APPENDIX 3: Long-Term Monitoring, 2009 CAM-F, Sarcpa Lake, Nunavut

FRANZ ENVIRONMENTAL INC.

◆ CONSULTING ◆ ENGINEERING ◆ TECHNOLOGIES ◆

Long Term Monitoring, 2009
FOX-C, Ekalugad Fjord, Nunavut

FINAL REPORT

Prepared for:

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Project No. 1697-0902
November 27, 2009

EXECUTIVE SUMMARY

FRANZ Environmental Inc. (FRANZ) was retained by Indian and Northern Affairs Canada (INAC) to conduct the first of eight long-term monitoring activities over the next 25 years at the former DEW Line site, FOX-C, as prescribed by INAC's FOX-C Ekalugad Fjord Long-Term Monitoring Plan. This project was completed under INAC standing offer number 01-09-6038, call-up number 01, file number 1632-11/01-09-6038.

The FOX-C Ekalugad Fjord site is located on the Northeastern coast of Baffin Island, Nunavut, on the southern shore of Ekalugad Fjord. FOX-C was an intermediate Distant Early Warning (DEW) Line Site at which a remediation project was conducted between 2005 and 2008. After demolition, remediation consisted of disposal of non-hazardous waste and contaminated soils in on-site facilities.

Monitoring efforts were conducted on August 27, 2009 while based out of the nearest community, Qikiqtarjuaq, approximately 240 km to the Southeast. The landfill monitoring program consisted of a visual inspection of the Non-Hazardous Waste Landfill (NHWL).

It was noted that there was some minor settlement on top of the landfill and some very minor erosion on the sideslopes, but otherwise it was in satisfactory shape. Based on visual and photographic investigations, it was determined that: the site remains little changed from the time construction and remediation were completed in 2008; its facilities continue to operate as designed; and the site poses no imminent threat to the natural environment.

The Lake, Beach, Mid- and Upper Station Areas were also observed and found to be in good condition with the exception of an insignificant stain in borrow area 6 of the Lake Area. Physical evidence and second-hand information suggest that wildlife and local hunters continue to frequent this site.

This executive summary should be read in conjunction with the main report and is subject to the same limitations described in Section 8.0.

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1.0 INTRODUCTION

Franz Environmental Inc. (FRANZ) was retained by Indian and Northern Affairs Canada – Nunavut Regional Office (INAC) to conduct long-term monitoring activities at the former DEW Line sites CAM-F and FOX-C. This project was completed under INAC standing offer number 01-09-6038, call-up number 01, file number 1632-11/01-09-6038.

This report describes the monitoring activities completed for INAC at FOX-C and was prepared in accordance with the INAC Request for Proposal (RFP) dated May 28, 2009, the FRANZ Proposal No. P-2893, dated June 5, 2009, the Call-up Details, dated June 22, 2009 and the Project Initiating Meeting Minutes, dated June 24, 2009.

Throughout this report the INAC DEW Line site FOX-C will be referred to as "the Site".

1.1 Project Objectives

The objective of the 2009 long-term monitoring was to complete the 2009 monitoring program at the FOX-C site as described in the FOX-C Ekalugad Fjord Long-Term Monitoring Plan. This included visual observations and chemical analyses (where warranted and possible) to determine whether the site is performing as designed.

1.2 Scope of Work

The scope of work as described in the 2008 Long-Term Monitoring Plan was as follows:

1. Visual Monitoring of the NHWL, including
    - Visually checking the physical integrity of the NHWL and looking for evidence of settlement, erosion, frost action, animal burrows, vegetation, staining, vegetation stress, seepage points, exposed debris, and the condition of wells;
    - Taking photographs to document the condition of the NHWL and substantiate the recorded observations.
2. Active Layer Water Monitoring, including
    - The collection of samples from the 5 monitoring wells installed around the NHWL. These samples were to be analysed and the results compared to those from background samples.
3. Soil Monitoring (as required)
    - Soil sampling was to be limited to locations where seepage or staining was identified as part of the visual inspection.
4. Natural Environment Monitoring, including
    - The collection of direct and indirect evidence of wildlife presence and activity;

- Making observations regarding the revegetation of disturbed areas.

5. Preparation of a 2009 monitoring program report.

The following tasks were assessed as necessary to fulfill the scope:

a) Preparation of a health and safety plan;
b) Preparation of a sampling plan for soil and groundwater;
c) Collection of water level data and observation of monitoring well condition at the site;
d) Visual inspection and photo documentation of the site;
e) Interviewing local residents and officials to understand land use and wildlife trends; and
f) Reporting.

2.0 BACKGROUND INFORMATION

2.1 Site Description

According to INAC's Long Term Monitoring Plan, the FOX-C Intermediate Distant Early Warning (DEW) Line Site was constructed in 1957 and subsequently abandoned in 1963. The site comprises three areas: the Upper Station, Mid Station, and Lower Station.

The Upper Station is so-called because of its location, at 770 metres above mean sea level. Before remediation was completed in 2008, the main site facilities were located in the area and included a module train, warehouse, garage, a former Quonset building, Inuit house, bulk fuel storage tanks, a radar tower and other site debris.

The Mid Station is located at the base of the summit approximately 500 metres east of the Upper Station. A glacier located across from the Mid Station feeds a river that flows alongside the access road to the Lake. Before remediation, the Mid Station area contained a dump area, barrel storage pad, four former Quonset buildings and numerous barrel and debris areas.

At the Lower Station near the Lake Area the access road from the Upper Station splits into two parts. One section heads southwest to the Lake Area and is approximately 1.1 kilometres long. A river flows out of the lake and empties into the ocean at the beach.

The site access road travels east from the Upper Station, through the Mid Station to a junction in the Lake Area. The road is approximately 5.9 kilometres long.

The other section of the road heads north to the Beach Area and is approximately 2.2 kilometres long. Before remediation, there were two petroleum, oil and lubricants (POL) storage tanks at the beach area, barrel caches and abandoned construction equipment. The landing area at the beach was used to allow ships to transfer fuel to the POL storage tanks.

A non-hazardous waste landfill (NHWL) was constructed at the site in 2006–2007 and closed in 2008. It was designed to contain non-hazardous materials only. It was constructed on natural ground surface with the organic matter stripped and consists of four perimeter berms constructed of granular material. The non-hazardous waste was placed in the landfill in layers consisting of 0.5 m lifts of waste covered by 0.15 m of granular fill. Once all the layers were completed a final cover consisting of a minimum of 1.0 m of granular fill was used to cap the landfill. The NHWL contains the following:

- Tier I contaminated soil (i.e., soil with lead content between 200 and 500 parts per million (ppm) and PCB content between 1 and 5 ppm)

- Petroleum hydrocarbon fractions F3 and F4 contaminated soil
- Non-hazardous demolition debris, such as timbers, plywood, and sheet metal
- Non-hazardous site debris, such as scrap metal and wood
- Non-hazardous debris/soil excavated from landfills
- Creosote timbers
- Double-bagged asbestos

Groundwater at the site is not used for water supply purposes, as it is not regularly inhabited and wells at the site would tend to freeze with permafrost. The area is apparently used by hunters and fishermen. Interviews with residents of the nearby village of Qikiqtarjuaq suggest that hunting is less popular in recent times due to helicopter activity. And although fishing is still thought to be good, no one interviewed could attest to having fished there this year (2009).

2.2 Previous Monitoring Programs

The 2009 monitoring program was the first of a proposed eight that are scheduled over a 25 year period. To become familiar with the site, FRANZ reviewed the following reports pertaining to DEW Lines sites:

- FOX-C Ekaluguad Fjord Long-Term Monitoring Plan, March 23, 2008, Indian and Northern Affairs Canada
- CAM-F Sarcpa Lake Long-Term Monitoring Plan, January 23, 2007, Indian and Northern Affairs Canada
- Long Term Monitoring 2008, CAM-F DEW Line Site, NU, January 8, 2009, UMA Engineering Ltd.
- Abandoned Military Site Remediation Protocol, December 2008, Indian and Northern Affairs Canada, Contaminated Sites Program.

3.0 INVESTIGATIVE METHODOLOGY

The monitoring program was carried out at the FOX-C DEW Line site on August 27, 2009. During the field investigations, weather conditions were sunny and mild. The program consisted of the following:

- Completing a Health & Safety Plan;
- Visually observing and photographically documenting the physical integrity of the landfill;
- Collection of ground water samples from existing wells (if possible);
- Collection of soil samples (if necessary); and
- Gathering information through first hand observation as well as through knowledgeable persons regarding local wildlife and human activity.

The field investigation procedures are described below.

3.1 Health & Safety Plan

Before commencing with site activities, a site-specific health and safety plan (HASP) was developed. The HASP identified and provided mitigative actions for potential physical and chemical hazards associated with the work involved in the site assessment. The HASP also contained a listing of emergency contact numbers and provided protocols to follow in the event of an emergency.

A copy of the plan was presented to INAC for their review and agreement before site activities began. Prior to conducting any work on-site, the plan was distributed and discussed with all personnel involved in the investigative program. A copy of the HASP has been retained on file at FRANZ.

3.2 Visual Inspections

The NHWL and surrounding areas were visually observed to assess the landfill's physical integrity, including evidence for erosion, ponding, frost action, settlement and lateral movement. A visual monitoring checklist, presented in the FOX-C Long-Term Monitoring Plan, was completed for the landfill and is found in Table 4-1, Section 4. Photographs were also taken to document the condition of the structures and substantiate the recorded observations (Appendix B).

3.3 Wildlife Survey

FRANZ made observations of the natural environment at the time of the site visit and recorded the observations in field notes. Observations included direct sightings of wildlife, other evidence of wildlife (e.g., droppings, tracks, feathers/fur), wildlife activities (migrating, nesting, etc.), numerical estimates of wildlife, and vegetation observations. Where possible, observations by FRANZ have been compared to previously recorded observations.

As part of the investigation, a FRANZ representative interviewed several members of the Nattivik Hunters and Trappers Association as well as other townspeople knowledgeable about surrounding areas. Land uses by humans and wildlife, as well as changes in use over previous years by each, were discussed and pertinent information is documented in this report.

3.4 Ground Water Sampling

The ground water sampling methodology conformed to guidance provided in the following Canadian Council of Ministers of the Environment (CCME) documents:

- CCME EPC-NCS62E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume I: Main Report, Dec 93 (CCME catalogue - http://www.ccme.ca/assets/pdf/pn_1101_e.pdf); and
- CCME EPC-NCS66E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume II: Analytical Method Summaries, Dec 93 (CCME catalogue - http://www.ccme.ca/assets/pdf/pn_1103_e.pdf).

Upon arrival at the FOX-C site, the FRANZ field assessors made an attempt to measure water levels at each of the wells. Using a water level tape, the field assessors found that none of the monitoring wells contained ground water; all of the water in the wells was frozen. To determine whether the water level tape was operating properly, a Waterra tube with a foot valve was inserted into each monitoring well. None were found to contain water. The level of the frozen water and the casing heights of each well were recorded, but no water samples could be obtained. General well conditions were also recorded, and the wells were re-locked using keyed-alike padlocks.

3.5 Soil Sampling

Because there were no indications of seepage or staining as part of the visual inspection, no soil samples were collected during the investigation.

4.0 NON-HAZARDOUS WASTE LANDFILL

4.1 Area Summary

The NHWL is located in the Lower Site Landfill Area, between the Beach and Lake Areas of the FOX-C DEW Line site. The monitoring of the landfill included visual observations to assess its physical integrity, including evidence for erosion, ponding, frost action, settlement and lateral movement. Groundwater and soil samples were to be collected at locations up- and downgradient of the NHWL. Due to completely frozen wells and no apparent signs of facility malfunction, groundwater samples could not be taken, while soil samples were deemed unnecessary by both the FRANZ and INAC personnel on site. The visual inspection report, including supporting photos and drawing, is presented in the following pages.

4.2 Photographic Record

The photographic record of the NHWL (and other areas of the site) has been completed as per the Terms of Reference. Those portions of the record referenced in the body of this document are included in Appendix B. The complete photographic record, of full-sized photographs, is provided in the attached CD-ROM.

4.3 Visual Inspection Report

Monitoring consisted in part of visual observations of the NHWL to assess its physical integrity, by collecting evidence of erosion, ponding, frost action, settlement and lateral movement. A plan view of the NHWL indicating photographic viewpoints, salient observations and locations of ground water monitoring wells can be seen in Figure A-1, Appendix A. The visual monitoring checklist provided in the FOX-C Long-Term Monitoring Plan has been completed and is included as Table 4-1 of this report.

Settlement

One area of settlement was noted running from north to south on the top of the landfill (Photo 2, Appendix B), in the central area along the top of the NHWL. The landfill slopes upwards slightly from the east to a high point in the centre, after which it slopes downwards gently to the west. Immediately to the west of the high point, a slight depression across the width of the NHWL is obvious. This settlement is likely an artifact of the techniques used to build the NHWL.

Additionally, two areas of noticeable depression have occurred at the foot of the NHWL: one to the northeast of the landfill (Photo 1, Appendix B); and another off its southwestern corner (Photo 8 and Photo 9, Appendix B). The depression to the northeast was damp and appears to contain ponded water at times of high rainfall. The second depression may be a manifestation of the natural topography, which clearly shows an erosion channel as one follows the depression away from the landfill. Neither appear to impact the structure at present.

Erosion

There is very little erosion on or near the NHWL. As indicated in Figure A-1, Appendix A, cobbles have been uncovered in select areas, and except for a few small potholes (Photo 3, Appendix B), erosion is surficial, not more than 5 cm deep (Photo 4, Photo 5 and Photo 6, Appendix B).

Frost Action

Some upwelling of bentonite inside well stickups was observed (Photo 7, Appendix B). This may be evidence of frost action at the site; however, limited movement of the well casing inside the stickups was observed. No test pits were advanced at the site; the subsurface conditions were not examined in detail.

Evidence of Burrowing Animals

Indications of burrowing animals were not observed.

Re-establishment of Vegetation

Based on the regional setting of this landfill reestablishment of vegetation is not likely. No growth was observed on the top or sides of the landfill.

Staining

No staining was observed in the area of the NHWL.

Seepage Points

Seepage was not observed during the NHWL inspection.

Debris

Exposed debris was not observed.

Discussion

All physical observations suggest that the NHWL is performing as designed and is containing the enclosed waste. Groundwater samples were not taken due to the frozen state of all the monitoring wells. Soil samples were not collected given the lack of evidence (e.g. staining) of any anomalies. The facility appears in satisfactory condition (Photo 10, Appendix B).

Table 4-1: FOX-C – Ekalugad Fjord – Visual Monitoring Checklist

ITEM	PRESENCE/ ABSENCE	EXTENT	DESCRIPTION/ PHOTOGRAPHIC REFERENCE
Instructions	*Yes or No*	*Provide dimensions as applicable: Length, Width, Depth*	*Features of note, photographic reference with scale, point of view & direction*
Settlement	Yes	Roughly 40 m x 8 m x 0.1 m	Photo 2, Appendix B; Figure A-1, Appendix A
Erosion	Yes	Negligible.	Photo 4, Photo 5 and Photo 6, Appendix A.---
Frost Action	No	---	---
Animal Burrows	No	---	---
Vegetation	No	---	---
Staining	No	---	---
Vegetation Stress	No	---	---
Seepage Points	No	---	---
Exposed Debris	No	---	---
Condition of Monitoring Instruments	Good, but frozen.	---	- Minor bentonite upwelling in some wells (Photo 7, Appendix B). - New Guard, 40 mm locks (No 834, key no 102) installed on three wells. - Lid on MW-East requires riveting (Photo 11, Appendix B).

ITEM	PRESENCE/ ABSENCE	EXTENT	DESCRIPTION/ PHOTOGRAPHIC REFERENCE
Surrounding depressions	Yes	1) radius ~ 3 m; depth ~ 0.2 m 2) 4 m x 8 m; max depth ~ 0.4 m	1) Photo 1, Appendix B. 2) Photo 8 and Photo 9, Appendix B.

5.0 SURROUNDING AREAS

Lake Area

To the southwest of the NHWL (Lower Site Landfill Area) lies the Lake Area, in which are found Borrow Areas 5 and 6 as well as the in-situ treatment area. This regraded area appears to be in good condition, with only two minor anomalies. The first is a small stain (area < 1 m^2) in Borrow Area 6 with a distinctly PHC-like smell, which was likely left by the regrading machinery (Photo 13, Appendix B); it does not appear connected to the failure or malfunctioning of any on-site facility. The second is a couple of small platforms, close to the in-situ treatment area, suspected to have been left by a local hunter (Photo 12, Appendix B).

Beach Area

To the north of the NHWL lies the Beach Area, containing Borrow Area 4, the former camp and the decommissioned sewage lagoon. No anomalies were observed in this area. Bird tracks were prevalent. Scattered bits of wood and metal were present but not in significant amounts. An erosion channel runs toward the lake, but does not seem to present any problems.

Mid- and Upper Station Areas

The Upper Station Area is located on the nearest peak to the east of the NHWL, at over 700 masl. The Midstation Area is slightly to east of this, roughly 100 m lower than the Upper Station. These areas presented no visual signs of degradation (Photo 14, Appendix B). The Midstation area, which formerly contained much of the waste found in the NHWL, was aesthetically graded and, other than a couple of small bits of metal, clean (Photo 15, Appendix B).

Access Road

The recently constructed road, used to access the Upper Station area from the Beach area, appeared to be in good condition, despite problems of it washing away in previous years.

6.0 NATURAL ENVIRONMENT

Information regarding the natural environment was gathered both directly, through observation, and indirectly, through consultation with knowledgeable local persons in order to better understand the presence and termporal change of wildlife. The FOX-C Long-Term Monitoring Plan recommends monitoring the following parameters:

- Wildlife sightings
- Other evidence of recent presence of wildlife (e.g. droppings, tracks)
- Wildlife activity (e.g. nesting, migration)
- Qualitative assessment of relative numbers versus previous years
- Revegetation of disturbed areas versus previous years

Wildlife and Human Activity

According to observations by members of the closest community, Qikiqtarjuaq, at the local co-op, human activities at the site usually consist of fishing for char in the adjacent lake. Some of the animals observed during visits to the site by community members include bear, fox, rabbit, wolf, ptarmigan and narwhal. The community members also recalled seeing caribou at the site, but not in recent years. They stated that this may be a result of the high volume of helicopter activity to and from the site in recent years.

During the site visit, the Franz field assessors observed two platforms adjacent to the lake (photo 12, Appendix B). These may have been left by a local hunter, suspected of setting up a shelter.

During the site visit, the FRANZ field assessors observed evidence (e.g. scat, tracks or visual observation) that ravens, Canada geese, polar bears and ducks are present on the site.

Re-establishment of Vegetation

Based on the regional setting of this site reestablishment of vegetation is again not likely in the near future. No growth was observed on any of the regraded areas.

7.0 LIMITATIONS

This report has been prepared exclusively for Indian and Northern Affairs Canada. Any other person or entity may not rely upon the report without the express written consent from Franz Environmental Inc. and Indian and Northern Affairs Canada.

Any use, which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Franz Environmental Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Some of the information presented in this report was provided through existing documents and interviews. Although attempts were made, whenever possible, to obtain a minimum of two confirmatory sources of information, Franz Environmental Inc., in certain instances, has been required to assume that the information provided is accurate.

The conclusions presented represent the best judgment of the assessors based on current environmental standards and on the site conditions observed on August 27, 2009. Due to the nature of the investigation and the limited data available, the assessors cannot warrant against undiscovered environmental liabilities.

Should additional information become available, Franz Environmental Inc. requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

There is no warranty, expressed or implied that the work reported herein has uncovered all potential environmental liabilities, nor does the report preclude the possibility of contamination outside of the areas of investigation. The findings of this report were developed in a manner consistent with a level of care and skill normally exercised by members of the environmental science and engineering profession currently practicing under similar conditions in the area.

A potential remains for the presence of unknown, unidentified, or unforeseen surface and sub-surface contamination. Any evidence of such potential site contamination would require appropriate surface and sub-surface exploration and testing.

If new information is developed in future work (which may include excavations, borings, or other studies), Franz Environmental Inc. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

8.0 REFERENCES

Indian and Northern Affairs Canada. January 23, 2007. *CAM-F Sarcpa Lake Long-Term Monitoring Plan*.

Indian and Northern Affairs Canada, March 23, 2008. *FOX-C Ekaluguad Fjord Long-Term Monitoring Plan*

Indian and Northern Affairs Canada. December 2008. *Abandoned Military Site Remediation Protocol*, Contaminated Sites Program.

UMA Engineering Ltd. April, 2009. FOX-C Intermediate DEW Line Site, Ekalugad Fjord, Site Restoration.

UMA Engineering Ltd. January 8, 2009. *Long Term Monitoring 2008*, CAM-F Dew Line Site, Nu.

Zeiner, S*.T., Realistic Criteria for the Evaluation of Field Duplicate Sample Results,* Proceedings of Superfund XV, November 29-December 1, 1994, Sheraton Washington Hotel, Washington, D.C.

9.0 CLOSURE

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Yours truly,

Franz Environmental Inc.

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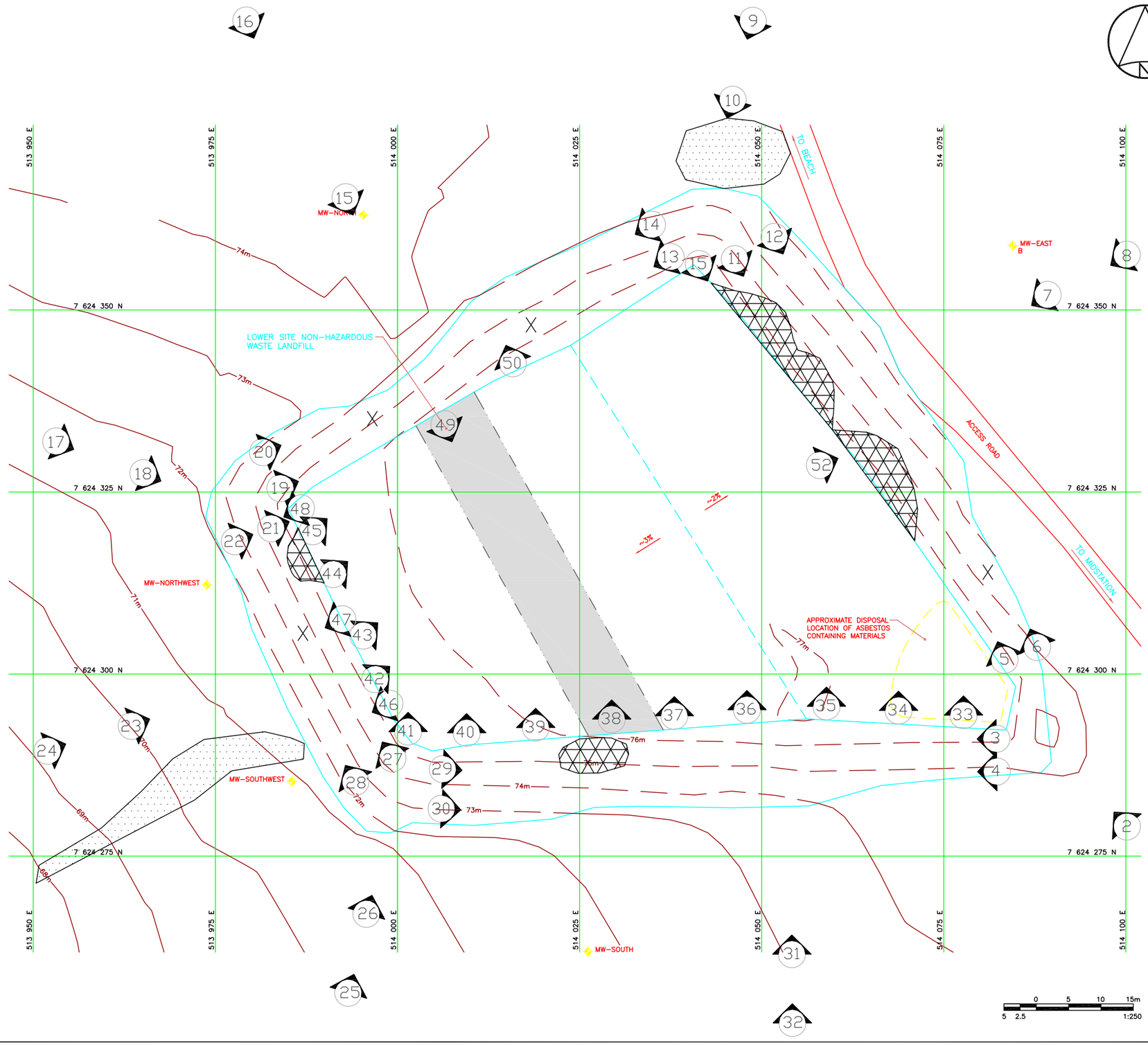
APPENDIX A

Figures



LEGEND

- PICTURE NUMBER VIEWPOINT
- EXPOSED RIPRAP
- SETTLEMENT
- AREA OF DEPRESSION
- X POTHOLE

Viewpoint #	Picture #	Viewpoint #	Picture #
1	P8270412	28	P8270440
2	P8270413	29	P8270441
3	P8270414	30	P8270442
4	P8270415	31	P8270443
5	P8270416	32	P8270444
6	P8270417	33	P8270445
7	P8270418	34	P8270446
8	P8270419	35	P8270447
9	P8270420	36	P8270448
10	P8270421	37	P8270449
11	P8270422	38	P8270450
12	P8270423	39	P8270451
13	P8270424	40	P8270452
14	P8270425	41	P8270453
15	P8270427	42	P8270454
16	P8270428	43	P8270455
17	P8270429	44	P8270456
18	P8270430	45	P8270457
19	P8270431	46	P8270458
20	P8270432	47	P8270459
21	P8270433	48	P8270460
22	P8270434	49	P8270461
23	P8270435	50	P8270462
24	P8270436	51	P8270463
25	P8270437	52	P8270464
26	P8270438	53	P8270465
27	P8270439		

NOTE:
PICTURE NUMBERS REFER TO PHOTOGRAPH NAMES AS THEY APPEAR ON THE ATTACHED CD-ROM.

Title: NON-HAZARDOUS WASTE LANDFILL

FRANZ ENVIRONMENTAL INC.
♦ CONSULTING ♦ ENGINEERING ♦ TECHNOLOGIES ♦

Project: FOX-C EKALUGAD FIORD 1697-0902

Date: NOVEMBER 2009

Client: INDIAN AND NORTHERN AFFAIRS CANADA

SCALE AS SHOWN

FIGURE A-1

Z:\Projects\2009\1697-0901 INAC CAM-F & FOX-C DEW Line Sites\1697-0902 FOX-C\Figures\AutoCAD 2007\IQALUIT-#340845-v1-FOX-C_AS-BUILT_DRAWING_413759-C12-R2.DWG(layout)

APPENDIX B

Site Photographs

Photo 1. Moist settlement off the northern corner of the NHWL; picture viewpoint number 9 (Figure A-1, Appendix A). Direction photo taken: S (P8270420).

Photo 2. NHWL showing very slight settlement running N-E (L to R in picture) along the NHWL; picture viewpoint number 43 (Figure A-1, Appendix A). Direction photo taken: NE (P8270455).

Photo 3. Close-up of eastern side of NHWL showing a few small potholes and exposed cobbles; picture viewpoint number 52 (Figure A-1, Appendix A). Direction photo taken: NE (P8270464).

Photo 4. Eastern side of NHWL showing small amounts of exposed cobbles; picture viewpoint number 51 (Figure A-1, Appendix A). Direction photo taken: SE (P8270463).

Photo 5. Exposed stone near NW corner of NHWL; picture viewpoint number 21 (Figure A-1, Appendix A). Direction photo taken: SE (P8270433).

Photo 6. Exposed stone near NW corner of NHWL; picture viewpoint number 48 (Figure A-1, Appendix A). Direction photo taken: SW (P8270460).

Photo 7. Monitoring well, MW-East, showing a good surface seal with minor cracking. Photograph number P8270371.

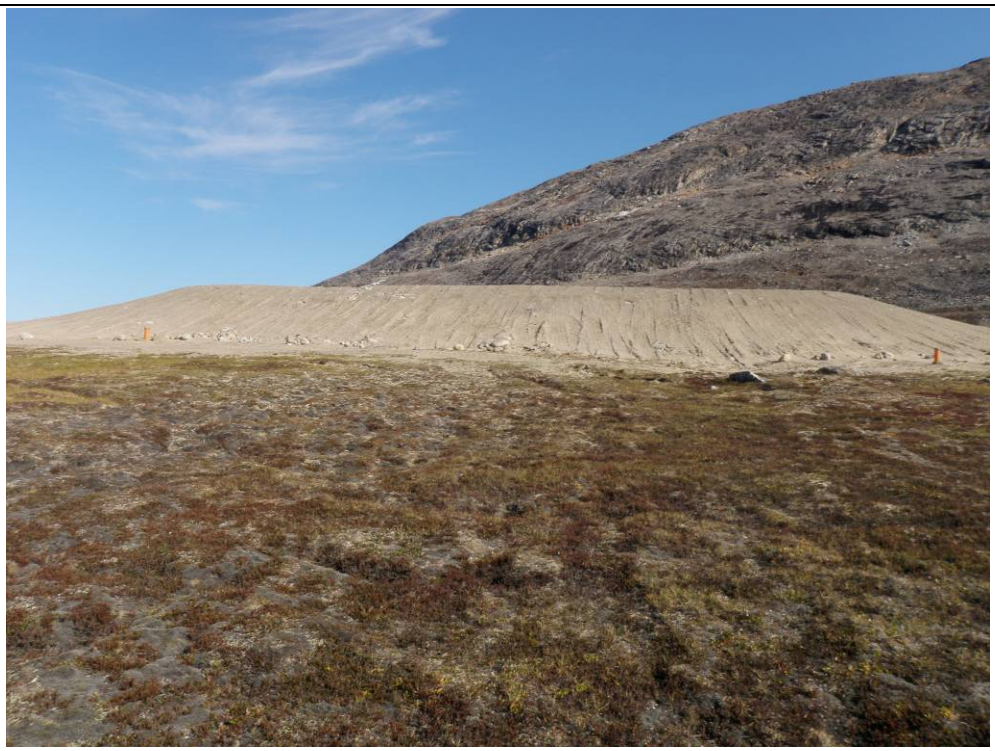


Photo 8. NHWL. Picture viewpoint number 24 (Figure A-1, Appendix A). Direction photo taken: SW (P8270436).

Photo 9. Depression near western side of NHWL; picture viewpoint number 46 (Figure A-1, Appendix A). Direction photo taken: W (P8270458).

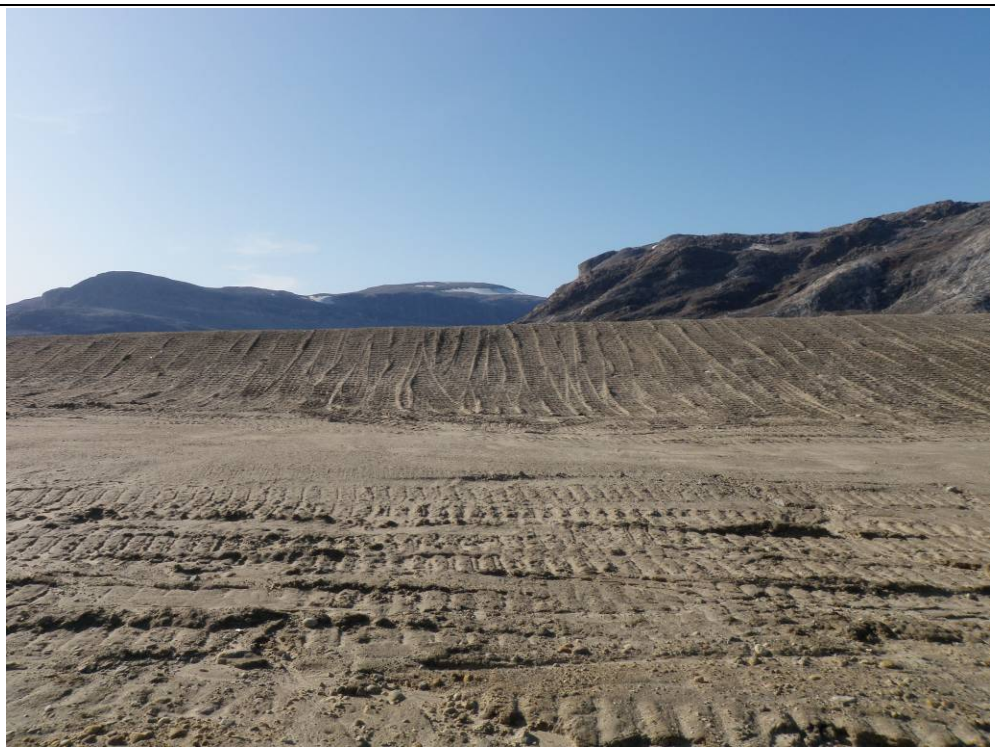


Photo 10. Eastern sideslope of NHWL; picture viewpoint number 7 (Figure A-1, Appendix A). Direction photo taken: SW (P8270418).

Photo 11. Monitoring well MW-East with failing rivets on lid; rivets have since failed. Photograph number P8270376.

Photo 12. Regraded borrow area 6 in Lake Area. Materials recently brought, presumably by local hunter, shown in centre. Direction photo taken: S (P8270491).

Photo 13. Staining in borrow area 6. Picture number P8270495.

Photo 14. Regrading at the Upper Station Area. Direction photo taken: W (P8270497).

Photo 15. Overlooking the former Midstation Area dump from the eastern edge of the Upper Station Area. Direction photo taken: E (P8270508).

Table B-1. Picture viewpoint numbers of the NHWL (as depicted in Figure A-1, Appendix A) cross-referenced with picture numbers on attached CD-ROM.

Viewpoint #	Picture #	Viewpoint #	Picture #
1	P8270412	28	P8270440
2	P8270413	29	P8270441
3	P8270414	30	P8270442
4	P8270415	31	P8270443
5	P8270416	32	P8270444
6	P8270417	33	P8270445
7	P8270418	34	P8270446
8	P8270419	35	P8270447
9	P8270420	36	P8270448
10	P8270421	37	P8270449
11	P8270422	38	P8270450
12	P8270423	39	P8270451
13	P8270424	40	P8270452
14	P8270425	41	P8270453
15	P8270427	42	P8270454
16	P8270428	43	P8270455
17	P8270429	44	P8270456
18	P8270430	45	P8270457
19	P8270431	46	P8270458
20	P8270432	47	P8270459
21	P8270433	48	P8270460
22	P8270434	49	P8270461
23	P8270435	50	P8270462
24	P8270436	51	P8270463
25	P8270437	52	P8270464
26	P8270438	53	P8270465
27	P8270439		

APPENDIX C

Field Notes

1697.0901 25.8.09

1.
2. A COUPLE OF PEOPLE MIGHT HUNT THERE
3. WINTER, USUALLY.
4. SITE ON WAY TO REPULSE, PEOPLE
5. STOP AT CABIN. FOOD, FIREPLACE.
6. PEOPLE OFTEN DON'T TAKE
7. GARBAGE HOME. PEOPLE HUNT
8. CARIBOU OVER THERE — SOMETIMES
9. IT'S AN OKAY HUNTING SPOT...
(SO-SO). LESS HUNTING NOW.

Tegita Malik 25/8/09 1900

1. CABIN LEFT BY BIOGENIE FOR HUNTERS — A CONDITION OF LOCAL HTA. USUAL HUNTING AREA FOR COMMUNITY. OUT ~5 TIMES. NO CHANGE NOTED IN WILDLIFE SINCE BIOGENIE DONE. DEPENDS ON SEASON HUNTING — RAIN LAST YEAR MEANT NO CARIBOU. IN SPRING, THE CABIN IS USED A LOT.

JASON MIKKI
@ HTA.

TM FAC# 1176/4/14.0502 26/8/09 0900.

1697.0902 26.8.09

INTERVIEW:
USED TO GO WHEN A KID — FISHING IN THE LAKE — ARCTIC CHAR. CAUGHT TUNDRA SWAN THOUGHT IT WAS A SNOW GOOSE. LAST YEAR WENT TO NEARBY LAKE — CAUGHT 1 CHAR. FRIENDS CAUGHT QUITE A FEW. ONCE IN A LONG WHILE — WOLF TRACKS, OCCASIONALLY CARIBOU TRACKS. USED TO COLLECT LITTLE EXPLOSIVES AT FOX C (ATTACH TO BATTERY & THEY EXPLODE). NO CHANGE NOTED — HAVEN'T GONE TOO MUCH RECENTLY. WENT TO A PLACE 2km-3km AWAY. SPRING TIME USUALLY FOR FISHING. ~~GARY Arnaqiq~~

26/8/09 1500 - AM 26.8.09.

1430
AM 26.8.09

LEVEL

1697-098R 26.8.09.

GUYS AT CO-OP
NOBODY OUT THERE THIS YEAR.
FISHING IN LAKE... ARCTIC
CHAR. BEAR, FOX, RABBIT,
PTARMIGAN, WOLF, NARWHAL,
NO MORE CARIBOU - TOO MANY
HELICOPTERS! RAVENS, SEAGULLS
SNOWY OWL, SNOW GOOSE.
PEOPLE USUALLY OUT IN SPRING.
HYDRA DUCKS. MIGHT SEE A LOON.
INTERVIEWEES INCL JOHNNY,
MORRIS (OUR FORMER BEAR
MONITOR) ET AL ON BREAK
AT CO-OP, 26.8.09 1500

AT 26.8.09

1697.098R 27.8.09

TRANZ: A. HENDERSON, M. CYR
EVENT: GW & SOIL (POSSIBLY) SAMPLING
OBSERVATION OF NHWL
LOCATION: FOX-C, NU
H&S: MODIFIED LEVEL D
EQPT: RKI EAGLE, HORIBA U-22,
INTERFACE PROBE, DIG. CAMERA.
WEATHER:

0600 CALIBRATE HORIBA U-22
(PINE ID: 13490) AT BASE -
TULUGAK HOTEL, QIKIQTARJUAQ -
TO AVOID REPEAT OF ERROR
READING (ERRG) IN FIELD
(LIKELY FROM TEMP FLUCTUATION)

	pH	cond	Turb	DO	Temp	ORP
pre	4.15	4.51	1.7	8.77	21.16	416
post	4.00	4.49	0.0	8.83	21.14	417

NB: here are the units for all
calibrations this program (and 1697-098R)
- mS/cm NTU V % °C mV

LEVEL

1697.0902 27.8.09

CALIBRATION GOOD, ALTHOUGH NOTE THAT ~~SEDIMENT~~ ORP PARAMETERS ARE OUT OF RANGE at 27809.

1000 ARRIVE FOX-C WITH C. LAMONTAGNE, K. MCKENNA, N. PLATO, ~~L. TOOMASI~~ am 27.8.09 (INAC), L. TOOMASI (BEAR MONITOR), M.

BEGIN INVESTIGATION OF MONITORING WELLS.

1230 BEGIN EXAMINATION OF LANDFILL, INCL. PICTURES.

1697.0902 27/8/09

SIGN	Time	LOC.	PIC
2 ravens fly-by	10am	NHOL	—
POLAR BEAR TRACKS (Mom & CUB)	1300	BOROW 3 OVERHEAD ↓	100-0467-69
BLACK BIRD (RAVEN)	1300		—
BIRD TRACKS	1320	NE OF NHOL	100-0470 am 27/8/09
DUCKS (SOUND)	1325	WATER (N)	—
BIRD TRACKS (C. GOOSE)	1400	BEACH	100-0483
SCAT (GOOSE)	1405	BEACH	100-0484
SCAT (GOOSE)	1420	LAKE	100-0493

LEVEL

1697.0802 27/8/09

1000 BEGIN EXAMINATION OF MWS – MEASURE STICKUP & CASING, DEPTH TO WATER, DEPTH TO BOTTOM & WATER QUALITY PARAMETERS.

MW.EAST – SURFACE SEAL LOOKS GOOD WITH MODERATE CRACKING. HINGE OF STICKUP CAP IN ROUGH SHAPE. (now broken) CL 27/8/09

Initial DTW: — DTB: 2.110
STICKUP 0.600 CASING: 54.0 cm

NOTE: WATER NOT ENCOUNTERED IN MW.EAST. ICE @ 2.110 (LIKELY).

MW.NORTH – SURFACE SEAL LOOKS GOOD WITH SOME CRACKING WHERE DIRT MEETS SEAL STICKUP & CASING LOOK STRAIGHT – NO HEAVING.

Initial DTW: — DTB: 2.01
STICKUP: 0.580 m CASING: 0.500 m

1697.0902 27/8/09

NOTE: WATER LEVEL METER IS NOT WORKING PROPERLY. USING WATERRAS TO ESTIMATE WATER LEVEL.

1100

MW NORTHWEST – SURFACE SEAL LOOKS GOOD – COVERED WITH DIRT. NO MOVEMENT OF INTERNAL CASING OR STICKUP. NO UPWELLING IN CAP OF STICKUP. AM 27/8/09

DTW — DTB 1.580
Stickup 0.480 Casing 0.245

MW SOUTHWEST – SURFACE SEAL OKAY – DIRT COVER. INNER CASING SHIFTED SLIGHTLY. NO UPWELLING IN STICKUP.

DTW — DTB 1.645
Stick-up: 0.550 Casing: 0.290

LEVEL

1697.0802 27/8/09

MW-SOUTH — SURFACE SEAL PRESENT — LOOKS GOOD WITH SOME CRACKING.

DTW — DTB 1.994

Stickup 0.560 Casing 0.465

SOME UPWELLING IN STICKUP. NO SHIFTING OF CASING OR STICKUP.

~~#~~ Put new lock on MW-South.

LOCKS WERE PRESENT ON MW NORTHWEST AND MW-SOUTHWEST.

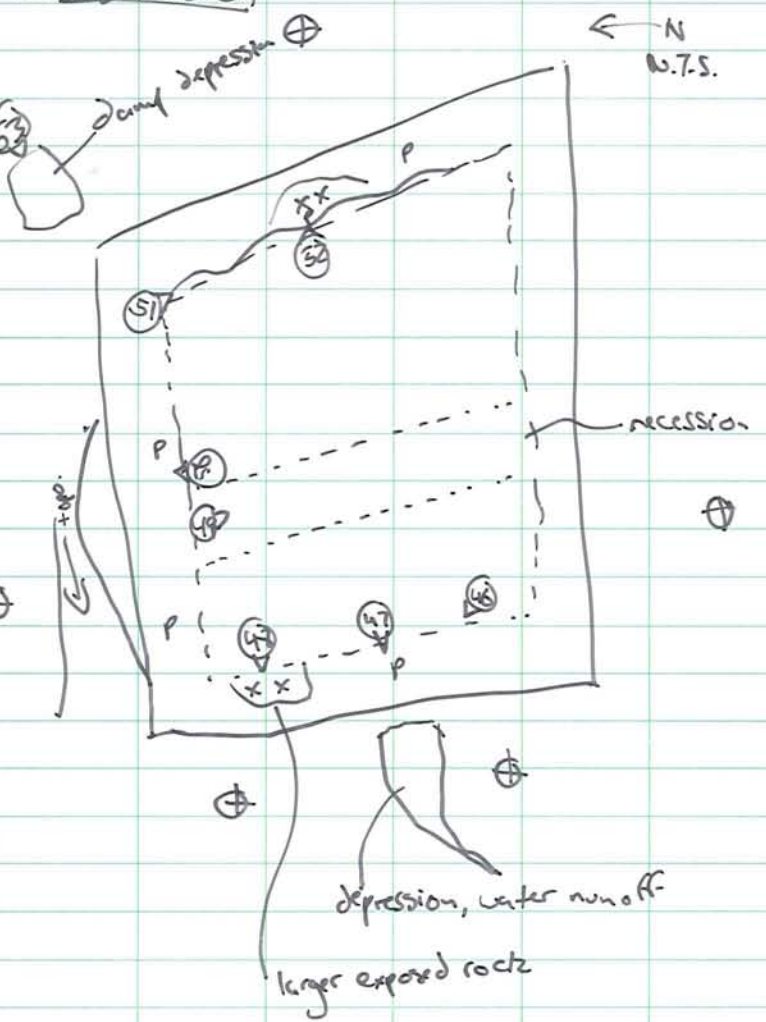
#1 SE corner 20m out diagonal
2 SE corner 10m out diagonal
3 1/3 down SE corner facing W
4 2/3 " " " " W
5 1/3 down SE corner facing N
6 2/3 " " " " "
7 mid ~~west~~ east side 20m out
8 " " " 30m out
9 NE corner 20m out diag.
10 " " 10 " "
11 NE corner facing SE 1/3 from top
12 " " " " 2/3 " "
13 NE corner facing NW 1/3 from top
14 " " " " 2/3 " "
15 mid N 20m out [redacted]
16 " " 30m " near MW-N
17 NW corner 20m out diagonal
18 " " 10m " "
19 NW corner 1/3 down facing NE
20 " " 2/3 " " NE
21 " " 1/3 " " SW
22 " " 2/3 " " SW
23 mid West side 20m out
24 " " " 30m "
25 SW corner 20m out diagonal
26 " " 10m " "
27 SW corner 1/3 down facing N
28 SW corner 2/3 down facing N
29 " " 1/3 " " E
30 " " 2/3 " " E
31 mid South 20m
32 " " 30m
33 facing N top corner SW side 10m W
34 " " " " " 20m "

LEVEL

35 facing N, top corner SE side 30m W
36 " " " " " " 40m W
37 " " " " " " 50m W
38 " " " " " " 60m W
39 " " " " " " 70m W
40 ~~facing~~ " " " " " 80m W
41 facing N, top corner SW side
42 facing W, top SW corner 5m in
43 " " " " " 15m "
44 " " " " " 25m "
45 " " " " " 35m "

1697-0902
NHWL SKETCH

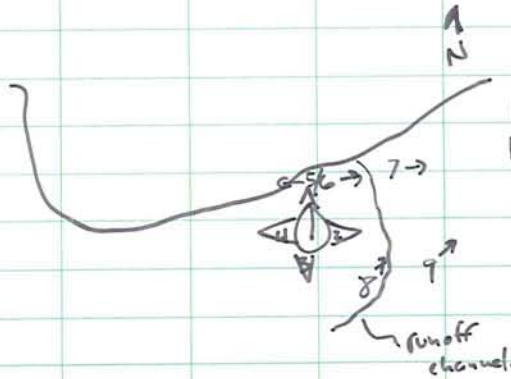
27/8/69.



LEVEL

1617.0902 27/8/07

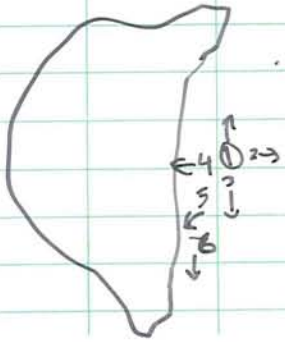
SEWAGE LAGOON PICS.



100-0474 ①
100-0475 ②
476 ③
477 ④
etc.

NOTE: SOME WOOD/METAL (NOT IN SIGNIFICANT AMOUNTS) PRESENT ON BEACH.

LAKE PICS 100-0487 - ① etc



1697.0902 27/8/07

NOTE: PICS 100-0494, 95 OF STAINED AREA IN BORROW S/C AREA (POSSIBLY IN SITU TREATMENT AREA). DISTINCT PHC-LIKE SMELL

TOP OF HILL PHOTOS

100-0497 — 100-0510 (LAST TOWARDS BLASTED AREA).