widely but is the minimum

expected for compaction when following recommended operations practices. Waste compaction is conducted infrequently at the Sachs Harbour facility but is planned to increase from once a year to twice a year.

Table 2: Waste quantity generation for Sachs Harbour

Year	Calendar Year	Total Pop.	Daily Rate	Daily Volume	Projected Annual Weight	Projected Annual Volume	Annual Comacted Waste Volume	Volume of Cover	Compacted Waste Plus 5:1 Cover	Cumulative Compacted Waste Volume
			m ³ pcd	m ³ /day	ton/yr	m ³ /yr	m ³ /yr	m ³ /yr	m ³ /yr	m ³
1	2019	102	0.017	1.7	63	633	211	42	253	253
2	2020	98	0.017	1.7	61	609	203	41	243	497
3	2021	98	0.017	1.7	61	609	203	41	243	740
4	2022	98	0.017	1.7	61	609	203	41	243	984
5	2023	98	0.017	1.7	61	609	203	41	243	1,227
6	2024	98	0.017	1.7	61	609	203	41	243	1,470
7	2025	91	0.017	1.5	57	565	188	38	226	1,696
8	2026	91	0.017	1.5	57	565	188	38	226	1,922
9	2027	91	0.017	1.5	57	565	188	38	226	2,148
10	2028	91	0.017	1.5	57	565	188	38	226	2,374
11	2029	91	0.017	1.5	57	565	188	38	226	2,600
12	2030	79	0.017	1.3	49	491	164	33	196	2,797
13	2031	79	0.017	1.3	49	491	164	33	196	2,993
14	2032	79	0.017	1.3	49	491	164	33	196	3,189
15	2033	79	0.017	1.3	49	491	164	33	196	3,385
16	2034	79	0.017	1.3	49	491	164	33	196	3,581
17	2035	76	0.017	1.3	47	472	157	31	189	3,770
18	2036	76	0.017	1.3	47	472	157	31	189	3,959
19	2037	76	0.017	1.3	47	472	157	31	189	4,148
20	2038	76	0.017	1.3	47	472	157	31	189	4,337

NOTES:

1. Waste volumes are based on population and an average solid waste volume of 0.017m³/c/day.
2. Weight estimates for uncompacted waste are based on a density of 0.099 tonnes/m³
3. Volumes are for uncompacted solid waste including residential, commercial and industrial wastes.
4. Compacted volumes are based on a compaction rate of 3:1 (Heinke and Wong, 1990).

The total volume of **compacted** and **covered** waste produced over the next **20** years is calculated to be **5,313 m³**. This will require approximately **50 m³ of cover material** annually.

3.0 Solid Waste Facility



Figure 3 Intended layout of the solid waste site

3.1 Waste Receiving

The solid waste facility is to be organized into six (6) separate disposal areas:

1. Domestic wastes Approx 2,000 m² (more frequent compaction and cover) twice a year between June and September.
2. Segregated Cells for Tires, Appliances, Reuseable Items Construction and Demoliton Debris, and Vehicles
3. Burn box for paper, cardboard and clean wood
4. Construction and Demolition Materials (less frequent compaction and cover) and End of Life Vehicles.
5. Historic Hazardous wastes (Oil drums and tanks)
6. Bulky Wastes, reuseable materials scrap metal, reuseable wood / items

The following is a summary of the various types of wastes to be disposed, waste receiving controls, burning operations, and cover operations..

Hamlet of Sachs Harbour

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Domestic Waste Area:

This is the largest disposal area at the landfill. General household wastes are placed here. The disposal area extends approximately 250m west of the access road and is approximately 200m wide. The area is surrounded by earthen berms approximately 1.5 m high. Fences have been installed which block the wind to prevent off-site migration of wind-blown debris. Fences can be improved.

Burn Box:

As per the Hamlet's Water Licence, The open burning of solid or liquid wastes is no longer acceptable (See **Appendix A**). An approved burn box shall be located in a separate area. Only clean combustible materials are to be disposed on in the burn pit, including paper, cardboard and clean wood.

Hazardous Wastes:

As per the Hamlet's Water Licence, these items are to be segregated and stored in a designated contained temporary storage area. in general accordance with the [Guideline for Hazardous Waste Management](#). Contaminated soils and/or contaminated snow are to be contained in such a manner as to minimize the potential for migration of contaminants into any waters. The Hamlet is to contact the ENR Water Resource Officer prior to accepting, and notify the ENR Inspector if any, contaminated soil and/or snow is deposited at the facility.

A large stockpile of hazardous waste drums currently exists on-site, however the Hamlet is planning to remove this stockpile and prevent it from reoccurring.

Household hazardous waste only from residents is collected at the Hamlet garage. The Hamlet does not collect hazardous waste from the Industrial, Commercial, or Institutional sector.

Bulky Waste Area:

Large non-combustible items such as automobiles, snowmobiles, old furnaces, appliances and empty holding tanks are placed in the bulky waste disposal area. It consists of an area located directly north of the main bermed disposal area. Empty containers are defined in the Guideline for Hazardous Waste Management as follows:

A container from which all:

a) Hazardous waste has been emptied, to the greatest extent possible, using regular handling procedures. Its contents shall not exceed 0.1% of the container's original capacity or 0.2 litres, whichever is less. This does not include toxic gas in Class 2.3 of the TDGR or containers which previously came in direct contact with:

- i. Substances in Class 6.1 Packing Group I materials of the TDGR; or*
- ii. Severely Toxic Contaminants.*

b) Flammable vapours have been reduced to less than twenty percent (20%) of the lower explosive limit for the material by purging, venting, or by the introduction of an inert material.

3.1.1 Accepted Waste

Any waste disposal option has limitations with respect to the waste streams which may be handled in an environmentally safe manner. Limits must be placed on the types of waste accepted at a disposal site in order to protect the environment, the employees, the users and neighbours, as well as the equipment from damage, while simultaneously providing adequate levels of service.

The Site Operator shall allow only those materials to be deposited at the Sachs Harbour Landfill for which the facility has been designed, with the exception of unique circumstances reviewed in consultation with regulatory agencies.

Acceptable wastes for disposal are listed below:

- Non-recyclable plastic, metal, and paper wastes; packaging; cardboard; newsprint; food; rubber; leather; glass; wood; from residential, commercial or industrial premises;
- Animal and vegetable (organic) waste material;
- Sweepings, clothing and textiles, consumer electronics, and discarded household utensils;
- Furniture and major appliances;
- Non-salvageable metals;
- Tires; and
- Construction & Demolition wastes (provided the waste is not a hazardous or banned material).

3.1.2 Non-accepted Waste & Hamlet Discretion

Wastes which present a danger at the solid waste facility, require special disposal techniques, or may interfere with the level of service to the public, are not acceptable for disposal. In some cases, wastes which are acceptable in small quantities may not be acceptable in large quantities from a single generator because they may cause the level of service to other users to deteriorate and cause handling problems at the site and increased environmental liability (for example, Construction and Demolition Wastes).

To some extent, the acceptability of large quantity wastes must be at the Hamlet's discretion, depending on the ability to accommodate disposal without deterioration in the level of service. In cases where unacceptable wastes are identified, site staff will attempt to identify allowable management alternatives to material haulers.

All wastes which pose potential safety or environmental problems cannot be listed in their entirety. The Site Owner and site personnel in general must be wary of accepting wastes which could cause future operational problems and must watch for the inclusion of unacceptable wastes in regular loads of refuse.

The following items are not accepted for placement in the landfill:

- Pathological or Biomedical wastes
- Radioactive wastes
- Industrial, commercial, and institutional hazardous wastes

- Asbestos
- Any other materials not listed as acceptable or conditionally acceptable with the approval of the SAO.

3.2 Waste Inspection

The checking of waste entering the facility is crucial to the safe and correct operation of the landfill. The site operator should carry out random checks of the waste entering the facility and random waste inspection in the disposal area. The following methods are employed to minimize the quantity of unacceptable waste which is disposed at the site and to direct the waste hauler to the correct disposal area:

- Site operators will be watchful for unacceptable or potentially hazardous wastes during unloading;
- When personnel encounters suspect waste in the disposal area, landfilling shall cease until the material is segregated and appropriate action is taken;
- The Site Operator will inform the hauler that a random check is to be performed. If the hauler refuses, the vehicle will not be permitted entry to the site, and will be selected for a check on its next visit. The Site Operator will record as much information as possible about haulers who refuse a random check;
- The selected hauler will be directed to an area near the active landfill area that is separate from all other incoming waste. Prior to dumping, the driver of the inspected vehicle will confirm the absence of unacceptable materials. An inspector (the Site Operator or a delegate) will examine the load for hazardous or unacceptable wastes. Completion and results of the inspections shall also be noted in the daily checklist.

3.2.1 Handling Unacceptable Waste

Unacceptable wastes may be classified as non-hazardous, potentially hazardous or unacceptable, and depending on the time of discovery, may or may not be associated with a known hauler. Once a waste is suspected to be hazardous or unacceptable, the onus is on the hauler to demonstrate otherwise, or remove the waste at their expense. Repeat deliverers of unacceptable or hazardous wastes may be banned from the site at the discretion of and for a period determined by the SAO.

Once unacceptable waste is identified it is important to correct the situation as soon as possible. Solid waste site operator's need to communicate their observations to the SAO immediately. The site attendant will notify the SAO of anyone dumping unacceptable or rejected waste at the landfill site. The report shall contain the following information:

- Vehicle license number
- Type of vehicle
- Date and time of incident
- Name of offender, if possible
- Material dumped, or rejected

3.3 Segregation of Recyclable/Reusable Materials

All salvage rights lie with the Hamlet, who shall dictate if salvaging is permissible in disposal area other than the landfill area. Salvaging is encouraged by the Hamlet.

3.4 Site Equipment

The Hamlet provides all vehicles, equipment, buildings, materials, and fuel necessary for the operation of the landfill and the collection of wastes. The following equipment is available:

- Pickup trucks for regular hauling
- Light duty dump truck for fuel tanks and larger items (6.5 m³)
- Loader (938 G&M Series Caterpillar)
- Bulldozer (D6 936 Caterpillar with bucket/plow blade)

3.5 Signage

The Solid Waste Facility must have a sign posted at the entrance to inform the public of the location of the Solid Waste Facility. The sign could also include the following current information:

- Site name
- Materials/wastes accepted for landfill and recycling
- Materials/wastes banned
- Penalties

Signage within the site has been installed and is necessary to maintain to indicate areas of waste segregation. The Hamlet is planning to install an entrance sign to the solid waste facility.

3.6 Site Personnel

3.6.1 Duties and Responsibilities

Senior Administrative Officer (SAO)

The Hamlet SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the Public Works Foreman. Two or three people are employed by the Hamlet to operate the garbage collection vehicle.

The SAO reports directly to the Mayor and is responsible for the following:

- Supervises - Site Foreman
- Maintains Liaisons with: Clients (Private sector generators & Government agencies), Suppliers, Inuvialuit Water Board

The Hamlet SAO Shall:

1. Ensure the operations are performed at the facility in accordance with the Landfill Operations & Maintenance Manual (latest approved version), applicable Engineering Drawings, the Operating Permit issued by the Inuvialuit Water Board;

2. Ensure that only acceptable wastes, as indicated on the approved list for disposal, are permitted at the site in consultation with regulatory agencies;
3. Prepare facility operating budgets and undertake staffing selections, and or contractors;
4. Communicate as required with regulatory agencies, including the forwarding of monitoring results, compiling annual reports;
5. Deal directly with the public, responding to disposal requests;
6. Coordinate site visits;
7. Maintain the environmental monitoring/sampling program;
8. Ensure that operators receive required training, when available;
9. Ensure that the site is maintained and operated in a clean and safe manner at all times, including regular collection of litter and compliance with NWT Safety Act and Regulations;
10. Coordinate the preparation of landfill areas for operation, and identifying the requirement for the establishment of surface water control measures.

Site Foreman

The Site Foreman reports to the SAO and is supervises Full-Time and Part-Time Assistants

The Site Foreman shall:

1. Perform operations and supervises operators at the facility in accordance with the Landfill Operations & Maintenance Manual (latest approved version), applicable Engineering Drawings, and the Water Licence issued by the Inuvialuit Water Board;
2. In consultation with the SAO, ensure that only acceptable wastes, as indicated on the approved list for disposal, are permitted at the site;
3. Prepare regularly scheduled reports (daily, weekly, monthly, annually) on progress and planning at the site;
4. Provide overall direction for daily site activities;
5. Conduct work in accordance with the Hamlet of Sachs Harbour Occupation Health and Safety Program and NWT Safety Act and Regulations;
6. Be responsible for the operations and maintenance of the site machinery;
7. Make recommendations to the Hamlet for major and minor repair work required for site equipment as well as replacement of same;
8. Ensure that the site is maintained and operated in a clean and safe manner at all times, including regular collection of litter;
9. Ensure that solid waste is compacted and covered in accordance with the Landfill Operations & Maintenance Manual;
10. Maintain accurate inventories of cover material for the ongoing maintenance of the solid waste site.
11. Ensure that approved burnable solid waste is segregated and burned in accordance with the ENR guidelines;
12. Coordinate snow removal and general maintenance for the access roads within the site and other areas as necessary;
13. Operate and maintain access to the segregation cells and control the surface water;
14. Undertake site security checks, reporting any noted issues to the Hamlet;
15. Inspect the site access road on a regular basis to recover any accumulation of garbage or other debris;

16. In consultation with the Hamlet, maintain the completed portions of the landfill;
17. Ensure that adequate signage and traffic control devices are in place in coordination with the Hamlet;
18. Perform all duties related to the identification and recording of incoming vehicles, and inspection of incoming waste;
19. Answer incoming telephone calls and requests for information, directing such requests as required; and
20. Perform such other related duties as may be assigned from time to time by the Hamlet.

Site Operator

The Site Operator is responsible for general site operation and maintenance requirements at the facility.

Site Assistants

The Site Assistants are responsible for tasks assigned to them by the Site Foreman. These positions would typically address both ongoing and periodic general site operation and maintenance requirements.

The Site Operator and Assistants report directly to the Site Foreman and are responsible for the following:

1. Perform duties as assigned by the Site Operator; and
2. Conduct work in accordance with the Hamlet of Sachs Harbour Occupation Health and Safety Program and NWT Safety Act and Regulations.

3.7 Personnel Training

The Hamlet is responsible for the training of staff. Solid Waste Facility staff should be trained to perform his or her job in a safe and environmentally responsible manner, in accordance with applicable regulations.

Given the nature of activities at the site, the SAO and Site Foreman will serve as the facility's health and safety representatives, and health and safety issues will be discussed as part of site meetings. All personnel should be familiar and abide by NWT Safety Act and Regulations.

A review of this Operations and Maintenance Manual will be a prerequisite for any employee/contractor before being declared eligible for work at the Landfill. Contractors and personnel are required to comply with all laws and regulations affecting the execution of the work at the site, including all applicable Federal, Territorial and local laws and regulations pertaining to socio-economic and environmental matters. All staff working at the Solid Waste Facility shall be trained in Bear/Wildlife Safety.

3.8 Site Security

Access to the landfill can be controlled at the landfill entrance. The chains are locked when the landfill is closed. The site is visited daily by the Hamlet staff for inspection.

4.0 Operational Procedures

The facility is managed using the area method. It is recommended that a 2 m high perimeter berm be constructed along the west edge of the site, to fill this area using the mounding method described below and to extend the life of the site.

4.1 The Area Method

This method has been used at the Sachs Harbour solid waste facility since the soil and terrain conditions are not suitable for excavation. A 1.5 m berm was constructed against which wastes are disposed and worked with heavy equipment such as a bulldozer, and packed. Soil is added as required to provide suitable cover. The area method procedure is illustrated in the **Figure 4** below.

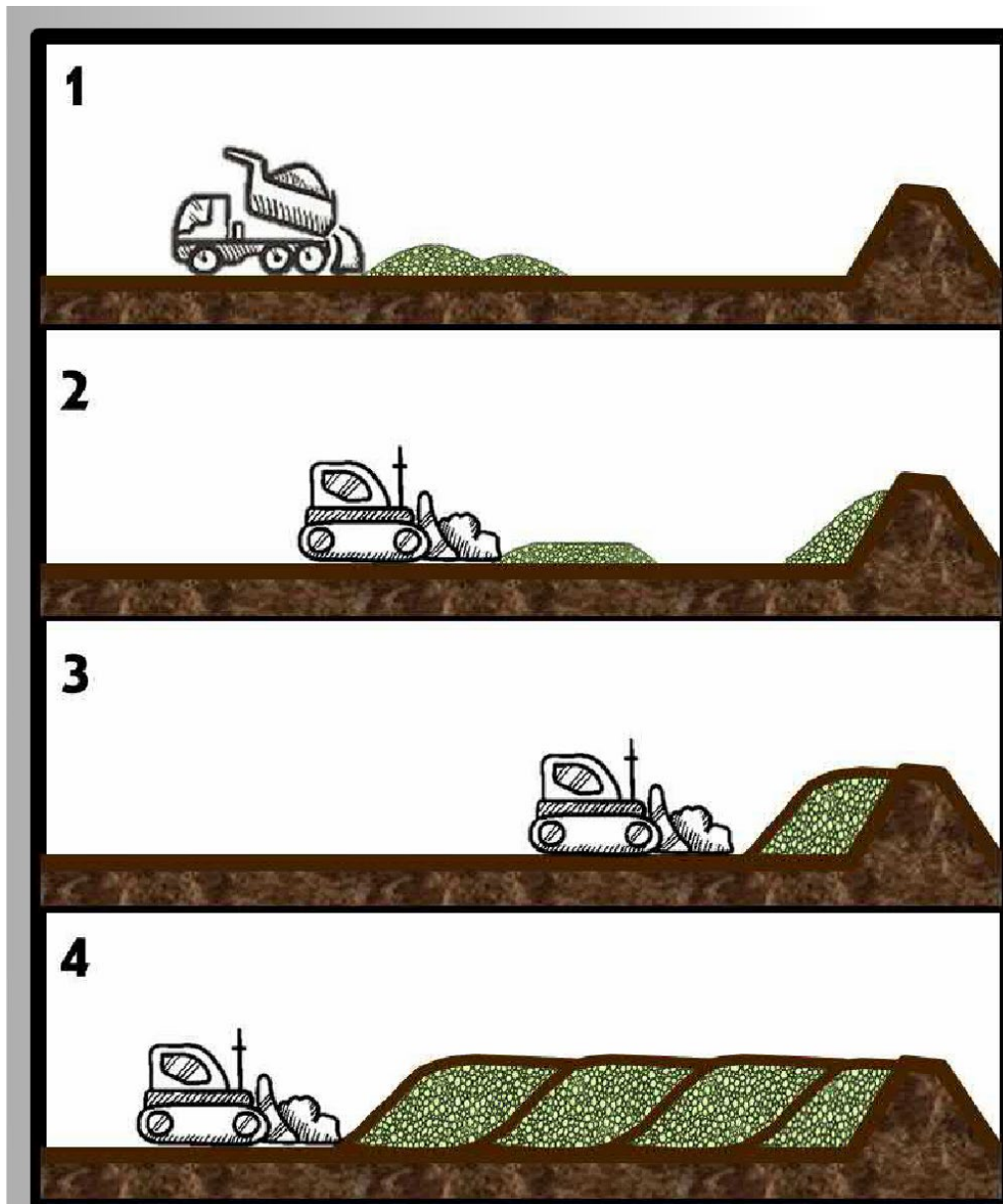


Figure 4: Area method procedure

1. Build berm, 2 m high. Dump waste near the berm.
2. Drive over the waste 3-5 times with a dozer. This will compact and compress lofty items and will help increase the capacity of the cell.
3. Alternate between dumping and packing waste until the packed waste is 2 m high (to the berm). In the spring or fall, or when the waste pile reaches 3-4 m wide, cover it with 0.3 m of granular material to make a cell.
4. Repeat steps 2 and 3 to make more cells, until the site is full. Then cover all the waste with 0.3 m of granular material. Pack and add more granular material until the top is level.
5. Build a new 2 m berm on top of the cells.
6. Repeat steps 2-4.
7. To close out the site, put 0.6 m of granular material on the cells then pack the surface down with the bulldozer so that water runs off.

4.1.1 Mounding to Provide Additional Life

As with any of the recommended methods for the operation of a modified landfill in the Northwest Territories, additional life can be added to a site by mounding. Slopes should be maintained for safe operation of equipment, prevent erosion, and minimize costs for cover material. Geotextile fabrics will promote slope stability. The mounding method procedure is illustrated in the **Figure 5** below.

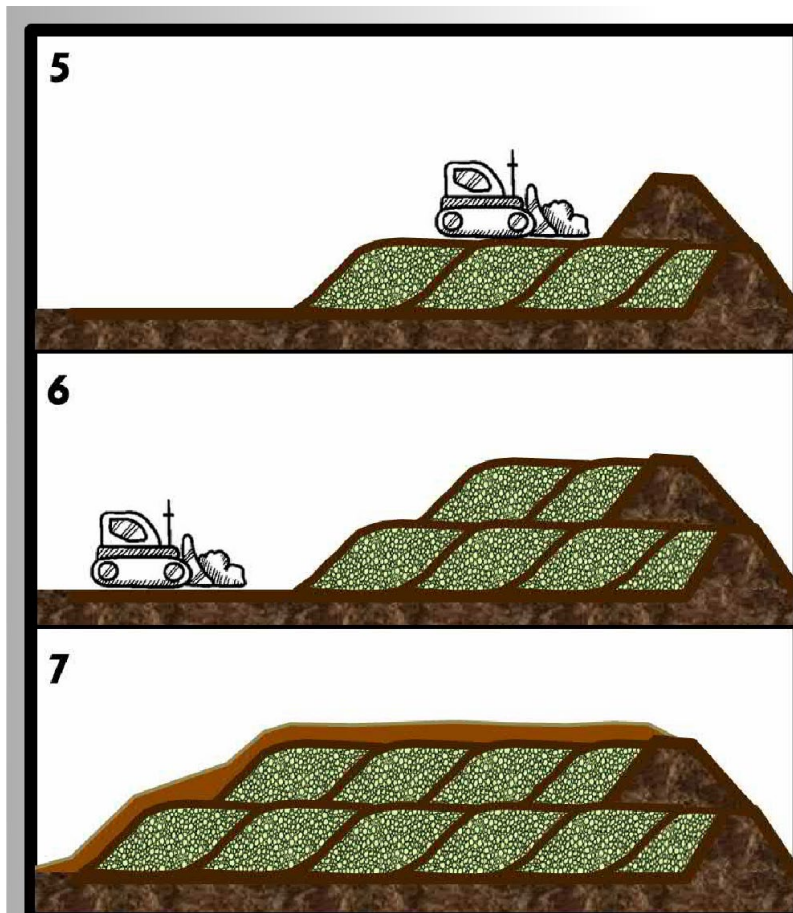


Figure 5: Mounding Method Procedure

4.2 Basic 'Area Method' Operations

The dozer is used once every week or "as needed" to push the waste into the disposal area. Readily available cover material is placed in layers using sand available on-site and stockpiled for use. The following procedures must be carried out on a regular basis to ensure the landfill operates safely and efficiently:

- All wastes are to be dumped in the appropriate area;
- Dumping should be restricted to a manageable portion of each area at a time;
- Weekly, or as frequently as possible, the wastes should be compacted using the Bulldozer;
- After compaction, each layer should be no more than 2.5m thick;
- The compacted waste should be covered with readily available cover material, from the borrow pit adjacent to the landfill, to a depth of 0.3 m for intermediate layers and 0.5m for the final cover; and
- Each layer of solid waste and cover material should be sloped to allow drainage. This can be done by adding more granular material to make a mound 0.3 high in the middle.

4.3 Bulky Waste Area Operation

The bulky waste disposal area is located north of the general disposal area. The landfill has an extensive scrap metal pile that has been accumulating since the 1980's. Large non-combustible items such as automobiles, snowmobiles, old furnaces, appliances, holding tanks, and tires are placed in the bulky waste disposal area. All fluids shall be drained from discarded automobiles and other motorized equipment prior to being accepted at the landfill to prevent site contamination.

White goods containing Ozone Depleting Substances (ODS) such as refrigerators and other deep freeze appliances shall be segregated from the regular bulky waste piles so that ODS's may be removed by a certified technician when a sufficient quantity have been accumulated.

Discarded electronic equipment such as computers and televisions shall also be segregated from the regular bulky waste piles so that environmental contaminants present in such devices such as lead and cadmium may eventually be recycled.

Runoff from this area is kept out of the swamp and confined to the main landfill area by the berm that has been built up around the perimeter.

To ensure effective operation:

- Place bulky wastes in an organized manner, starting from the back and working towards the front;
- Stack bulky wastes whenever possible to conserve space; and
- Ensure that wastes are stacked in such a way that it is safe to walk through the site.

Once the bulky and hazardous wastes currently stored on site have been removed, a processing and shipping plan should be developed for management of bulky waste at the site in subsequent years.

4.4 Special Considerations

4.4.1 Winter Operations

A compaction and covering cycle is to be completed in the fall to prepare for the onset of winter. If required, a new berm should be built prior to the onset of winter to provide adequate capacity until the following summer. Area fill and mounding operations easily performed in the winter as the frozen slopes are more stable.

4.4.2 Wind

The landfill site is located in the open tundra; hence, litter fences are required to help control the movement of wind driven material off the landfill site. The solid waste operator is responsible for collecting the windblown litter throughout the year.

4.4.3 Spring Clean-up

A spring clean-up should be conducted after the snow has melted to collect waste that has accumulated around the site and around the Hamlet over the winter.

4.5 Safety

Due to the nature of the facility, safety precautions should be taken by those personnel involved in the operation and maintenance of the landfill.

Some of the safety precautions which landfill personnel should follow include:

- Water and puncture proof gloves and safety boots are to be worn at all times;
- Work clothes should not be worn home;
- Hands are to be washed frequently, as a minimum after work and before eating;
- During approved waste burning, personnel should stand clear to reduce exposure to toxic fumes and smoke; Burning wastes should not be left unsupervised;
- Personnel should receive appropriate vaccinations and ensure they are kept up to date;
- Proper lifting techniques should be exercised, lift with your legs and not your back; and
- Only personnel trained to handle hazardous materials should do so.
- Bear encounters can be frequent at the landfill. Site personnel should be familiar with bear safety protocols and bear bangers or other deterrents should always be carried while onsite.
- If a bear is encountered at the solid waste facility, it is recommended that all work on site be halted while the bear is present. If work must proceed, extreme caution should be used while working around the animal. Please see **Appendix B** for bear safety information.
- Frequent compaction of waste will help to remove the attraction for bears; these activities should take place a minimum of once a month.

All personnel should be familiar and abide by the Hamlet of Sachs Harbour's Occupation Health and Safety Program or the NWT Safety Act and Regulations which contain information such as training requirements, personal protective equipment requirements, WHMIS & Transportation of Dangerous Goods, Chemical Storage & Fire Protection, and First Aid.

All personnel should be familiar with and abide by the NWT Safety Act and Regulations.

The Hamlet is responsible to ensure that workers are supplied with the proper equipment and materials to conduct work safely, and to ensure that workers are trained in and follow established safe work procedures.

It is the duty of every worker to assume responsibility for their own safety by complying with legislative, company and industrial standards as well as the prompt reporting of all unsafe acts or conditions to supervisors to ensure immediate action and resolution.

4.5.1 Managing Contaminated Soils and Snow

Contaminated soils are generally not accepted at the Solid Waste facility. However, deposits can be managed with approval from the ENR. Deposits of contaminated soil and/or snow shall be contained in such a manner as to minimize the potential for migration of contaminants into any waters, to the satisfaction of the Inspection. This could involve the installation of berms or liners at the receiving site.

4.5.2 Managing Hazardous Wastes

Hazardous Waste Definition

Hazardous wastes require special handling and disposal techniques to eliminate the risks to human health and the environment. *Hazardous waste* is defined in the [Guideline for Hazardous Waste Management](#).

Residents need require relatively small secure containment for typical household hazardous waste that includes:

- Cleaning Products (oven cleaners, drain cleaners, bleach, spot remover)
- Paints and Solvents (oil-based paints, thinners, paint stripper)
- Automotive Products (antifreeze, motor oil car batteries, brake fluid, transmission fluid)
- Small propane tanks & cylinders (Barbeque tanks)
- Miscellaneous Hazardous Materials (household batteries, thermostats, pharmaceuticals, aerosol sprays)

Household hazardous waste from residents will be collected at the Hamlet Garage and stored in secure means of containment such as pails, drums, pallets, and mega bags.

All hazardous waste generated by Industrial, commercial and institutional sector are to be managed by the waste generator in accordance with the [Guideline for Hazardous Waste Management](#).

Due to the danger of handling hazardous wastes, the handling, packaging, storage, treatment of the waste should only be completed by personnel trained in Transportation of Dangerous Goods (TDGR) and/or Hazardous Waste Management and WHMIS. Transporting hazardous waste on barges requires specific International Marine Dangerous Goods (IMDG) Certification.

Containers and storage areas must be properly labelled and signed during the entire time of storage. If this is not carefully completed then there could be problems identifying the waste when it is time to ship it for disposal.

4.6 Site Records

Records should be kept to assist in planning for yearly operations and future expansion. The information should be reviewed yearly to evaluate the effectiveness of the operation and to forecast future operational requirements. The records should be kept in the Hamlet Office and maintained by the SAO.

As a minimum, the following information should be recorded:

Domestic Waste

- The number of collection trips and loads per day;
- The dates of compaction and cover; and
- The dates of burning approved

Construction and Demolition Waste

- The number of collection trips and loads per day;
- The dates of compaction and cover; and
- The dates of burning approved wastes.

Bulky Wastes

- Itemize the site contents;
- The number of trips to the site and the dates; and
- The date when the site is full.

The Hamlet shall also maintain the following information at the Hamlet Office:

- Copy of the permit(s) for the site or the certificate(s) of operation;
- Inspection records for inspections conducted by staff and regulatory agencies;
- Monitoring results for leachate, surface and ground water;
- Interpretations of monitoring results; and
- Copies of all annual reports.

The SAO shall, unless otherwise instructed by an inspector, include all of the data and information required by the “Surveillance Network Program” in the Hamlet’s Annual Report. This includes the results of the approved quality assurance/quality control program which shall be submitted to the Inuvialuit Water Board on or before April 30th of the year following the calendar year being reported. The Surveillance Network Program is outlined in a separate Surveillance Network Program Manual.

5.0 Maintenance Procedures

Proper maintenance of a landfill is crucial to ensuring the efficient operation of all the components. Activities can be divided into two categories: storage/collection maintenance and site maintenance.

5.1 Storage and Collection Maintenance

Residential waste collection is conducted twice a week on Tuesdays and Thursdays. The Hamlet conducts a periodic visual inspection of the site, and general site maintenance is performed by the Foreman and Site Assistants.

5.1.1 Storage Maintenance

As the first step in the waste collection process, residential and commercial storage containers should be adequately maintained. The following points should be considered:

- Private burning of wastes within the Hamlet boundaries is not permitted as the smoke and fire hazards generally outweigh any benefit from reducing the volume of waste;
- Garbage containers should be covered to prevent wind-blown debris from littering the community and to prevent animals from getting into the garbage; and
- Bulky wastes should not be left in residential areas for long periods due to aesthetic and safety concerns.

5.1.2 Collection Maintenance

The waste collection vehicle should be maintained in good operating condition to ensure the collection service is not interrupted for extended periods. Other maintenance considerations include the following:

- The collection vehicle should be equipped with a shovel to clean up accidental spills during collection; and
- The collection vehicle should be cleaned periodically.

5.1.3 Equipment Maintenance

Regular vehicle maintenance is to be performed on all Hamlet-owned equipment. This should include but is not limited to regular:

- Oil changes
- Fluid changes
- Checking of tire pressure
- Greasing
- Brake pad replacement
- Cleaning
- Periodic maintenance requirements as set out by the equipment manufacturer

In the event of equipment failure or malfunction, it shall be the contractor's responsibility to correct the problem using appropriate methods.

5.1.4 Fencing

A 1.8m high fence is located along a portion of the perimeter of the landfill. A gate is in place across the main access road to control access. A temporary snow fence is used around the solid waste bermed area to help control wind-blown litter.

5.1.5 Access Road Maintenance

The access road is gravel and approximately 150 m long. Basic road maintenance is to be conducted as follows:

- At least twice per year, the road is to be graded to smooth and reshape the surface; and
- During the winter, snow is to be removed to ensure unrestricted access to the site for the garbage collection vehicles.

5.2 Nuisance Control

5.2.1 Litter Control

Litter can be a significant problem at municipal solid waste disposal sites. Litter control is best accomplished by a combination of proper disposal operations, litter retaining fences, and a litter picking program. A clean, litter-free appearance will be maintained at the site at all times, not only for public relations, but also for efficient operation of the landfill. Poor litter control attracts unwanted scavengers.

In summary, litter control measures shall include:

- Regular weekly and monthly covering of wastes in the active disposal area;
- Litter collection fencing located around the active fill area to catch blowing litter;
- A litter collection schedule shall be directed by the Site Operator; and
- Litter on fencing, on site roadways, in ditches and adjacent properties shall be monitored and collected on a minimum monthly basis.

5.2.2 Odour Control

Odours will be controlled at the facility by implementation of the following daily measures:

- Regular soil cover shall be applied at the active disposal area;
- Burning of approved wastes shall only be conducted with prior approval from inspectors and at times when weather conditions permit; and
- Routine site inspections to identify and eliminate localized surface water ponding and/or surface water drainage problems.

5.2.3 Wildlife Control

Solid waste disposal facilities attract birds and other wildlife due to the availability of food. This landfill facility is near the airport buffer zone and therefore bird control is very important. Control measures to minimize the presence of birds shall include:

- Compacting and covering of waste;
- Collecting litter; and
- If this does not seem to minimize the amount of birds in the area then a noise device such as propane cannons and screechers may be required to discourage birds from the site.

5.3 Indiscriminate Dumping

Waste will be disposed at designated areas at the facility (i.e. bulky waste, treated lumber, tires, contaminated soil etc.) only. When indiscriminately dumped materials are discovered, they will be immediately relocated to the appropriate designated area. This includes any hazardous materials that are found to have entered the general waste stream. If hazardous wastes are found to have entered the facility, the owner of these materials will be contacted to remove them if possible. If this is not possible, hazardous materials found in the general waste stream will be immediately relocated to a temporary storage area until they can be processed and removed from the site to a proper Hazardous Waste Receiver.

Although the Hamlet of Sachs Harbour does not accept hazardous wastes from industrial sources, it will remove hazardous materials that are indiscriminately dumped in the landfill. This will be done in accordance with Territorial guidelines that require site record be provided including the name of the carrier removing wastes and copies of the Transport of Dangerous Goods forms from persons removing wastes from the site.

5.4 Spill Prevention and Control

Spill prevention planning and control should be used to:

- Prevent the occurrence of spills of petroleum products and other regulated liquids (liquids) by the use of sound maintenance and management controls where spills occur.
- Prevent the unauthorized discharge of liquids into surface waters, the sewers system and to prevent contamination of the environment by those liquids.
- Prevent exposure of personnel, the public, and the community to liquids.

Petroleum Products and Other Reportable Liquids

No petroleum products and other reportable liquids are stored at the facility. Petroleum products are used to fuel vehicles using the facility.

5.4.1 Reportable Releases or Incidents

Spills can be defined as releases of pollutants into the natural environment originating from a structure, vehicle, or other container, and that are abnormal in light of all circumstances. Spills must be reported immediately to the NWT 24-hour Spill Line (867) 920-8130, and by filling out and submitted a Spill Report Form by Fax (867) 873 6924 or by email at spills@gov.nt.ca. A sample Spill Report Form can be found in **Appendix C**. Where the owner and/or the person in control of the spilled material are not already aware of the spill, the incident must also be reported to them.

The size of a reportable spill varies depending on the type and consequence of the spill and must be reported if the release is regarded as abnormal. Dripping and leaks such as would normally be associated with vehicle maintenance and operation are not defined as reportable spills. Minimum reportable quantities by type of contaminant are listed in the “Consolidation of Spill Contingency Planning and Reporting Regulations”. Although this legislation prescribes quantities under which spills

are not reportable, accurate determination of spill quantities is difficult and often underestimated. (Appendix D identifies reportable quantities for all types of dangerous goods.)

5.4.2 Spill Containment Equipment

Site Equipment

A supply of shovels, and sorbents shall be readily available at the Solid Waste Facility. In addition, shovels, rubber gloves, rubber boots, sorbent pads and a boom shall be maintained at the Hamlet Public Works Shop and made available to the Solid Waste Facility as needed.

Collection Vehicles

Each collection vehicle shall be supplied with an emergency spill containment kit, which contains a drip pan, absorbent material such as cat litter bags and small absorbent booms designed to prevent liquids from entering drains.

5.4.3 Potential Areas Where Spills Could Occur

Potential spills could occur at locations where liquids are stored or used, such as at tanks and during vehicle fuelling. This section of the plan details the procedures used to ensure that every precaution is taken to minimize the potential for a spill.

Incoming Waste Screening

Incoming waste should be screened for non-accepted waste items as described in Section 3.2.2 of the O&M Manual.

Vehicle/Equipment Fuelling

The following procedure is used to ensure the risk of spills while fuelling is minimized:

- Engine shall be shut off.
- Drip pans or other similar preventative equipment shall be used.
- The person fuelling the vehicle will not leave the fuelling station unattended.
- Automatic fuel shut-offs will not be used.

If a spill should occur, the Hamlet Foreman will be informed immediately and will coordinate the spill response as noted below.

5.4.4 Emergency Spills Response

The following procedures represent the approach that staff will take when responding to a spill of a liquid or petroleum product. Prompt response to a spill is the best means of minimizing any impact to the environment and in particular, preventing a discharge reaching surface water.

Immediate Notification and Response Procedure

In the event of a spill, the employee first becoming aware of the spill will assume the role of temporary spill coordinator until he/she can notify the Hamlet Foreman. If the temporary spill coordinator is unable to notify either the Hamlet Foreman or a back-up, then he/she will assume the responsibility of

implementing the response procedures to ensure public and environmental safety is preserved until back-up arrives. The following immediate response and notification procedure will be followed:

Spills Occurring at the Solid Waste Facility:

The employee will:

- Disconnect or shut off any mechanical equipment connected with or causing the spill that can be done without jeopardizing his or her personal safety.
- Temporarily secure area to minimize environmental impact by, for example, plugging drains to prevent uncontrolled liquid discharge into surface water.
- Contact the Hamlet Foreman for further instructions.

Spills Occurring on Public or Private Property:

The employee will:

- Disconnect or shut off any equipment connected with or causing the spill that can be done without compromising his or her safety.
- Marshal any public or individuals away from the spill area.
- Temporarily secure area to minimize environmental impact by covering drains to prevent uncontrolled liquid discharge into sewers or into surface water.
- Contact the Hamlet Foreman for further instructions.

Assessment of Hazard

Upon notification of a spill, the Hamlet Foreman will determine the hazard potential of a spill response by determining at least the following factors:

- Details regarding the spill location and any public or environmental impact.
- The substance spilled and its hazard potential.
- The amount of the spill and the extent of spreading.
- The source of the leakage/spill.
- The action taken to minimize impact.

If a spill is determined to be of such a magnitude that it cannot be safely and effectively controlled by facility personnel, then the Hamlet Foreman shall promptly notify outside emergency response companies to implement control and cleanup.

Reporting of Spill

The GNWT 24-hour spill line number is (867) 920-8130. See Section 7.2 in O&M Manual for reporting procedures.

Directing Spill Response

The Hamlet Foreman shall direct those responding to the spill to obtain the appropriate response equipment and personal protective equipment. The Hamlet Foreman will liaise with any Territorial Environment Officer present on the scene.

5.5 Burn Box Maintenance

A burn box is located at the landfill for approved wastes including paper, cardboard, and untreated lumber. These materials can be diverted from the landfill and are burnt to reduce waste volume. Burning of wastes must be approved by ENR. The following practices should be adhered to when burning:

- Reuse or recycle wood residues if feasible;
- Only burn when conditions permit and keep fire under control at all times;
- Measures are taken to ensure the fires do not escape the burn box to prevent the spread of fire to the rest of the landfill;
- Adequate fire-fighting equipment is readily available ;
- Brush and wood is stacked in a series of separate piles to facilitate fire control and to enhance a hot burn for the minimization of smoke;
- conditions are blowing away from the community so that there is no threat to public health and safety and no nuisance or hazard is caused by smoke or odour;
- The duration of any burning is less than 24 hours; and
- Full time supervision is provided until the burning activity is complete (i.e. until there is no smoke and until no danger of fire exists). **Open fires should not be left unattended.**



6.0 Monitoring

6.1 Surface Water Monitoring

A SNP manual has been developed that includes procedures for sampling surface water as per the terms and conditions of the water licence.

6.2 Runoff and Drainage Control

The objective of runoff control is to control the discharge of water from the site to the receiving environment. The water leaving the site will be comprised of melt water from the spring freshet, runoff from precipitation, and leachate from the waste mass.

7.0 Emergency Response

Due to the nature of the facility, uncontrolled fires and spills of unknown materials should be treated with extreme caution. Hamlet personnel responsible for solid waste facilities should be trained in Workplace Hazardous Materials Information System (WHIMS), Transportation of Dangerous Goods (TDG), Emergency First Aid, and Bear Safety. It is also important to ensure that appropriate vaccinations are kept current.

7.1 Fire

A contingency plan shall be developed by the Hamlet Fire Department for responding to a fire at the solid waste disposal site. Special precautions should be implemented as burning refuse can produce poisonous emissions. The following procedures should be used in case of an uncontrolled fire:

- Evacuate the area around the landfill immediately
- Keep all personnel up-wind of site
- Notify the Hamlet Fire Department

7.2 Spills

Spills of unknown substances at the landfill should be treated with extreme caution. Spilled materials should only be handled by properly trained and equipped personnel. The following actions should be undertaken by personnel in the event of a hazardous materials spill at the landfill:

- Be alert and consider your personal safety first;
- Assess the hazard to persons in the vicinity of the spill and where possible take action to control danger to human life. If possible, identify the material or products spilled;
- If the spill creates a fire, explosion or other hazard to human life, remove all potential ignition sources, if possible evacuate the area and contact the RCMP, and the Fire Department; and
- If safe and practical, try to take appropriate action to stop the release material:
 - Contact the Hamlet Foreman and report the spill; and
 - Mark the spill scene to warn public and prevent access.

Once contacted, the Hamlet Foreman shall:

- Proceed to the spill location;
- Make necessary arrangements for first aid and removal of injured personnel;
- Take necessary action, where possible, to secure the site to protect human safety;
- If not already done so and if it is safe to do so, take the appropriate action to stop the flow or release of material. If at all possible take the necessary action to contain or prevent the spread of spilled material;

- Contact the 24-hour spill line at (867) 920-8130;
- Contact the Hamlet SAO; and
- Contact the Fire Department if required.

Environment Canada's Emergency Contact number is (867) 920-5131. This number connects to a 24-hour emergency pager that is monitored by Emergency and Enforcement Officers.

Throughout the spill response, personnel should place their personal safety as the highest priority.

7.3 Bear Safety

There are active polar bears around Sachs Harbour at any given time. No mitigation measures are in place to deter wildlife from entering the area. There are currently no bear deterrents used at the site. No provision has been made to erect electric fences on site due to cost. For this reason, it is imperative that all personnel working in and around the solid waste site be properly trained in bear safety. A copy of the Bear Safety Manual provided by the Government of the Northwest Territories is included in **Appendix B**.

8.0 Operations and Maintenance Summary

Daily

- Collect waste from the Hamlet and transport to the landfill
- Ensure all wastes are disposed of and are contained in designated areas
- Push garbage with loader into a contained area
- Clean up any spills immediately
- Clear snow from roads and disposal areas as required
- Record O & M information

Weekly

- Pick up windblown materials which have migrated past the boundaries of the landfill
- Record O & M information
- Compact and cover refuse if necessary

Monthly

- With ENR approval, burn paper and wood material as required
- Grade and maintain access roads if required
- Record O & M information
- Prepare materials for backhaul on the barge

Yearly

- Compact and cover refuse in the spring and fall
- Review O & M records to assist in planning for the upcoming year
- Prepare new landfill area (or berm for mounding) if required during the summer months
- Prepare materials for backhaul on the barge

9.0 References

Environment and Climate Change Canada. Solid Waste Management for Northern and Remote Communities, Planning and Technical Guidance Document: March 2017

Heinke, G.W. and Wong, J., 1990, Guidelines for the Planning, Design, Operation and Maintenance of Solid Waste Modified Landfill Sites in the Northwest Territories, Volume I - Planning and Design, Volume II - Operation and Maintenance Produced for MACA.

Kent, R., Marshal P.,Hawke L. 2003, Guidelines for the Planning, Design Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories. Produced for MACA.

NWT Bureau of Statistics. *2016 Population Estimates by Community.* Yellowknife, NT : Government of the Northwest Territories, 2016.

Appendix A

Municipal Solid Wastes Suitable for Open Burning

Municipal Solid Wastes Suitable for Open Burning

Municipal solid wastes (MSW) that are conditionally suitable for open burning are paper products, paperboard packaging and untreated wood wastes only.

Conditions for this burning are:

- * The principle of source reduction should be utilized to reduce, reuse and recycle materials otherwise bound for landfill.
- * The appropriate materials are segregated and burned in a controlled manner and site which is separate from the working landfill so that the fire cannot spread. Standard burning conditions shall apply to burning such as on days where winds are light, blowing away from the community, in manageable volumes so that fires do not get out of control, having applicable permits and managed by an authorized, qualified person from the community. These are conditions also recommended in the Municipal and Community Affairs Solid Waste Modified Landfill Guidelines.
- * Building demolition wastes should not be burned unless they have been sorted to remove non-wood wastes such as roofing materials, electrical wire, plastics, asbestos and other non-wood wastes.
- * Waste wood treated with preservatives such as creosote, pentachlorophenol or heavy metal solutions shall not be burned. Examples of treated wood materials include railroad ties, telephone/hydro poles, pilings, cribbing and foundations.
- * Following a review of the specific landfill location, additional local conditions or controls may be applied.

Where geographic conditions do not allow for the proper operation of a modified landfill, such as because of limited availability of cover materials and unsuitable ground conditions, communities may have to assess other alternatives of MSW management ie: balefill, incineration.

The open burning of non-segregated MSW remains an unacceptable option for the management of MSW. Continuation of this practise should not be allowed unless a site- specific assessment fails to identify a feasible and practical alternative. At that point some form of segregation will be required.

Environmental Protection Division
Department of Environment and Natural
Resources Phone:

Appendix B

Polar Bear Safety

Each encounter with a polar bear is unique. Good judgement, common sense and familiarity with polar bear behaviour are required in all situations. This pamphlet provides guidelines for avoiding and dealing with polar bear encounters. For your safety and the safety of the bears, please read this pamphlet carefully and seriously consider the risks involved with travel in polar bear country. Further information is available in the DVD *“Polar Bears: A Guide to Safety”* developed by Parks Canada and the Safety in Bear Country Society.

After a *polar bear attack* or *encounter* follow this emergency check list:

1. **STAY CALM** and ensure you are safe.
2. Check that all people in your group are accounted for.
3. Call for help by radio or satellite phone. (Get contact numbers at your orientation to the park.)
4. Report location and time of incident.
5. Report number of people involved.
6. Report extent of injuries and property damage.
7. Report numbers and last locations of all polar bears involved in the incident.
8. Report reason for the attack if known (female protecting cubs, surprise, defending food source, etc.)
9. Report description of bears (male or female, size, markings, etc.)
10. Stand by to provide additional information to rescuers.

Polar bear behaviour is very different from that of grizzly and black bears.

Polar bears are predators, primarily hunting seals, while grizzlies and black bears mostly eat plants. As predators, polar bears will investigate humans, their camps and may even consider humans as a food source.

Hamlet of Sachs Harbour

Solid Waste Facilities - Operations & Maintenance Manual 2022

AVOIDING an ENCOUNTER

Be alert and aware of your surroundings. Scan all around with binoculars at regular intervals. Be vigilant! Watch for signs such as tracks, droppings, diggings, wildlife carcasses and polar bear dens.

Travel in daylight and avoid areas of restricted visibility. Be especially careful in areas along the coast, where a polar bear may be hidden behind boulders, pressure ridges (pushed up sea ice), driftwood or vegetation.

Travel in groups and stay together to increase your safety. The larger the group the greater the chances of deterring a bear.

Never approach a bear for any reason. Every bear defends a “critical space”, which varies with each bear and each situation: it may be a few metres or a hundred metres. Intrusion within this space is considered a threat and may provoke an attack. Approaching a bear could be considered disturbing wildlife which is an offence under the National Parks Wildlife Regulations.

Never approach a fresh kill or carcass as polar bears will defend their food. Adult polar bears will often only eat the fat of beached whales, seals and other kills, but other bears may scavenge from these carcasses.

Never feed bears. A bear that finds food from a human source begins to associate humans with food. This can result in the bear losing its natural tendency to avoid people and becoming persistent in its search for human food. The consequences for you and the bear can be serious. A bear that associates food with humans is more likely to injure people and these bears may have to be relocated or killed. It is also illegal to feed any wildlife in a national park.

Use sealed bags and containers or bear-proof canisters to store food and garbage. Pack out all garbage.

Eliminate or reduce odours from yourself and your camp. Avoid using scented soaps and cosmetics and avoid bringing strong smelling foods.

-
-

Polar Bear Feeding Areas

- **In fall, winter and early spring** most polar bears are on the sea ice hunting seals, by the floe edge, open water leads and along pressure ridges. Bears and seals can also be found in places where the ice is thin or cracked, such as tide cracks in land-fast ice or at toes of glaciers. Seals can more easily maintain breathing holes in these areas.
-
- **In early spring**, females with cubs tend to hunt along pressure ridges and cracks in land-fast ice (particularly in bays) where seal birthing dens are found.
-
- **During the ice-free summer season**, when polar bears are forced ashore, they can be found anywhere but they generally hunt and scavenge along coastlines, beaches and rocky islands. Keep an eye on the ocean, polar bears are often well hidden when swimming.

Stay away from polar bear den sites.

Unlike other bears, there is no time when all polar bears are inactive in dens.

- **Maternity dens** are excavated by pregnant females in snow drifts on leeward (wind protected) slopes of coastal hills and valleys. In the Baffin Region, dens can be found at high elevations on snowfields and glaciers. Maternity dens are occupied from fall to early spring. The dens are inconspicuous, however, bear tracks leading to and from the site in early autumn or late spring or ventilation holes can indicate their presence.
- **Temporary dens** are excavated in snow drifts or pressure ridges by polar bears (males, females and females with cubs) that are active over the winter. The dens can be used as resting places or as temporary shelter from bad weather. They can be used from a few days to several months.
- **Summer retreat dens** are excavated during the open water

season in the remaining snow banks or into the permafrost. These can also be at higher elevations on snowfields and glaciers or the valleys leading up to them. Male and female bears of all age groups use them to keep cool and avoid insect harassment.

If a bear does not know you are there:

- **quietly back away and leave the area** either in the direction you came or make a wide detour around the bear. Do not run, move quickly or make motions that might attract the bear's attention.
- **stay downwind**, so the bear cannot smell you and detect your presence.
- **keep an eye on the bear.**

If a bear knows you are there and shows signs of being curious, such as:

- moving slowly with frequent stops,
- standing on hind legs and sniffing the air,
- holding its head high with ears forward or to the side,
- moving its head from side to side, or
- trying to catch your scent by circling downwind and approaching from behind.

THEN:

- **help it to identify you as a human,**
- **wave your arms over your head and talk in low tones,**
- **move slowly upwind** of the bear so it can get your scent.

If the bear has been surprised at close range or shows signs of being agitated or threatened, such as:

- huffing, panting, hissing, growling or jaw-snapping,

- stamping its feet,
- staring directly at a person, or
- lowering its head with ears laid back.

THEN:

- **act non-threatening.** Do not shout or make sudden movements, which might provoke the bear. Never huff or hiss as this can cause a polar bear to charge.
- **avoid direct eye contact.**
- **back away slowly.** DO NOT RUN.
- **be prepared to use deterrents.**

If the bear shows signs of stalking or hunting you, such as:

- following you or circling you,
- approaching directly, intently and unafraid,
- returning after being scared away, or
- appears wounded, old or thin.

THEN:

- **fight back!** Use any potential weapon, group together and make loud noises.
- **DO NOT RUN.**
- **be prepared to use deterrents.**

If a bear charges:

- **stand your ground and be prepared to fight!** Focus on hitting the bear in sensitive areas, especially the face and nose if possible. Bluff charges are rare.

Report all bear
sightings and signs to
ENR.

DETERRENTS

Reducing the threat posed by a polar bear during an interaction may be difficult. Non-lethal deterrents cannot be depended on to ensure safety. The best way to live safely with bears

is to avoid contact with them.

Any potential weapon must be considered, such as skis, poles, rocks, blocks of ice or even knives.

Stay together as a group. This can be a deterrent and actions, such as making noise, jumping, waving arms, throwing things, may help to drive a polar bear away.

COMMERCIAL deterrents

- **Noisemakers** including air horns, pistol and pen launched bear bangers may scare a bear away.
- **Pepper spray** is effective against polar bears, but has some limitations. It must be warm enough to atomize and it must be used at close range. Also be aware of wind direction to avoid having the spray blow into your face.
- **Know how and when to use these deterrents and practice beforehand.**
- **Availability of commercial deterrents is limited in the north**, most will have to be purchased elsewhere and transported as dangerous goods.
- **Portable solar electric fences** may deter a bear at your campsite if properly installed and maintained.
- Contact Parks Canada or ENR for more information.

Appendix C

Sample Spill Report Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND
OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE

Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca



Canada



REPORT LINE USE ONLY

A	Report Date:	MM	DD	YY	Report Time:	<input type="checkbox"/> Original Spill Report OR <input type="checkbox"/> Update # _____ to the Original Spill Report	Report Number:
	Occurrence Date:	MM	DD	YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):					Water Licence Number (if applicable):	
D	Geographic Place Name or Distance and Direction from the Named Location:					Region: <input type="checkbox"/> NT <input type="checkbox"/> Nunavut <input type="checkbox"/> Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds				Longitude: _____ Degrees _____ Minutes _____ Seconds		
F	Responsible Party or Vessel Name:				Responsible Party Address or Office Location:		
G	Any Contractor Involved:				Contractor Address or Office Location:		
H	Product Spilled: <input type="checkbox"/> Potential Spill				Quantity in Litres, Kilograms or Cubic Metres:		U.N. Number:
I	Spill Source:				Spill Cause:		Area of Contamination in Square Metres:
J	Factors Affecting Spill or Recovery:				Describe Any Assistance Required:		Hazards to Persons, Property or Environment:
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:						
L	Reported to Spill Line by:		Position:		Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:		Position:		Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:		Position:		Employer:	Location Called:	Report Line Number:
Lead Agency: <input type="checkbox"/> EC <input type="checkbox"/> CCG/TCMSS <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> AANDC <input type="checkbox"/> NEB <input type="checkbox"/> Other: _____					Significance: <input type="checkbox"/> Minor <input type="checkbox"/> Major <input type="checkbox"/> Unknown		File Status: <input type="checkbox"/> Open <input type="checkbox"/> Closed
Agency:		Contact Name:		Contact Time:		Remarks:	
Lead Agency:							
First Support Agency:							
Second Support Agency:							
Third Support Agency:							

Appendix D

Reportable Quantities for Spills in the NWT

Substance	Reportable Quantity	TDG Class
Explosives	Any amount	1.0
Compressed gas (toxic/corrosive)		2.3/2.4
Infectious substances		6.2
Sewage and Wastewater (unless otherwise authorized)		6.2
Radioactive materials		7
Unknown substance		None
Compressed gas (Flammable)	Any amount of gas from containers with a capacity greater than 100L	2.1
Compressed gas (Non-corrosive, non-flammable)		2.2
Flammable liquid	≥100 L	3.1/3.2/3.3
Flammable solid	≥ 25 kg	4.1
Substances liable to spontaneous combustion		4.2
Water reactant substances		4.3
Oxidizing substances	≥ 50 L or 50 kg	5.1
Organic peroxides	≥1 L or 1 kg	5.2
Environmentally hazardous substances intended for disposal		9
Toxic substances	≥ 5 L or 5 kg	6.1
Corrosive substances		8
Miscellaneous products, substances or organisms		9
PCB mixtures of 5 or more ppm	≥ 0.5 L or 0.5 kg	9.0
Other contaminants--for example, crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater.	≥ 100 L or 100 kg	None
Sour natural gas (i.e., contains H ₂ S)	Uncontrolled release or sustained flow of 10 minutes or more	None
Sweet natural gas		
Flammable liquid	≥ 20 L When released on a frozen water body that is being used as a working surface	3.1/3.2/3.3
Vehicle fluid		None
Reported releases or potential releases of any size that: 1. are near or in an open water body; 2. are near or in a designated sensitive environment or habitat; 3. Pose an imminent threat to human health or safety; or 4. Pose an imminent threat to a listed species at risk or its critical habitat	Any amount	None



Hamlet of Sachs Harbour

SURVEILLANCE NETWORK POINT (SNP) MANUAL FOR WATER LICENCE N7L3-1531

Sampling steps

Step 1. Safety

Step 2. Preparation

Step 3. Sampling Procedure – Part 1 - 3

Step 4. Sampling Locations & Requirements

SNP 1531-2

SNP 1531-3

SNP 1531-1

Step 5. Sampling & Analysis

Step 6. Storing and Reporting Sampling Data

Step 1. Safety

Before sampling, make sure YOU ARE PREPARED WITH THE FOLLOWING:



Vaccinations

It is **recommended** that you get the vaccinations for:

1. Hepatitis A & B
2. Tetanus



Hand Sanitizer

Use hand sanitizer wipes after each sample



Gloves + Field Gear

Make sure you wear proper field gear such as boots

Use gloves during sampling and discard afterwards inside cooler

Step 2. Preparation

Before Sampling, prepare the necessary equipment & contacts:



Pick a date!

Select a date each month
to collect samples



Bottles and Cooler

Order bottles and a cooler from
Taiga Lab **3 days** advance of
sampling date
(use bottle order form, see
Additional Attachments)



Ice packs

Community should
have ice packs ready
to keep samples
cold (but not frozen)



Taiga Lab

Contact Taiga Lab and let
them know you are planning
to send them samples

Pick Dates for Inspection and Sampling Plan for potentially 5 open water dates

2019 - 2020

June

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SAMPLING CHECKLIST

- ☐ Sample bottles (pre-labelled) and cooler
- ☐ Ice Packs
- ☐ Heavy duty garbage bags (to carry bottles)
- ☐ Rubber gloves -at least one clean pair per SNP site
- ☐ Garbage bag for used gloves
- ☐ Hand sanitizer
- ☐ Rubber boots,
- ☐ Bug jackets
- ☐ Permanent markers

Step 2. Preparation

Before Sampling, prepare the necessary equipment & contacts:



pH/
Conductivity



Total
Suspended
Solids



Mercury
& Total
Metals

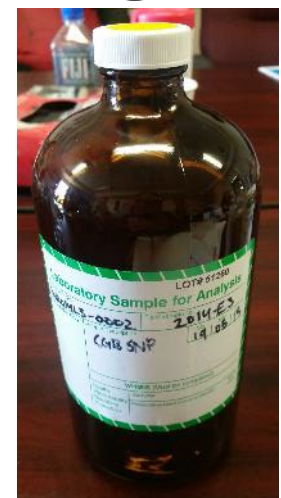
STERILE



Faecal
Coliforms



BOD/
CBOD



Oil & Grease

{ 3 X SNP 1531-2 Solid Waste Site }

{ 6 X SNP 1531-3 Discharge from the Sewage Lagoon }

Step 2. Preparation

Before Sampling, prepare the necessary equipment & contacts:

Label Bottles

You should have 9 bottles.

Label each bottle with:

1. Licence # (Submission No.)

2. SNP # (Field Sample No.)

6 will have "SNP 1531-2"

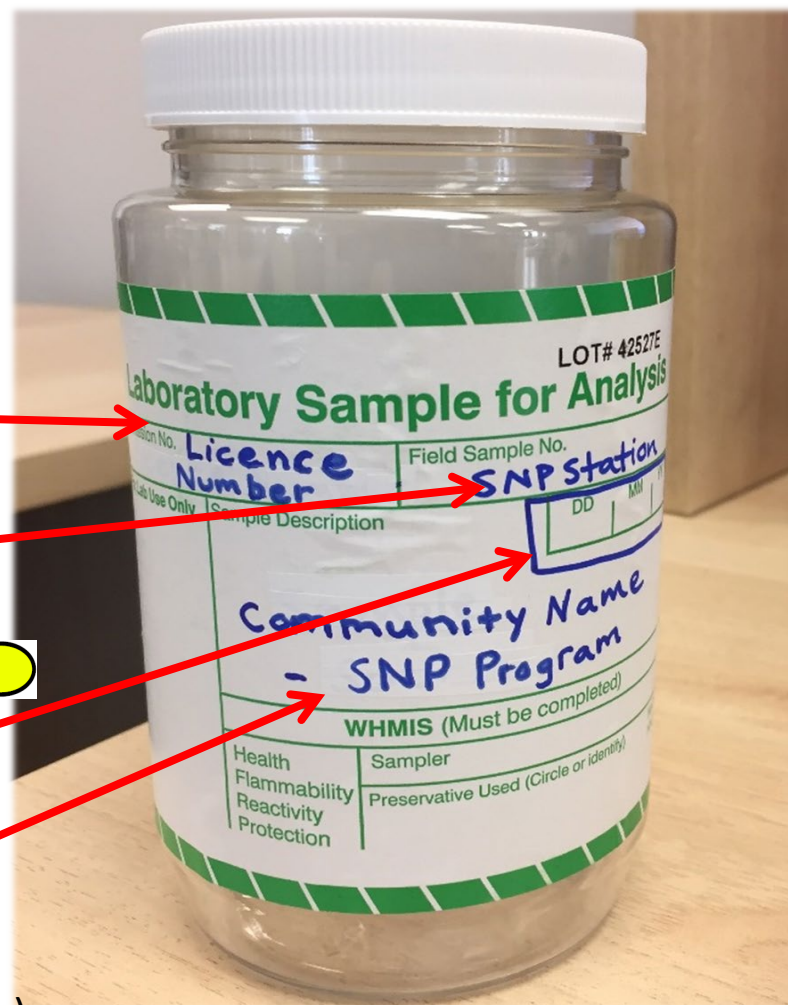


3 will have "SNP 1531-3"



3. Date and Time

4. 'Sachs Harbour – SNP Program' (Sample Description)



Step 2. Preparation

Before Sampling, prepare the necessary equipment & contacts:



SACHS HARBOUR: TO

Inuvik	421	16:30 / 19:30	M	--	--	Th
	422	18:00 / 19:30	--	Tu	--	--

Transport Bottles

1. Sample **the same day** (e.g. the afternoon) that they will be shipped
2. [Complete Laboratory Order Form](#) (See Additional Attachments)
3. Arrange with Air courier for delivery of samples to Yellowknife
4. Arrange with Taiga Lab to pick up samples from Airline
5. Samples should be submitted within **24 hours** of sampling or as close as possible.



Taiga Environmental Laboratory



TAIGA ENVIRONMENTAL LABORATORY – FIELD SHEET

4601 – 52 Avenue, Yellowknife, NT, X1A 2L9 • Tel: (867) 767-9235 • Fax: (867) 920-8740 • email: taiga@gov.nt.ca

Step 3. Sampling procedure PART 1

1. Sample the CLEANEST LOCATION to the DIRTIEST LOCATION and as close to flight time as possible (e.g. late morning if early afternoon flight, etc.)
2. AT EACH SNP LOCATION:
 - a) Wear gloves
 - b) Ensure bottles are labeled before collecting samples
 - c) Collect samples
 - d) Place used bottles in cooler and keep unused bottles in separate bag
 - e) Discard used gloves in garbage bag away from sample bottles
 - f) Use hand sanitizer wipes

Step 3. Sampling procedure PART 2

Rinse Bottles 3 times, shake with lid on top, and dump away from sampling area before taking actual sample filled to the top

“Fill, shake, and dump” x 3



FOR SAMPLING REQUIREMENTS:



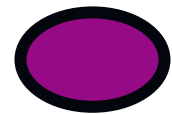
pH/
Conductivity



TSS, Ammonia,
Phosphate



Mercury &
Total Metals



BOD/
CBOD

Step 3. Sampling procedure PART 3

DO NOT rinse bottle before taking actual sample.
Instead, fill bottle to the top and record the time of day the sample was taken

FOR SAMPLING REQUIREMENTS:

STERILE

Faecal Coliforms



Oil & Grease

Step 4:

Sampling Locations and Requirements

Sewage Lagoon 1531-2

PART D: CONDITIONS APPLYING TO SEWAGE AND SOLID WASTE DISPOSAL

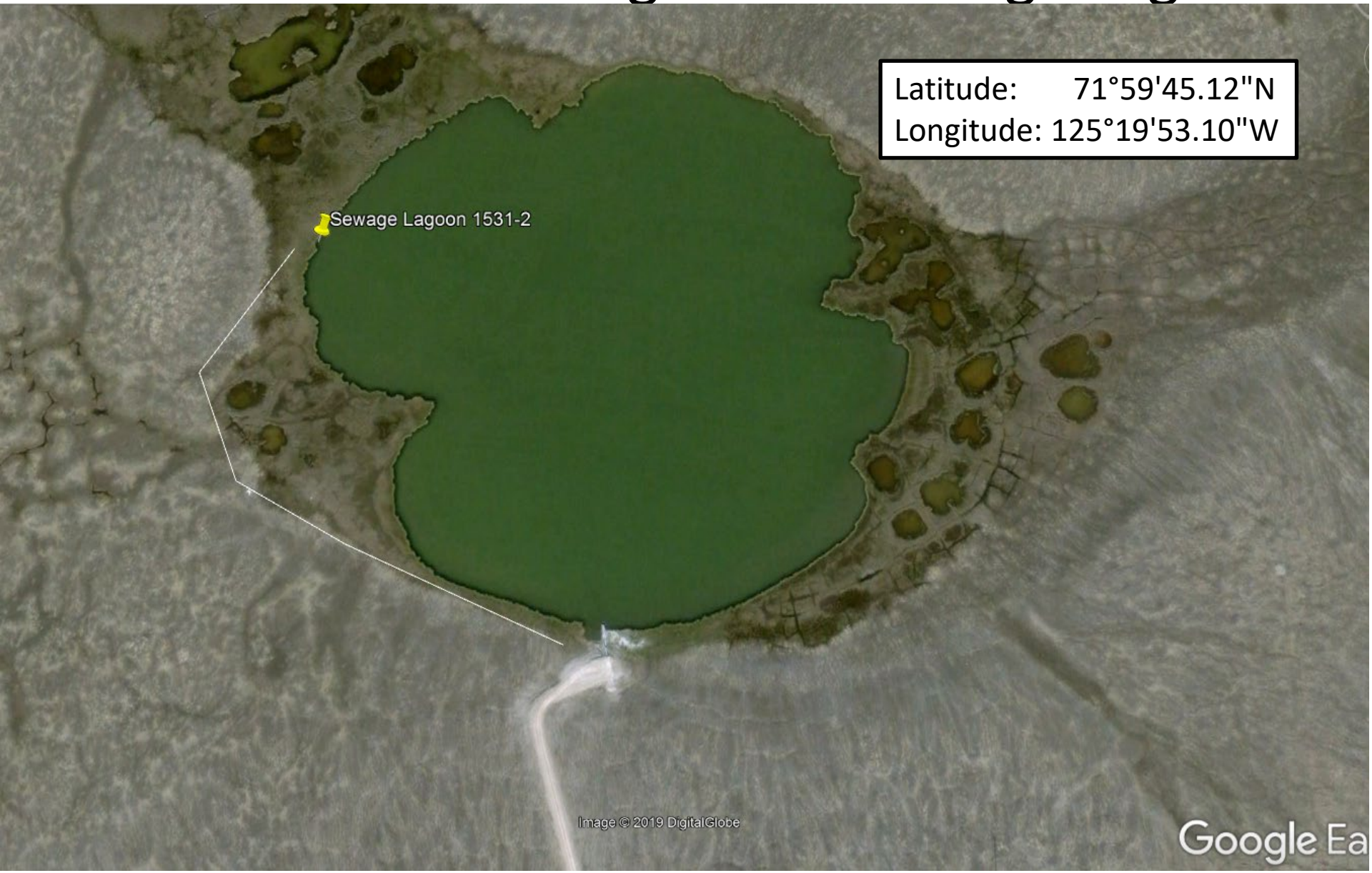
1. The Licensee shall direct all pump-out sewage to the Sewage Waste Disposal Facilities or as otherwise approved by the Board.
2. All effluent discharged from the Sewage Waste Disposal Facilities at "Surveillance Network Program" Station Number 1531-2 shall meet the following effluent quality standards:

Parameters	Maximum Average Concentration
Faecal Coliforms	1×10^4 CFU/100mL
Biological Oxygen Demand (BOD ₅)	120 mg/L
Oil and Grease	5 mg/L
Total Suspended Solids (TSS)	180 mg/L
The effluent discharged shall have a pH between 6 and 9, and no visible sheen of oil and grease.	

1. Water at Station Numbers 1531-2 shall be sampled **once immediately after break-up and monthly during the open the water season** analyzed for the following parameters:

Description of Sampling Station	Parameters
Effluent discharge from Sewage Waste Disposal Facilities	Biological Oxygen Demand (BOD ₅), Carbonaceous Biological Oxygen Demand (CBOD ₅), Total Suspended Solids (TSS), pH, Faecal Coliforms, Oil and Grease

SNP 1531-2 Discharge from Sewage Lagoon



Latitude: 71°59'45.12"N
Longitude: 125°19'53.10"W

Sewage Lagoon 1531-2

Image © 2019 DigitalGlobe

Google Earth

Sewage Lagoon 1531-2. End of Sewage lagoon where discharge would occur with spring high water and sampling location

Latitude: 71°59'45.12"N
Longitude: 125°19'53.10"W

Once Immediately after break-up and
monthly during the open water season



pH/ Conductivity	TSS, Ammonia Phosphate	Faecal Coliforms	BOD/ CBOD	Mercury & Total Metals	Oil & Grease
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SNP 1531-3 Run-off from existing Solid Waste Disposal Facilities

2. Water at Station Numbers 1531-3 shall be sampled annually when run-off is observed and analyzed for the following parameters:

Description of Sampling Station	Parameters
Run-off from Solid Waste Disposal Facilities	pH, Total Suspended Solids (TSS), Total Mercury (Hg), Total Chromium (Cr), Total Copper (Cu), Total Nickel (Ni), Total Iron (Fe), Total Cadmium (Cd), Total Cobalt (Co), Total Manganese (Mn), Total Lead (Pb), Total Zinc (Zn)

3. Water at Station Numbers 1531-2 and 1531-3 shall be inspected monthly during the open water season for the presence of an oily sheen. If an oily sheen is detected, then a sample shall be collected and analyzed for the presence of oil and grease.

SNP 1531-3

Run-off from existing Solid Waste Disposal Facilities



Sachs Harbour SNP 1531-3

Run-off from existing Solid Waste Disposal Facilities.

Sampled annually when run-off is observed and analysed for the following parameters

pH, Total Suspended Solids (TSS), Total Mercury (Hg), Total Chromium (Cr), Total Copper (Cu), Total Nickel (Ni), Total Iron (Fe), Total Cadmium (Cd), Total Cobalt (Co), Total Manganese (Mn), Total Lead (Pb), Total Zinc (Zn)

Option A:

Latitude: 71°59'15.01"N

Longitude: 125°27' 8.40"W

Option B:

Latitude: 71°59'10.67"N

Longitude: 125°27' 8.44"W

Option C:

Latitude: 71°59'12.02"N

Longitude: 125°27' 1.26"W



pH/Conductivity



TSS, Ammonia
Phosphate



Mercury & Total
Metals



SNP 1531-1

Raw water supply at the point of intake



No Sampling
Requirements:

Quantities only
Measured and recorded in
cubic metres (m³)

1 volume reading monthly

Step 6. Example of Storing and Reporting Data

SNP RESULTS



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT, X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120932

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 002-2

Client Project: W2007L3-0002
Sample Type: Sewage
Received Date: 04-Oct-12
Sampling Date: 03-Oct-12
Sampling Time: 16:30

Location: Whiti
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
Inorganics - Physicals						
pH	7.82		pH units	04-Oct-12	SM4500-H:B	
Solids, Total Suspended	1170	5	mg/L	15-Oct-12	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	66.6	0.005	mg/L	15-Oct-12	SM4500-NH3:	
Biochemical Oxygen Demand	106	2	mg/L	05-Oct-12	SM5210:B	
Microbiology						
Coliforms, Fecal	320000	10000	CFU/100mL	04-Oct-12	SM9222:D	
Coliforms, Total	>2420000	1000	MPN/100mL	04-Oct-12	SM9223:B	74
Escherichia coli	199000	100	MPN/100mL	04-Oct-12	SM9223:B	
Fecal streptococcus	28500	100	MPN/100mL	04-Oct-12	SM9223:B	
Trace Metals, Total						
Aluminum	780	5	µg/L	12-Oct-12	EPA200.8	
Antimony	0.9	0.1	µg/L	12-Oct-12	EPA200.8	
Arsenic	0.6	0.2	µg/L	12-Oct-12	EPA200.8	

Report Date: Wednesday, October 17, 2012
Print Date: Wednesday, October 17, 2012

Page 2 of 4

ANNUAL REPORT TEMPLATE

Annual Reporting		Discharge From the Sewage Lagoon						
		SNP 1531-2						
Parameters	Criteria	May	June	July	August	Sept	Oct	Nov
pH/Conductivity	between 6 & 9					7.82		
Total Suspended Solids	180 mg/L					1170		
BOD	120 mg/L							
COD								
Faecal Coliforms	1 x 10 ⁴ CFU / 100 ml							
Oil and Grease	5 mg/L							

LICENCE REQUIREMENTS

Parameters	Maximum Average Concentration
Faecal Coliforms	1 x 10 ⁴ CFU/100mL
Biological Oxygen Demand (BOD ₅)	120 mg/L
Oil and Grease	5 mg/L
Total Suspended Solids (TSS)	180 mg/L
The effluent discharged shall have a pH between 6 and 9, and no visible sheen of oil and grease.	