FINAL

TECHNICAL MEMORANDUM

Landfill Assessments at LF024 and LF026

Eareckson Air Station

June 2025

Contract Number: W911KB22D0016

AFCEC/CZOP
10471 20th Street
JBER Alaska, 99506-2201

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Draft Technical Memorandum

06 June 2025

SUBJECT: Landfill Assessments at LF024 and LF026, Eareckson Air Station, Shemya Island, Alaska; USACE – Alaska District Contract No. W911KB22D0016, Task Order W911KB22F0095

This Technical Memorandum (Tech Memo) presents the approach and findings of the landfill assessments conducted in May 2024 at the LF024 and LF026 landfills at Eareckson Air Station (EAS) on Shemya Island, Alaska (Attachment A, Figure 1). The task order was conducted for the Air Force Civil Engineer Center under United States Army Corps of Engineers Contract # W911KB22D0016 with the ensuing Tech Memo prepared in accordance with the Final Workplan (USAF 2024), the Manual for Electronic Deliverables (MED) (USACE 2017), and 18 Alaska Administrative Code (AAC) 60 (ADEC 2023).

1. INTRODUCTION

This Tech Memo provides a brief history of the landfills, a description of the field activities, and a summary of the findings. Attachments to this report include site figures (Attachment A), the Photographic Log (Attachment B), Field Documentation (Attachment C), and the Geophysical Report (Attachment D).

The project goals were to confirm the landfill boundaries, determine landfill cover thickness, and quantify uncovered debris that may require future removal. Project activities included completing landfill visual inspections, establishing global positioning system (GPS) survey control, and conducting geophysical surveys with an associated land survey of site features.

2. SITE BACKGROUND

EAS occupies all of Shemya Island, which is part of the extremely remote Near Islands. It is located approximately 1,500 miles southwest of Anchorage, Alaska (Attachment A, Figure 1). The United States Army first developed facilities on Shemya Island in 1943 to support operations against the Japanese occupation forces on nearby islands during World War II (WWII). In 1954, the site was deactivated; it was turned over to the Civil Aeronautics Authority in 1955, and subsequently leased to Northwest Airlines. In 1958, the United States Air Force (USAF) returned to Shemya Island to support various strategic intelligence gathering activities. The station was designated as an Air Force Base in 1968 and was re-designated as EAS in 1994. In 1995, EAS was downsized and reverted to caretaker status, and a private USAF Contractor took control of the facility. A work force of 30 to 60 Contractor personnel live and work at the station.

LF024 is in the southwest part of the island and is immediately adjacent to LF026 (Attachment A, Figure 2). LF024, also known as Barrel Bay, was used primarily as a disposal area for empty 55-gallon drums. The drums likely contained fuel. LF026, also known as the Scrap Metal Area, was used as a disposal area for metal debris, vehicle parts, wood, and other debris. The scrap metal at LF026 likely includes metal drums

which contained hazardous substances such as fuels, solvents, and glycols. A Record of Decision (ROD) for LF024 and LF026 was finalized in June 2010 (USAF 2010) and documented institutional controls (ICs) as the selected remedy. The ROD specifies that the landfill cover thickness and vegetation be maintained to prevent erosion, promote drainage, and prevent the escape of waste or leachate. The landfill caps must be inspected biannually to determine if they are thick and extensive enough to properly cover debris and to determine if significant erosion has occurred or may occur. If the landfill caps are deemed inadequate for any reason, they must be repaired. The ROD also requires that any uncovered debris be removed and disposed of properly. ICs for LF024 and LF026 include preventing exposure to subsurface soil and groundwater. IC inspections are conducted annually, and Comprehensive Environmental Response, Compensation, and Liability Act Five-Year reviews are conducted every five years. The most recent five-year review report finalized in February 2020 determined that the remedy at LF024/LF026 was not protective of human health and the environment because metallic debris is eroding from the landfill. The report recommended mitigation and/or remediation measures be evaluated to address the exposed metallic debris and erosion at the landfill. The most recent long-term monitoring report for EAS noted that LF024 was well vegetated on the cap, though significant metal debris was exposed along the beach (USAF 2023). The report also noted that LF026 was well vegetated but that the entire shoreline side of the site was eroding, with metal debris exposed and falling from the sidewall. The report recommendations included investigating exposed debris and determining landfill repair needs at LF024 and investigating erosion and determining landfill repair needs at LF026.

3. FIELD ACTIVITIES

Personnel from Aleut and Logic Geophysics mobilized to EAS on 3 and 8 May 2024, respectively, from Joint Base Elmendorf Richardson (JBER) via government operated passenger aircraft. Geophysical and survey equipment were mobilized ahead of the personnel via the government's bi-weekly cargo flight from JBER to EAS. Field activities were conducted between 7 and 13 May, upon which project demobilization occurred. An early field effort was planned for when the seagrasses were matted down to eliminate the need for vegetation clearing at the landfills. Project field activity approach and findings for landfill visual inspections, establishment of survey control, and geophysical and land survey are detailed in the following sections.

3.1 Visual Site Inspections

Aleut conducted visual inspections on 11 May 2024 at LF024 and 13 May 2024 at LF026. The inspections were conducted across the landfills in accordance with 18 AAC 60.396 (ADEC 2023) to document stressed vegetation, erosional features, exposed debris and other site features. Site inspection observations are documented in the Photographic Log (Attachment B) and on inspection logs (Attachment C). The land survey locations of select site features such as area groundwater monitoring wells, an existing survey control point, and site structures are shown in Attachment A: Figures 2, 3 and 4.

Observations noted during the LF024 inspection included (Attachment A, Figure 3):

- Access to the landfill area was not limited (no gate or traffic control) and no signage posted (Land Use Control Signs).
- Evidence of past dumping at the eastern end of the access road included rope, wood debris, cement blocks and an intact lead acid battery (Attachment B, Photographs 15 and 16).
- Monitoring wells (labeled SW10W3 and SW10W2) were identified and visually found to be in good condition. There was no evidence of tampering, the wells were not frost jacked, and the well riser pipes were capped; however, the well lids were not locked, and the lid hinges had rusted off (Attachment B, Photographs 03 and 14).
- The old WWII roadbed that curves through the northeastern portion of the site collects some surface water runoff although likely seasonal (Attachment B, Photograph 17).
- The landfill cap was well-vegetated across approximately 90% of the site, with no areas of stressed vegetation noted. However, in the south-central area of the site, where historical wood burning has occurred, surface metal debris has been exposed (Attachment B, Photograph 13). The ocean bluff is actively eroding, exposing additional landfill debris into the intertidal zones along the southwestern and southern boundaries (Attachment B, Photographs 04–08). Based on observations of landfill cover thickness along the bluff and the presence of less surface metal, the landfill cover appears to range from just a few inches to 12 inches thick in the south-central area along the beach bluff and the central remnant burnt wood debris area. In contrast, cover material along the beach bluff to the west of the south-central area was 2 to 3 feet thick. LF024 cover conditions are also visible in Photos 01–03.
- Prohibited waste present in the high and middle intertidal zones along the southern beach bluff included five partial lead acid batteries, scattered bits of battery lead plates (Attachment B, Photograph 08) and two partial 55-gallon drums of suspected tar (Attachment B, Photographs 08 and 09). Scattered bits of battery lead plates among the debris and the rocks in the middle and high intertidal zones and loose suspected tar material around the drums indicates wave action is breaking apart and spreading these items. In addition, an intact lead acid battery was located near the end of the access road in the spray zone (Attachment B, Photograph 16).
- A large volume of surface metal debris was observed scattered along the bluff that included several pieces of heavy equipment and smaller partially buried debris around the remnant burnt wood area in the central part of the site (Attachment B, Photographs 02, 04–09).
- Metal and wood debris was observed in two eroding sections of landfill cover on the beach embankment on the east side (Attachment B, Photograph 20).

Observations during the LF026 inspection included (Attachment A, Figure 4):

- Access to the area was not limited (no gate or traffic control) and no signage was observed to be posted (e.g., Land Use Control Signs) (Attachment B, Photographs 21 and 22).
- Site structures including the hazardous material storage shed, SP operations building and former weather instrument cluster were no longer present onsite. The continuously operating reference station (CORS) was still located onsite. An electrical transformer and stub up electrical panel box were newly installed midway down the western side of the access road.
- No evidence of unauthorized access or dumping was observed.

- Monitoring wells MW11, SW12W3, and an unlabeled well located at the beach adjacent to the WWII pillbox on the west boundary (possibly SW12W1, according to CH2MHill, 1990) were identified and were visually in good condition. There was no evidence of tampering, the wells were not frost-jacked, and the well riser pipes were capped. However, the well lids were not locked, and the lid hinges had rusted off (Attachment B, Photographs 23-25).
- LF026 boundaries extend further south and east from Figure 2 landfill boundaries based on observed beach bluff and surface debris. Observed landfill extents are presented in Figure 4.
- Stormwater runoff was direct to the ocean on the west, south and eastern sides of the landfill.
- The landfill cap appeared well-vegetated across approximately 90% of the site, except for areas disturbed by vehicle traffic during recent electrical upgrade installations. A slough in the cap was observed below the CORS (Attachment B, Photographs 35–36). The recent electrical upgrades at the site disturbed the landfill cover and resulted in exposed small metal debris near the surface. Landfill cover thickness was observed to range from approximately 2-3 feet on the southern bluff to over 10 feet on the western bluff. The cover on the eastern exposed bluff was approximately 3-4 ft in thickness.
- Exposed debris was observed eroding into the ocean along the western, southern, and eastern landfill ocean bluff boundaries that receive direct exposure to ocean waves during higher tides and inclement weather events. Debris consisted of heavy equipment, truck axels, miscellaneous metal, tires and prohibited waste items (lead acid batteries and suspected tar material (Attachment B, Photographs 27-34, 39). Exposed debris in the beach bluff approximately ranged in thickness from 2 to 10 ft. The debris extended into the high and middle intertidal zones.
- Prohibited waste included clumps of suspected tar material on the western beach bluff (Attachment B, Photograph 39) and a lead acid battery was observed on the beach bluff on the eastern side in the high tidal zones (Attachment B, Photograph 34).

3.2 Survey Control

Prior to geophysical and land survey activities, an assessment of the existing permanent survey monuments near the sites was conducted and all were either missing or damaged. Therefore, a new survey temporary control point was established by Logic Geophysics on the northeast side of the intersection of South Road and Laundry Loop Road across from the LF026 entrance road (Attachment A, Figure 4; Attachment B, Photograph 37). Logic Geophysics set the survey control using a global navigation satellite system (GNSS) real-time kinematic (RTK) base station to collect static position data over a metal rod driven into the ground to just above ground surface for a duration of approximately 5.5 hours. The static data was submitted to the Online Positioning User Service (OPUS) for final survey control position coordinates.

This control point served as the survey control to establish the landfill boundaries in accordance with 18 AAC 60.390(c) (ADEC 2023) and to document landfill features such as monitoring wells and exposed debris as discussed in Section 2.3 below. An existing survey control point found imbedded in a cut off telephone pole at the high point of the LF026 served as the daily check in/checkout point to verify and document positioning during survey activities. More information on establishing survey control is provided in the Geophysical Report (Attachment D).

3.3 Geophysical and Land Surveys

A geophysical survey utilizing ground-penetrating radar (GPR) and geospatial survey equipment was conducted to investigate the extents and landfill cover depth at both LF024 and LF026. GPR was proposed as the geophysical survey method because it provides sufficient electrical contrast between overlying soil and landfill debris. GPR can also detect both metallic and nonmetallic debris and can simultaneously provide the cover depth and lateral debris extent.

Logic Geophysics collected GPR data generally using a 10-foot line spacing across the anticipated extent of the landfills in a north-west direction, as topography allowed. GPR data was collected using 200-MHz GPR antennas mounted to a sled. Due to safety considerations, the direction and length of the lines depended on the site features (i.e., the easiest way to collect lines with the sled was up and down slopes rather than transversing them). The GPR control unit and associated display provided real-time quality control. During the geophysical survey, some of the portions of LF024 and LF026 were not possible for GPR data collection due to a combination of hazardous footing, steep terrain, surface debris and specifically the LF024 intertidal areas due to the concentration of large rocks that could affect the results of the survey. Additionally, surface debris and debris in the ocean bluff was observed west from the anticipated LF026 boundary; therefore, the land survey continued westward to encompass this area. Additional details and discussion of the GPR methods, equipment used, data quality assurance and control, and data analysis areas are discussed in Logic Geophysics' report in Attachment D.

A separate land survey using the same GNSS receivers and RTK as the GPR was conducted to document the location of key features such as survey controls, monitoring wells, exposed surface debris, and beach debris areas (Attachment A, Figures 3 and 4).

4. FINDINGS AND RECOMMENDATIONS

Exposed surface debris, eroding landfill edges along the ocean, and the presence of prohibited waste at both landfills are compromising the sites to the extent that the implemented ICs are no longer functioning to protect human health and the environment. It should be noted that open dumping and waste burning is no longer allowed and that the USAF provides a Site Orientation to all visitors indicating use of the active landfill.

The LF024 landfill cap was well vegetated across nearly 90% of the site with the exception being where the cover was disturbed around the burnt wood area and along the ocean bluff where the cover is actively being eroded. Exposed debris was observed along the southern and southwestern boundary eroding into the ocean was mostly metal, however several lead acid batteries and partial drums of tar were noted. In addition, a volume of metal debris was observed on the ground surface and partially buried along the southern beach bluff and to the north around the remnant burnt wood area. The hatched area shown in Attachment A, Figure 3, displays the general location of this surface debris. Additional metal debris was observed in the beach bluff, along the beach middle and high intertidal zones and scattered on the ground

surface west of the anticipated landfill western boundary. Past unauthorized dumping of wood, rope and cement blocks were observed at the end of the access road to the east.

The LF026 landfill cap was well vegetated across approximately 90% of the site with the exception being where the cover was disturbed during a recent electrical upgrade at the site, a slough below the CORS station and landfill boundaries to the west, south and southeast being actively eroding by the ocean. The recent electrical upgrades at the site disturbed the landfill cover and resulted in exposed small metal debris near the surface. Exposed debris was observed along the southwestern/southern boundary and the southeastern boundary eroding into the ocean was mostly metal; however, a lead acid battery and clumps of tar were noted. Landfill cover thickness was observed to range from approximately 2-3 feet on the southern bluff to over 10 feet on the western bluff. The cover on the eastern exposed bluff was approximately 3-4 ft in thickness. Site structures including the hazardous material storage shed, SP operations building and former weather instrument cluster were no longer present onsite. No evidence of recent dumping of debris or trash was noted.

The initial processing and interpretation of geophysical data provided estimates of the cover depth and lateral extents of the debris locations. The maximum depth of penetration with the GPR was approximately 12 feet. Figure 2 of the geophysical report (Attachment D) shows the lateral and vertical extent of the debris and Figure 3 of the geophysical report (Attachment D) shows the gridded surface elevations. The estimated depth below surface for the top of the debris ranged from 0 to 3 feet. Test pitting is recommended to ground truth the estimated depths.

Based on the visual inspection and geophysical survey results, the estimated quantity of exposed metal debris at the landfills are listed below:

- LF024 Bluff/beach – Landfill debris exposed 600 feet long, up 10 feet wide; up to 60 tons
- LF024 Surface – Heavy equipment, scattered loose metal debris, some partially buried; up to 50 tons
- LF026 Bluff/beach - Landfill debris 405 feet long, up to 15 feet wide; up to 100 tons

To comply with the landfill ICs identified in the ROD and 18 AAC 60, removal of the exposed debris on the beaches and landfill caps will be required, landfill cover repair needs to be completed, and signage needs to be posted. It is recommended that heavy equipment be used to safely remove and relocate the exposed landfill debris at the two sites. At this time, all prohibited debris items in the landfills (batteries, tar drums) should also be removed and disposed of in accordance with state/federal regulations off island. It is also recommended that the landfill cover be repaired with the exposed material being cut level with the existing surface grade and fill material placed to achieve required cover thickness. Additionally, reinforcement material should be added to the exposed and actively eroding landfill boundaries to prevent the potential for debris re-exposure.

5. REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2023. *18 Alaska Administrative Code (AAC) 60 Solid Waste Management. October.*

CH2M Hill. 1990. Final Technical Report, Shemya Air Force Base, Shemya Alaska. August.

United States Air force (USAF). 2010. Final Record of Decision North Beach Landfill (LF018), Barrel Bay and Scrap Metal Disposal Area (LF024/LF026) Eareckson AS, Alaska. June.

USAF. 2023. Final 2021 Long Term Management, Land Use, and Institutional Controls Report. July.

USAF. 2024. Technical Memorandum – Final Work Plan – Landfill Assessment at LF024 and LF026, Eareckson Air Station, Shemya Island, Alaska. March.

USACE. 2017. Manual for Electronic Deliverables, Requirements for Submittal of Documents, Laboratory Data, and Other Items. April

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ATTACHMENT A

FIGURES

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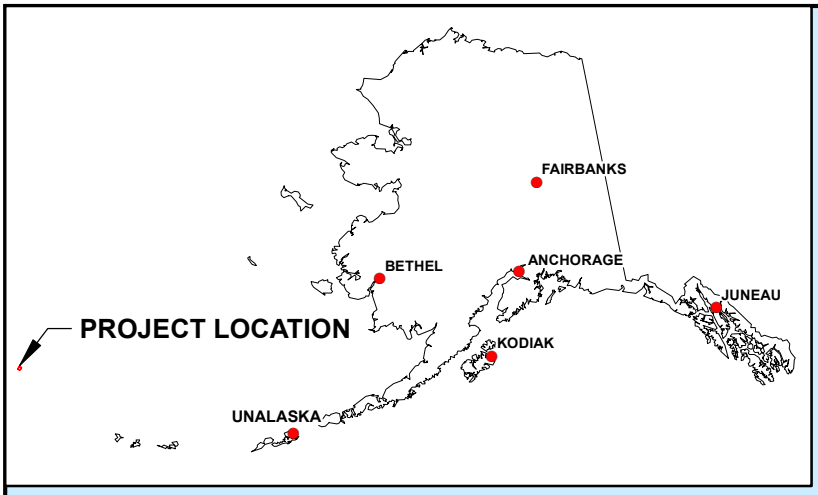
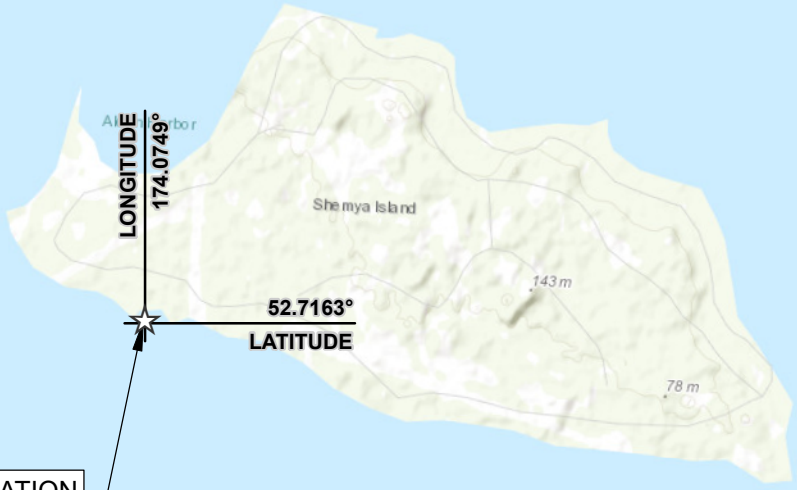
1 INCH





Basemap Source: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap

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LANDFILL ASSESSMENT AT LF024 AND LF026 REPORT
EARECKSON AIR STATION, SHEMYA ISLAND, ALASKA

STATE AND SITE VICINITY

DATE: 6/3/2025
PROJECT No.: 311137
DRAWN: K.T.

FIGURE: **1**

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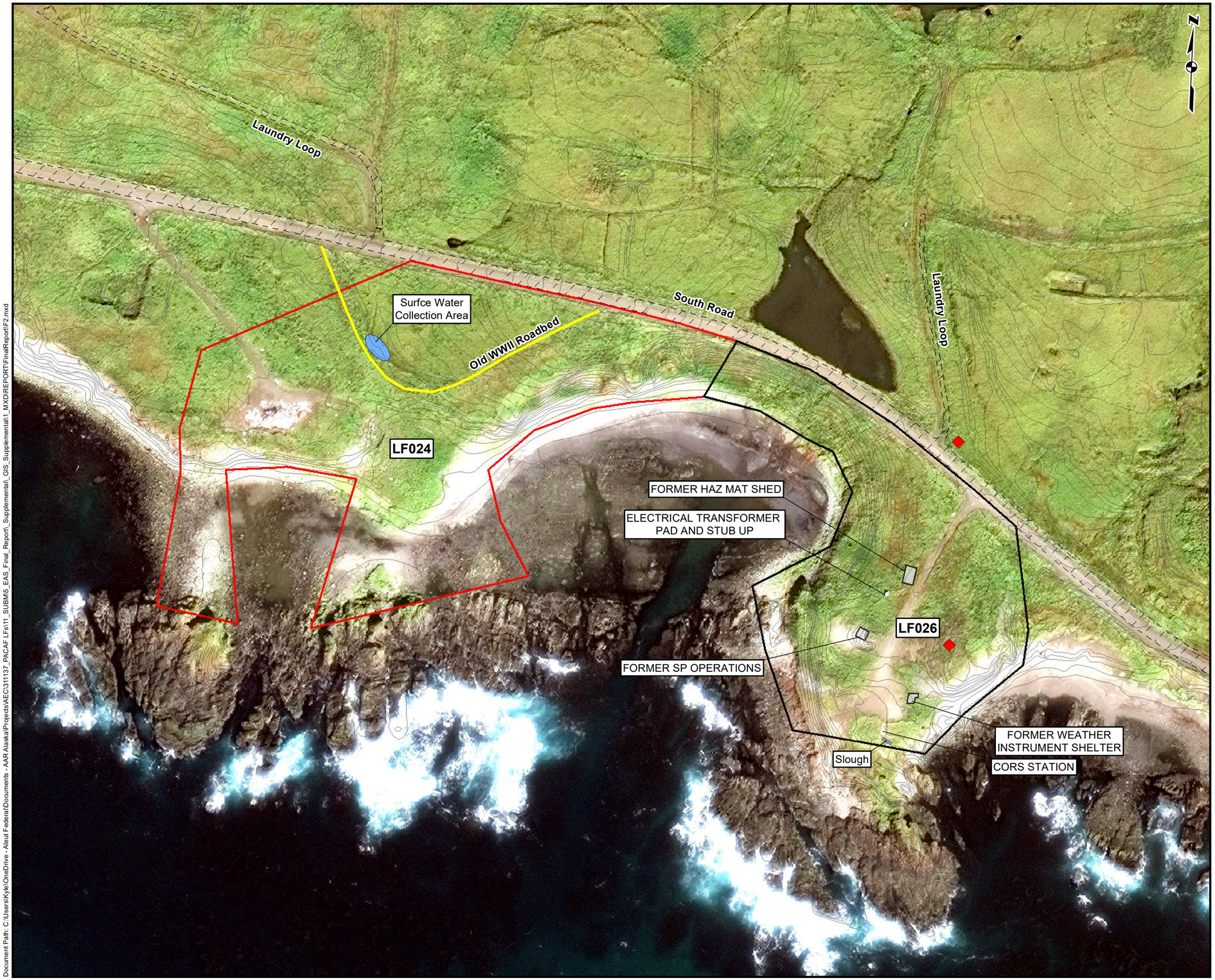
LANDFILL ASSESSMENT AT LF024 AND LF026 REPORT

EARECKSON AIR STATION, SHEMYA ISLAND, ALASKA

LF024 AND LF026 OVERVIEW



Legend

- Control Point
- WWII Roadbed
- Contour
- Surface Water Area
- Former Structure Location
- Road

Landfill Location

- LF024
- LF026

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.8.

References

1. Imagery, Road, Contour, and Landfill locations were provided by US Air Force Civil Engineer Center Environmental GIS Program's environmental Functional Data Sets. 2019. *Land Use Control Management Plan Update, Eareckson Air Station Shemya Island, Alaska.* August.
2. Control point locations were surveyed with RTK survey techniques in May 2024 by Logic Geophysics & Analytics LLC.s

UNIVERSAL TRANSVERSE MERCATOR COORDINATE SYSTEM ZONE 60, METER

HORIZONTAL DATUM: WGS84 | VERTICAL DATUM: NAVD88

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LANDFILL ASSESSMENT AT LF024 AND LF026 REPORT

EARECKSON AIR STATION, SHEMYA ISLAND, ALASKA

LF024 SITE FEATURES AND GEOPHYSICAL SURVEY AREA

Laundry Loop

South Road

MW-SWW10W3

MW-SW10W2

LF024

LF026

Surfce Water Collection Area

Old WWII Roadbed

Area with Significant Metal Surface Debris

Burnt Wood and Surface Disturbance

Surface Debris Area from Unauthorized Dumping

One Battery

Barrels in Cliff

Pipes in Outcrop

Two Partial Drums of Tar and Battery Pieces

Four Batteries

Low Intertidal Zone - No Debris

Low Intertidal Zone - No Debris

N

UNIVERSAL TRANSVERSE MERCATOR COORDINATE SYSTEM ZONE 60, METER
HORIZONTAL DATUM: WGS84 | VERTICAL DATUM: NAVD88

110 55 0 110

SCALE IN FEET

Legend

- Lead Acid Battery
- Tar Drums and Battery Pieces
- Beach Debris
- Surface Debris
- Monitoring Well
- WWII Roadbed
- Beach Debris Located in Middle/High Tidal Zone
- Contour
- Landfill Cover Disturbance Area
- Surface Water Area
- Geophysical Survey Location
- Road

Estimated Landfill Cover Area

- LF024
- LF026
- Extensive Surface Debris

Abbreviations

GPR ground-penetrating radar

Notes

1. For conceptual purposes only. All wells and debris locations were surveyed in 2024. All other site feature locations are approximate.
2. Map produced using ESRI ArcMap v. 10.8.
3. Geophysical survey location was investigated with GPR on a 10-foot line spacing across the anticipated extent of the landfills as topography allowed.
4. Estimated landfill cover locations drafted by referencing surveyed debris locations.

References

1. Imagery, Road and Contour locations were provided by US Air Force Civil Engineer Center Environmental GIS Program's environmental Functional Data Sets. 2019. *Land Use Control Management Plan Update, Eareckson Air Station Shemya Island, Alaska*. August.
2. Monitoring well and beach/surface debris locations were surveyed with RTK survey techniques in May 2024 by Logic Geophysics & Analytics LLC.
3. Tar drums and lead acid battery locations were plotted from photo coordinates watermarked via Solocator application.

PROJECT No.:	DATE:	FIGURE:
311137	6/3/2025	3
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LANDFILL ASSESSMENT AT LF024 AND LF026 REPORT

EARECKSON AIR STATION, SHEMYA ISLAND, ALASKA

LF026 SITE FEATURES AND GEOPHYSICAL SURVEY AREA

South Road
LF024
Laundry Loop
N
MW-11
Established Survey Control Point
WWII Pill Box
MW-SW12W1
MW-SW12W3
Electrical Transformer Pad and Stub Up
West Beach Debris Area
LF026 Site Access Raod
LF026
Existing Survey Control Point at Cut Off Telephone Pole
CORS Station
Crane Debris
Slough
East Beach Debris Area
Landfill Cover Slump Area

UNIVERSAL TRANSVERSE MERCATOR COORDINATE SYSTEM ZONE 60, METER
HORIZONTAL DATUM: WGS84 | VERTICAL DATUM: NAVD88

100 50 0 100 SCALE IN FEET

Legend

- Lead Acid Battery
- Tar
- Monitoring Well
- Beach Debris
- Surface Debris
- Control Point
- Beach Debris Located in Middle/High Tidal Zone
- Contour
- Electrical Upgrade Landfill Cover Disturbance Area
- Surface Water Area
- Geophysical Survey Location
- Road

Estimated Landfill Cover Area

- LF024
- LF026

Abbreviations

GPR ground-penetrating radar

Notes

1. For conceptual purposes only. All wells and debris locations were surveyed in 2024. All other site feature locations are approximate.
2. Map produced using ESRI ArcMap v. 10.8.
3. Geophysical survey location was investigated with GPR on a 10-foot line spacing across the anticipated extent of the landfills as topography allowed.
4. Estimated landfill cover locations drafted by referencing surveyed debris locations.

References

1. Imagery, Road and Contour locations were provided by US Air Force Civil Engineer Center Environmental GIS Program's environmental Functional Data Sets. 2019. *Land Use Control Management Plan Update, Eareckson Air Station Shemya Island, Alaska*. August.
2. Monitoring well, beach/surface debris, and control point locations were surveyed with RTK survey techniques in May 2024 by Logic Geophysics & Analytics LLC.
3. Tar and lead acid battery locations were plotted from photo coordinates watermarked via Solocator application.

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ATTACHMENT B

PHOTOGRAPHIC LOG

(LF024: PHOTOGRAPHS 01 THROUGH 20)
(LF026: PHOTOGRAPHS 21 THROUGH 39)

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Photograph 01: Overview of the LF024 area.

Photograph 02: Overview of the western area with metal surface debris outside of LF024 west boundary.

Photograph 03: LF024 groundwater monitoring well SW10W2 and metal surface debris.

Photograph 04: Metal debris at southwestern beach bluff and high intertidal zone outside of the LF024 western boundary.

Photograph 05: Metal piping sticking out from the beach bluff and metal debris in the middle and high intertidal zone outside of the LF024 western boundary.

Photograph 06: LF024 southern bluff edge with scattered surface metal debris on the ground surface and eroding into the middle and high intertidal zones facing west.

Photograph 07: LF024 southern bluff edge with buried and surface metal debris eroding into the middle and high intertidal zones facing east.

Photograph 08: A broken lead acid battery in LF024 high intertidal zone below the southern bluff.

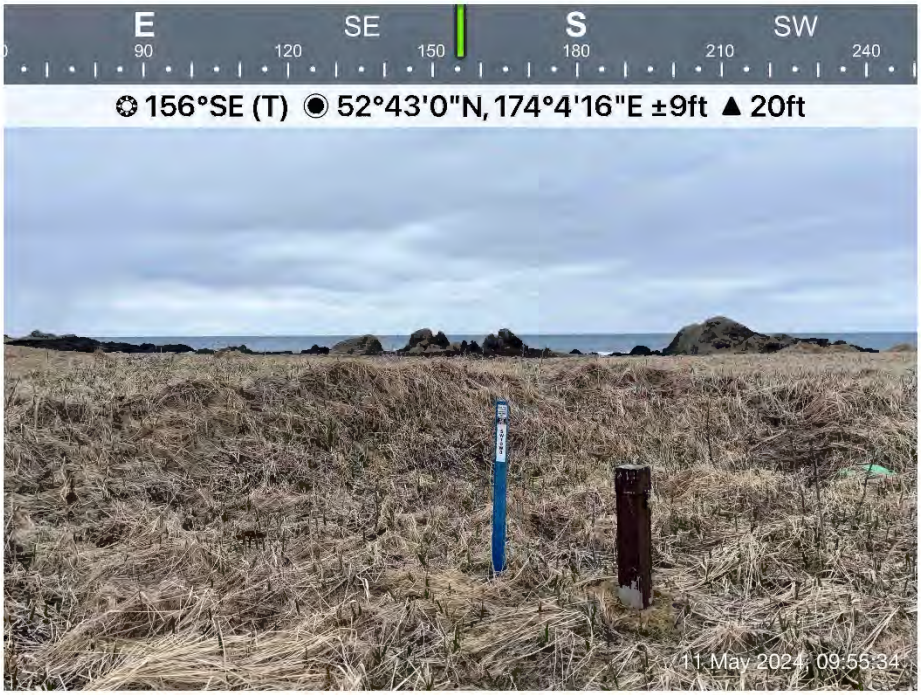
Photograph 09: Partial drums of tar in high intertidal zone of the LF024 southern debris area.

Photograph 10: LF024 southwestern peninsula area overview of middle intertidal zone.

Photograph 11: Attempt to perform GPR over the LF024 southern peninsula middle intertidal zone.

Photograph 12: LF024 southeastern peninsula low and middle intertidal zone overview.

Photograph 13: LF024 burnt wood area with small metal debris.



Photograph 14: LF024 groundwater monitoring well SW10W3.

Photograph 15: LF024 unauthorized surface debris dumped at the end of the access road.

Photograph 16: LF024 GPR survey in progress and an intact lead acid battery near the end of the access road in the spray zone.

Photograph 17: LF024 old WWII roadbed and surface water ponding.

Photograph 18: LF024 view west from the eastern boundary.

Photograph 19: GPR survey along the eastern beach.

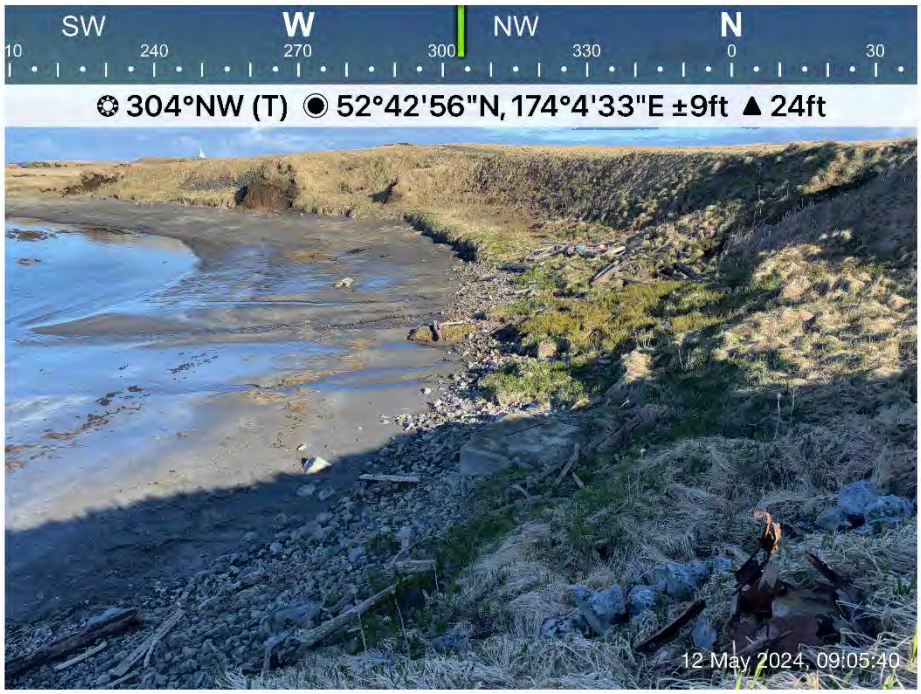
Photograph 20: Buried metal and wood debris in the eastern beach bluff.

Photograph 21: Overview of LF026 located on the southern side of South Road facing West.

Photograph 22: LF026 access road entrance.

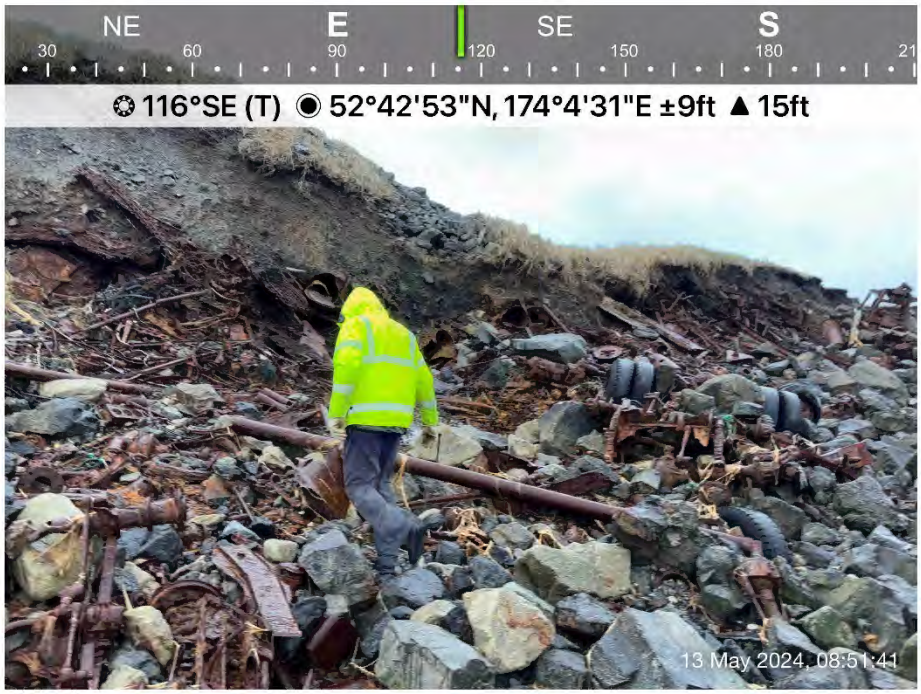
Photograph 23: LF026 groundwater monitoring well MW 11 near the intersection of South Road and Laundry Loop Road.

Photograph 24: LF026 groundwater monitoring well MW SW12W3.



Photograph 25: LF026 western boundary with unmarked groundwater monitoring well in front of the WWII pill box.

Photograph 26: View of LF026 western boundary from LF024 boundary with WWII pill box in the center of picture.



Photograph 27: LF026 southwestern boundary with exposed landfill debris along beach middle to high intertidal zones with the crane visible on the right-hand side.

Photograph 28: View of continued exposed LF026 debris along the southwestern boundary with the crane in the background in the middle to high intertidal zones

Photograph 29: LF026 southern boundary with exposed landfill debris along the beach bluff in the high intertidal zone.

Photograph 30: GPS survey of exposed metal debris at the southern edge of LF026 in the high intertidal zone.

Photograph 31: LF026 eastern boundary.

Photograph 32: GPS survey of LF026 southeastern boundary exposed landfill debris in the middle to high intertidal zones.

Photograph 33: LF026 eastern boundary with exposed landfill debris along the bluff.

Photograph 34: LF026 eastern landfill debris with lead acid battery at toe of exposed bluff debris.

Photograph 35: Disturbed landfill cover with exposed debris from recent electrical upgrades.

Photograph 36: LF026 exposed landfill debris in cover slough below the CORS station.

Photograph 37: Landfill survey control point location across from LF026.

Photograph 38: Daily GPS check shot location at LF026 cut off telephone pole control point.

Photograph 39: Tar material observed on western bluff of LF026.

ATTACHMENT C

FIELD DOCUMENTATION

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Aleut Remediation - Forrest Janukajtis 5/11/24

Eareckson Air Station - LF24 Inspection

Landfill Visual Inspection Form			
	Description	**Yes/ No/ n/a**	**Notes**
Access Control and Signs			
1	Is access to and within the facility limited and controlled?	No	- blocks & telephone to block road present but not in place to control traffic
2	Is there any evidence of unauthorized access or dumping?	Yes	- rope/cement blocks ↳ older & not recent (rope/cement blocks)
General Facility Components			
3	Are there any signs of damage to the retaining walls, roads, public areas, or other structures?	Yes	Cover material thin in areas & ocean bluff erosion
Monitoring Devices			
4	Are monitoring wells, gas vents, and thermistors easily located and accessible (clear of vegetation and debris)?	Yes	MW present, no vents or thermistors
5	Are monitoring structures functional and well maintained? Locked? Clearly Labeled?	Yes/No	MW appears ok, not locked, lids hinges rusted off SW#W3 & SW#W2
6	Are monitoring structures free of signs of tampering?	Yes	
7	Have monitoring structures been impacted by frost action (frost heaving, raised or cracked surfaces)?	No	wells are upright/vertical good condition
8	Have monitoring structures been otherwise damaged (missing, dented, or bent)?	No	- lid hinges rusted off
Stormwater Management System			
9	Are pipes, culverts, ditches, swales, berms, dikes, straw bales, erosion control matting, riprap, and other stormwater structures well maintained and free of waste?	No	- old road bed collects some surface water
10	Does the control system prevent run-on from flowing into the active cell?	No	
11	Does the control system prevent run-off from the landfill from impacting nearby lands or waters?	No	
12	Is there any standing water in the landfill?	Yes	- likely seasonal

Alert Remediation - 5/11/24

Eareckson Air Station - LF24 Inspection

Landfill Visual Inspection Form			
	Description	Yes/ No/ n/a	Notes
Waste Handling and Placement			
13	Is the waste disposal area at least 50 feet from the property boundary?	N/A	- All USAF property * Match debris outside provided land PA boundary to the west
14	Do the landfill slopes appear properly graded and stable? (Look for cracks, sloughing of soil or waste)	No	- S, SW ocean bluff eroding - eastern beach bluff slumps
15	Are there any prohibited wastes disposed in or around the landfill?	Yes	- lead acid batteries, tar drums X2 X 5
16	Is there any waste in contact with surface water, including temporary ponding?	No/Yes	- Not fresh water @ surface - Ocean water in contact w/ debris
17	Are disposed wastes sufficiently covered?	No	*
Impacts to Landfill Cells			
18	Are there any signs of frost action (frost heaving, raised or cracked surfaces)?	No	
19	Do the landfill slopes appear properly graded and stable? (look for cracks, sloughing of soil or waste)	No	- southern bluff face eroding
20	Is there any settling of waste causing depressions or holes in the landfill?	No	
21	Is there visible evidence of a leachate seep? (If so contact ADEC)	No	
22	If leachate is visible, is it contained within the landfill cell?	N/A	
23	Is any waste apparent on closed or inactive areas?	~~No~~ Yes	*

* surface metal debris present in central area where access road ends. Extensive metal surface debris along southern ocean bluff & in intertidal area. 5 batteries noted in intertidal zone @ bluff. West boundary not clear as metal debris on surface & visible in bank. some metal debris observed in beach embankment on east side but minimal.

Aleut Remediation - Forrest Jankajtis 5/13/24 pg 1

Eareckson Air Station - LF26 Landfill Inspection

Landfill Visual Inspection Form			
	Description	Yes/ No/ n/a	Notes
Access Control and Signs			
1	Is access to and within the facility limited and controlled?	No	- no signs present - access not controlled
2	Is there any evidence of unauthorized access or dumping?	No	
General Facility Components			
3	Are there any signs of damage to the retaining walls, roads, public areas, or other structures?	Yes	- cover eroding on SW, S, E ocean bluffs - Haz storage shed / SP Ops Bldgs some - electrical service upgrade - ~~roads ok~~
Monitoring Devices			
4	Are monitoring wells, gas vents, and thermistors easily located and accessible (clear of vegetation and debris)?	Yes	- note well @ beach on west boundary
5	Are monitoring structures functional and well maintained? Locked? Clearly Labeled?	Yes / No	MW11, MW-SW12W3 = Yes unlocked/unlabeled mw @ beach
6	Are monitoring structures free of signs of tampering?	Yes	
7	Have monitoring structures been impacted by frost action (frost heaving, raised or cracked surfaces)?	No	- upright & undamaged
8	Have monitoring structures been otherwise damaged (missing, dented, or bent)?	Yes	- riser caps not air tight - beach well
Stormwater Management System			
9	Are pipes, culverts, ditches, swales, berms, dikes, straw bales, erosion control matting, riprap, and other stormwater structures well maintained and free of waste?	No	- no surface waste - no stormwater mngement system - run off direct to ocean
10	Does the control system prevent run-on from flowing into the active cell?	N/A	
11	Does the control system prevent run-off from the landfill from impacting nearby lands or waters?	N/A	
12	Is there any standing water in the landfill?	No	

Eareckson Air Station - LF26 Landfill Inspection

Landfill Visual Inspection Form			
	Description	**Yes/ No/ n/a**	**Notes**
Waste Handling and Placement			
13	Is the waste disposal area at least 50 feet from the property boundary?	N/A	- All USAF property - Waste within boundary
14	Do the landfill slopes appear properly graded and stable? (Look for cracks, sloughing of soil or waste)	No	- Some metal surface debris - Exposed edges along W. S. SE ocean edges
15	Are there any prohibited wastes disposed in or around the landfill?	Yes	Lead acid batteries, tar e East side bluff
16	Is there any waste in contact with surface water, including temporary ponding?	Yes	Landfill debris spilling onto beach along W, S, E sides
17	Are disposed wastes sufficiently covered?	No	- uncovered surface debris from recent eletrical pad upgrades - W, S, SE beach bluffs exposed debris
Impacts to Landfill Cells			
18	Are there any signs of frost action (frost heaving, raised or cracked surfaces)?	No	
19	Do the landfill slopes appear properly graded and stable? (look for cracks, sloughing of soil or waste)	No	- exposed metal debris in crack below CORS station - exposed debris on beaches W, S, SE areas
20	Is there any settling of waste causing depressions or holes in the landfill?	No	
21	Is there visible evidence of a leachate seep? (If so contact ADEC)	No	
22	If leachate is visible, is it contained within the landfill cell?	N/A	
23	Is any waste apparent on closed or inactive areas?	Yes	- see #14

ATTACHMENT D

GEOPHYSICAL REPORT

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GPR SURVEYS AT PACAF LANDFILLS

Draft Report

Logic Geophysics & Analytics LLC
Final Report
For Ground-Penetrating-Radar Surveys of PACAF Landfills at Eareckson Air Station, Kalakaket Creek, and Indian Mountain

Date: 5 June 2024
To: Rex Hovey; AECOM Technical Services, Inc.
From: Esther Babcock, Logic Geophysics & Analytics LLC
Attachments: A: Figures

Contents

1. Executive Summary

Logic Geophysics & Analytics LLC (Logic Geophysics) is submitting this report to AECOM Technical Services, Inc. (AECOM) concerning ground-penetrating-radar (GPR) surveys at 3 different landfills within the Pacific Air Force (PACAF) area of command, located at Eareckson Air Station, Kalakaket Creek Radio Relay Station (RRS), and Indian Mountain Long Range Radar Station (LRRS). The project objective was to collect GPR data in transects at 10-ft spacing over each landfill, then process and interpret the data to provide interpreted lateral extent of debris and the estimated depth of cover. Deliverables, as per the project specification, include a report (this document) showing the interpreted extent of debris as well as associated electronic deliverables.

Logic Geophysics collected GPR data at the sites in May and July 2024 using 200-MHz GPR antennas mounted on a sled. All project work was completed with a focus on safety. During data collection, the GPR control unit and associated display provided real-time quality control. The GPR system also tied Global Navigation Satellite System (GNSS) data directly to the incoming geophysical data for real-world, real-time kinematic (RTK) positioning of the surveyed lines and associated interpretations.

Initial data processing and interpretation of profile data provided estimates of the depth of cover and also lateral extents of the debris locations. Figures with geo-referenced maps are provided electronically with this report. At Eareckson, GPR data indicates that debris may potentially extend outside the current boundaries (Figure 2). Ground-truth information such as potholing will be required to corroborate the GPR interpretations.

Logic Geophysics completed the entire project safely and on time. Please contact me if you have any questions. I appreciate the opportunity to provide these services to AECOM and hope to work with your team again in future.

2. Objectives and Deliverables

The objectives for the geophysical surveys at the 3 PACAF landfill sites were as follows:

1) Collect ground-penetrating-radar (GPR) data in linear transects over the identified areas of concern (AOCs) at the 3 landfills; and
2) Process and interpret the collected GPR data to estimate the lateral extent and thickness of cover on the debris; and
3) Identify ash layers in the landfill where possible and confirmed by boreholes.

The corresponding deliverables per the scope of work are the following:

1) Raw and processed geophysical data in compliance with the 2017 Manual for Electronic Deliverables (MED); and
2) A final report (this document) describing methods and including figures showing the interpretations.

MED-compliant data will be provided upon conclusion of the work and delivery of the final report.

3. Methods

3.1 Overview of ground-penetrating radar (GPR)

A GPR transmitter emits electromagnetic energy (the "signal") into the subsurface at a specified central frequency. If conductivity is low, this energy travels as a wave. Where subsurface objects or lithology contrasts exist, corresponding changes in electrical properties can cause part of the propagating signal to reflect to the surface. A co-located GPR receiver measures the reflected signal, which the system digitizes and records for processing and interpretation. GPR is often implemented for delineating the lateral and vertical extent of buried waste because the electrical properties of those manmade materials differ significantly from those of the background, usually fill or native soil materials, thus providing an amenable target for the GPR system.

GPR is widely implemented for mapping buried debris and subsurface geology. Nonetheless GPR methods are not infallible, having several known limitations including soil conductivity. The GPR method has advantages and disadvantages for subsurface geotechnical investigations. Advantages include the following:

1) Targets of geotechnical investigations are often suitable for the GPR method;
2) GPR is non-destructive and non-hazardous;
3) GPR does not require ground disturbance; and
4) Extensive survey areas, such as these landfills, can be covered at greatly reduced time and cost as compared to traditional methods such as drilling boreholes.

However, limitations inherent to this method can hinder its efficacy:

1) Ground-truth information is always required for correlating geophysical interpretations with subsurface features of interest;
2) Conductive features, such as high clay content or salt water, preclude GPR signal penetration; and
3) Processing and interpretation of GPR data require substantial user knowledge.

3.3 Safety

Safety was the highest priority throughout the project work. All personnel participated in a safety meeting each morning, before the start of work. The most common hazards were slips, trips, and falls, due to the uneven surface, surface obstructions, and occasionally steep terrain such as at the Eareckson site. Surface obstructions included debris, for example boards with nails in them or metallic objects on the surface partially exposed in the tundra. Methods for mitigating this hazard included reviewing each day's area before working to identify specific surface hazards. The second-highest hazard was wildlife, at the Kalakaket and Indian Mountain sites (Anticipated).

Two additional hazards included the weather and fatigue. To manage fatigue, during the workday, frequent breaks allowed for food, hydration, and rest. On poor weather days, more frequent rest breaks were employed to allow for warming. Suitable clothing, including waterproof outer layers, kept workers warm and relatively dry during adverse conditions.

3.4 Description of equipment used

Logic Geophysics employed Sensors & Software's "pulseEKKOPro" GPR imaging system using 200-MHz antennas mounted on a sled with a GNSS receiver affixed above the midpoint of the instrument (Photos 1 and 2). The system incorporates a high-power transmitter and the latest available receiver technology offered by Sensors & Software, called the "Ultra," for maximum imaging depth. The high-power transmitter is about 10 times more powerful than standard GPR transmitters, and the Ultra can "stack" up to 64,000 times. (One method to improve signal-to-noise ratio for common-offset reflection GPR data is to collect more than 1 trace at each measurement position and add them together. This method is commonly called "stacking." Stacking improves data quality because signal events constructively sum during the averaging process, while noise tends to deconstructively interfere. Since the data quality improves proportional to the square root of the stacks, the enhanced stacking feature of the Ultra represents a significant increase in data quality.)

Photo 1: The 200-MHZ GPR system on Eareckson in the sled used for acquisition. Note the sled puller, on the right, referencing his mobile device for positioning.

Photo 2: The 200-MHZ GPR system on Eareckson in the sled used for acquisition. The controller is on the ground on the right.

The two boxes mounted within the sled in Photo 2, covered in waterproofing material, are the system's receiver and transmitter. The transmitter and receiver mount on external antennas within the sled and are powered by 2 internal batteries. The antennas are grey wooden boards that house selectively arranged resistors and capacitors for creating the desired signal. The GPR controller recorded the received signals for later processing and also displayed them during data collection for real-time quality control of incoming data (Figure 4). The controller tied incoming GNSS NMEA-data strings directly to the GPR data for real-world positioning of collected data.

The GPR controller, to the right in Photo 3, is powered by its own separate battery, which the operator wears in a backpack while the controller is mounted on a chest harness. The controller stores the incoming data, as well as displays the data on its screen for real-time quality control. A Global Navigation Satellite receiver (GNSS) receiver above the center of the system provides positioning for the collected data. During data acquisition, the GNSS antenna streams positioning information to the controller, which then ties that information to the data. Table 1 provides parameters used during data collection, which followed manufacturer guidelines.

The 200-MHz antennas can typically provide target detection to about 12 or 14 feet below surface. Exact depth limitations depend on site conditions, for example soil-moisture content and soil lithology. Logic Geophysics' geophysicist used both the GPR's controller display and daily review of collected data to ensure that depth objectives were met.

Table 1: Data collection parameters for the PACAF landfills.

Parameter	200-MHz Setting
Survey type	Reflection (common offset)
Antenna polarization	Broadside
Antenna orientation	Perpendicular
Central frequency	200-MHz
Acquisition setting	Free run, 0.5 seconds
Along-line measurement (trace) spacing	0.33 feet
Time window	185 nanoseconds
First break offset	10%
Sampling interval	400 picoseconds
Antenna separation	1.5 feet
Stacking	2048
Pulser voltage	1000 Volts

3.5 Positioning

During data collection, a Global Navigation Satellite System (GNSS) system was used to provide survey-grade positioning of results. At Shemya, on the first day on site, static-data collection with the GNSS base-station receiver occurred for ~5.5 hours. This data record was then processed online using the Online Positioning User Service (OPUS) to provide an accurate coordinate for the base receiver location and the location marked with green whiskers. The OPUS report is included in the electronic deliverables. One the second day, the static point was collected for 8 hours, and the OPUS solution reprocessed. On Kalakaket and Indian Mount, existing survey-grade control points were used for the base station location (Anticipated). A check shot was collected each day as well.

Throughout data collection, the base-station receiver was stationed above the respective survey control point (Photo 3). The base station then provided corrections in real-time via radio link to the GNSS rover antenna mounted above the GPR sled. The deliverables are provided in UTM Zone 60N, meters, and NAVD88 Geoid12B, also in meters for consistency.

Photo 3: The GNSS base-receiver site on Shemya.

4. Data Quality Assurance and Quality Control (QA/QC)

4.1 Tests conducted

GPR data QA/QC procedures included the following items:

1) System warm-up of 10 minutes;
2) Static data assessment before acquisition to verify data collection parameters and qualitatively assess data quality;
3) A “lift test” to identify any system noise and assess data quality;
4) Real-time monitoring of GNSS data quality during QA/QC tests and subsequent acquisition; and
5) Real-time monitoring of GPR data quality via the controller display.

The GPR static test allows the operator to qualitatively assess proper data collection, to monitor the GNSS data quality, and to examine the system for the presence of any interference and/or noise. Static test data acquisition occurred after a 10-minute system warm-up. A lift test after the static test at the start and end of the daily GPR work provided a system assessment. During the lift test, the system settings remained the same as for the static test.

4.2 Real-time QA/QC

Before each line’s collection began, the controller displayed the system settings to ensure no unintended changes had occurred that would negatively affect data quality. The controller simultaneously displayed the starting GNSS data quality information to ensure positioning accuracy reliability.

Real-time GPR QA/QC is provided by visual monitoring of the incoming GPR and GNSS data in the DVL. The controller processed the incoming data for visualization purposes; but to maintain data integrity the controller only stores the raw data. With this visualization, Logic’s experienced GPR operator could readily detect problems with degraded signal content or interference from external noise sources should they exist (for example, nearby radio interference).

4.3 Results

Real-time QA/QC of the incoming GPR and GNSS data indicated good data quality (on a scale of poor/fair/good) throughout acquisition. Maximum depth of penetration with the GPR systems was approximately 12 feet. GNSS data quality was excellent throughout the survey. A complete reporting of QA/QC results as well as associated data and electronic deliverables is being provided upon completion of the project.

5. Data Analysis

5.1 Initial Processing

After data collection, I downloaded the data from the controller onto the processing computer. Sensors & Software EKKOProjects software provided data processing, visualization, and interpretation. Processing steps included the following items:

1) Dewow: Dewow is a zero-phase filter generating the difference between the trace value and the average trace value over a defined window width. GPR data require the dewow process before viewing or carrying out further processing. The time window length was set to one period and therefore varied by frequency.
2) Bulk static shift (“time-zero” correction): Proper data collection practice requires setting the initial break in the recorded GPR signal to a time delay of about 10% of the collected time window. This setting preserved all information in the signal. Thus, applying a bulk static shift realigned all reflection events to their true recorded times. This correction always applies to the first break, not to the maximum amplitude as is so frequently incorrectly done by inexperienced GPR practitioners. Correcting to the first break, the “true” time zero, prevents depth errors associated with wavelet dispersion and other signal distortions in identified reflection layers.

This algorithm shifted all traces equally in time to align the median value of the first break time with zero time. The threshold was 5 mV.

3) Background removal: This 2-dimensional filter calculated the average of the entire line data and subtracted it from the data. This filter removed the direct arrival between the antennas, of no use in interpretation, and reduced other noise from nearby, constant-distance, metal objects such as small metal hardware pieces on the sled.
4) Gain: Since radar signal strength decreases with time due to unavoidable attenuation processes, applying a gain function boosted the later time signals for optimal visualization and interpretation. For these data, a spreading and exponential compensation (SEC) gain, a composite of linear time gain and exponential signal recovery optimized late-time reflection events. This gain attempts to compensate both for spherical spreading losses and for the exponential ohmic dissipation of radar energy. SEC gain is the gain closest to physical reality and most commonly used for GPR data.
5) Velocity analysis: Determining the correct radar wave velocity is essential for accurate determination of object depth and for migration processing. A hyperbolic velocity calibration fits a superimposed hyperbola to diffraction patterns in the data, such as those generated from crossing over subsurface boulders or other buried point objects.
6) Time-to-depth conversion: GPR data are recorded in time. Since the desired outcome is layer depths, not time, the final step was to use the same velocity model that was applied during migration to convert the profile time values to depth.

5.3 Interpretation

Interpretations were accomplished using online software called Geolitix, which allow the user to add points and polylines to interpreted anomalies and export those to Google Earth. A polyline tool was used to pick the top of the interpreted debris. After picking, the software exports the raw picks to .csv files with corresponding position information. Gridding the .csv data occurred in Golden Software's "Surfer" software. Gridding was performed using triangular interpolation. After gridding, the data were smoothed and contoured and plotted with a suitable color scale for visualization.

6. Landfill Sites and Results

6.1 Eareckson Air Station

The Eareckson landfill was located on Shemya Island to the southwest of the runway. The surface within the planned survey area was variable, including gravel, rock, debris, hummocks, tussocks, and terrain features (Photo 4). Surface debris was prevalent within the project area and precluded data collection in some locations. Due to safety considerations and time limitations, the steepest areas were not collected with the GPR. Direction and length of lines depended on the site features, both natural and manmade. For example, the easiest way to collect lines with the sled is up and down slopes, not traversing across them.

Photo 4: An example of surface conditions at Eareckson AFS landfills.

Figure 2 shows the results from the GPR interpretation at Eareckson over the surveyed area for the lateral and vertical extent of the debris. Estimated depth below surface for the top of the debris ranged from 0 to 3 feet. A hatched area on Figure 2 provides an outline of the section of the landfill which had prevalent surface debris. Figure 3 shows the gridded surface elevations, ranging from ~1 to 17 m in NAVD88, Geoid12B.

6.2 Indian Mountain Long Range Radar Station

TBD

6.3 Kalakaket Radio Relay Station

TBD

7. Uncertainty

Several potential sources of error exist for these data and corresponding analysis, including the 2 following largest sources of uncertainty:

1) *Depth errors*: Estimates of target depths generated from GPR data have several sources of error:
    a. Vertical resolution limitations inherent to the GPR data;
    b. The true ground surface being below the effective GPR surface in areas of thick vegetation; and
    c. Errors in the velocity eestimates.

    Mitigation: Diffraction patterns in the collected data provide objects for velocity hyperbola calculations. However, suitable data features for velocity analysis were scarce. Vertical resolution limits for the various frequencies can introduce approximately 20% error for this survey, depending on the thickness of the burial area. Uncertainty increases with depth of targets, which is a physical limitation of the method. The blanking problem is also an inherent limitation of the method. Mitigation of this source of error included using the highest frequency possible after assessing target depths.
2) *Interpretive errors*: Interpretation for these data are based on user experience at similar landfills in Alaska. In some places within these data sets, the extent and top of the debris

are quite blatant. In others, the interpretations have more uncertainty. Ground-truth, in the form of boreholes or pot-holing, is essential to confirm the GPR interpretations for future accurate use of these data sets.

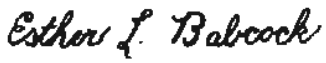
3)

8. Closing

TBD

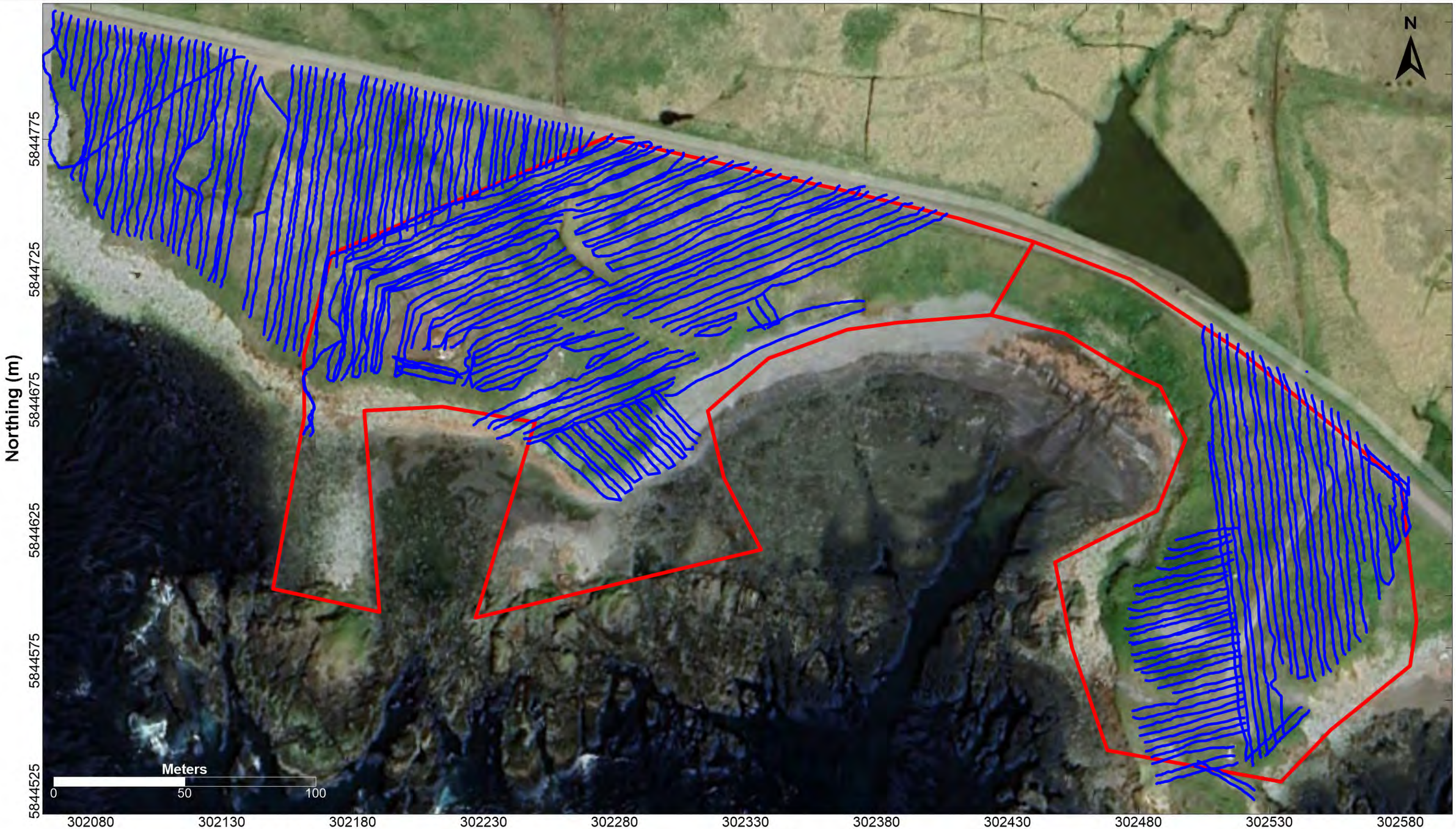
Logic Geophysics & Analytics LLC is pleased to provide these results to AECOM and looks forward to working with you again in future. Please contact me if you have any questions.

Sincerely,



Esther Babcock, Ph.D.
Owner/Geophysicist
Logic Geophysics & Analytics LLC
ebabcock@logicgeophysics.com | Ph: (907) 744-8111
Service Disabled Veteran Owned – Certified Alaska DOT DBE – Woman Owned Small Business

Appendix A



LEGEND

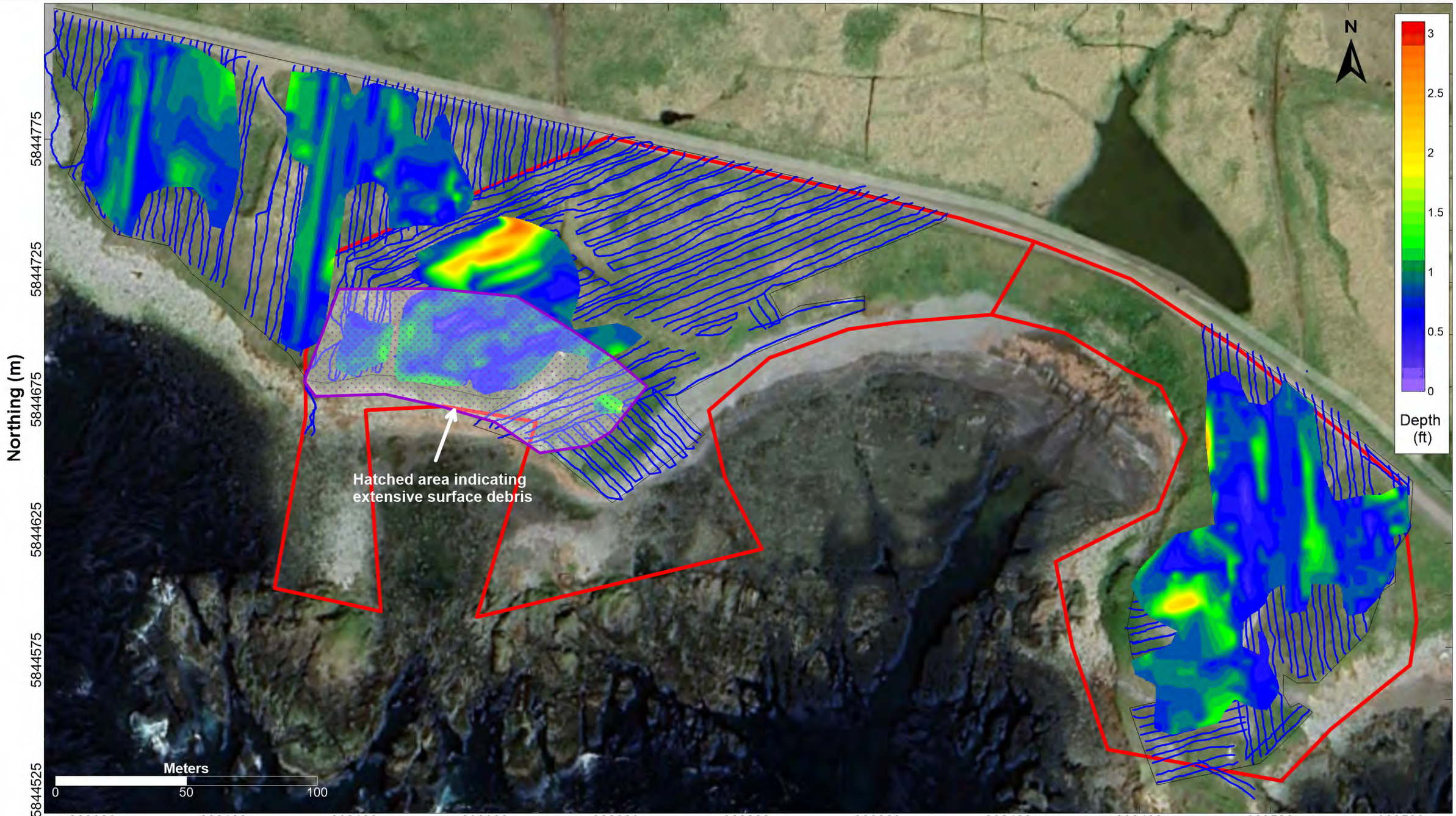
- Area outline
- Completed lines

NAD83, UTM Zone 60N, meters

Figure 1
Eareckson Data Collection

LogicGeo
www.logicgeophysics.com

Project Name: Landfill GPR investigations at various Air Force stations
Project no.: AECOM #60709918
Project Location: Eareackson AFS, Alaska
File Name: AreaOverview2.srf
Client: AECOM
Date Created: 6 April 2024
Field Dates: 10-15 May 2024
File Path: D:\\Projects2023\ALE24\Figures



LEGEND

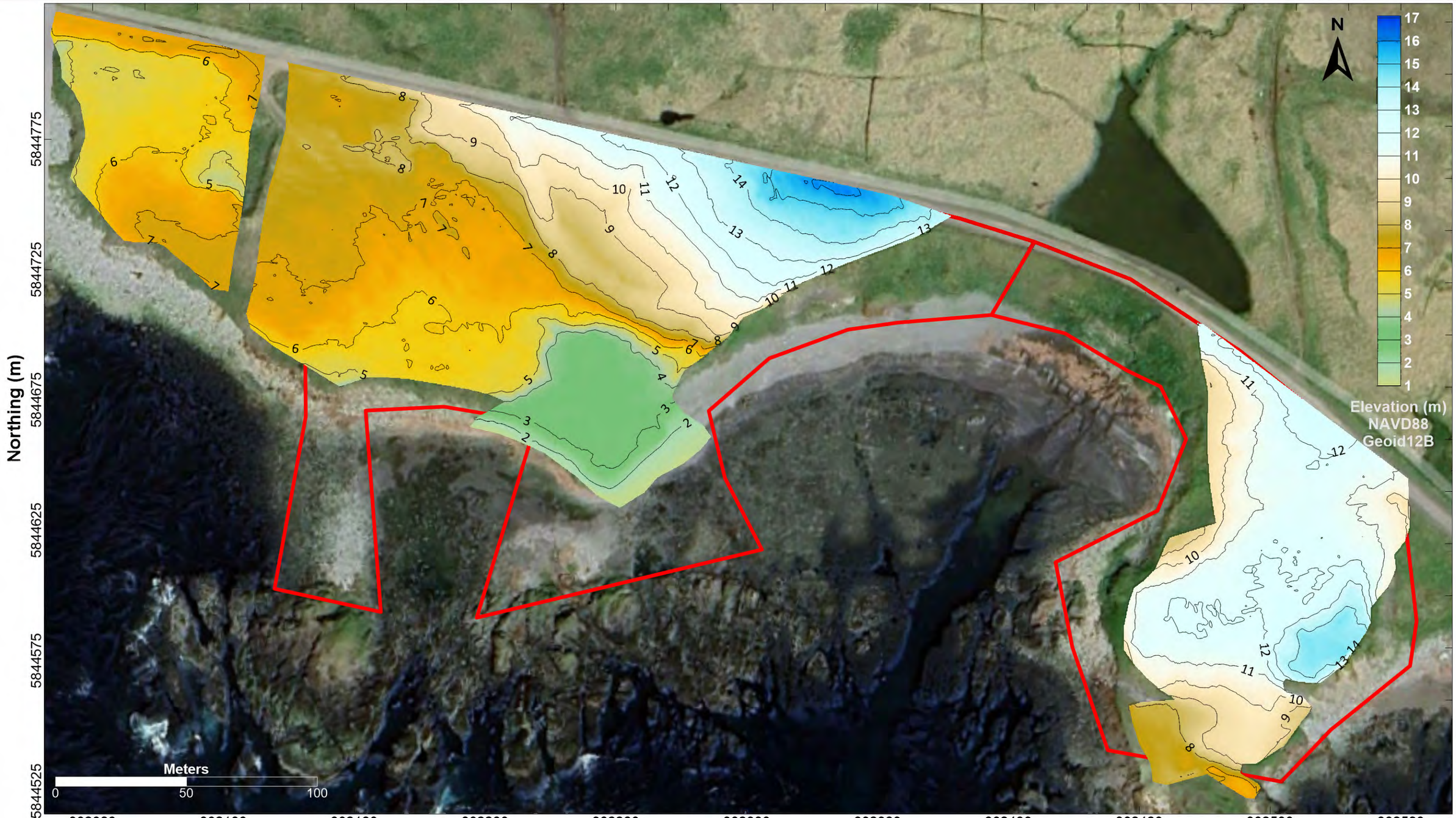
- Area outline
- Completed lines

NAD83, UTM Zone 60N, meters

Figure 2
Interpreted Depth of Cover

LogicGeo
www.logicgeophysics.com

Project Name: Landfill GPR investigations at various Air Force stations
Project no.: AECOM #60709918
Project Location: Eareackson AFS, Alaska
File Name: EarecksonResults.srf
Client: AECOM
Date Created: 1 June 2024
Field Dates: 10-15 May 2024
File Path: D:\\Projects2023\ALE24\Figures



LEGEND

- Area outline
- Completed lines

NAD83, UTM Zone 60N, meters

Figure 3
Eareckson Surface Elevation

LogicGeo
www.logicgeophysics.com

Project Name: Landfill GPR investigations at various Air Force stations
Project no.: AECOM #60709918
Project Location: Eareackson AFS, Alaska
File Name: SurfaceMap.srf
Client: AECOM
Date Created: 6 June 2024
Field Dates: 10-15 May 2024
File Path: D:\\Projects2023\ALE24\Figures

ATTACHMENT E

RESPONSE TO COMMENTS

(with ADEC Approval Letter)

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THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Site Program

610 University Avenue
Fairbanks, AK 99709
Main: 907.451.2143
Fax: 907.451.2155

File No.: 2649.38.001
2649.38.024
2649.38.026

Electronic Delivery Only

May 19, 2025

Ms. Kristy Rouse
Remedial Project Manager
AFCEC/CZOP
10471 20th Street, Suite 348
JBER, Alaska 99506-2201

Subject: DEC responses to comments for the *Draft Technical Memorandum –Landfill Assessments at LF024 and LF026, Eareckson Air Station, Shemya Island, Alaska; USACE – Alaska District Contract No. W911KB22D0016, Task Order W911KB22F0095* January 2, 2025

Dear Ms. Rouse:

The Alaska Department of Environmental Conservation (DEC) received responses to comments for the review of the above-referenced document. The document describes findings and observations of two landfill (LF) sites (LF024 and LF026) at Eareckson Air Station (EAS) on Shemya Island, Alaska. The project goals were to confirm the landfill boundaries, determine landfill cover thickness, and quantify uncovered debris that may require future removal. Exposed surface debris, eroding landfill edges along the ocean, and the presence of prohibited waste at both LF024 and LF026 are compromising the institutional controls for the sites. Corrective actions (removal of surface debris, repair landfill cover, post signs and removal of the prohibited items) were recommended to bring the site back in compliance with the institutional controls (IC's) described in the *CERCLA Record of Decision North Beach Landfill (LF018) Barrel Bay and Scrap Metal Disposal Area (LF024/LF026), Final, Eareckson Air Station, Alaska* (dated June 2010).

The DEC Contaminated Sites Program and the DEC Solid Waste Program reviewed the responses and have accepted the responses (see enclosure). Please provide a clean, final document to complete a comment backcheck on prior to DEC providing approval. If there are any questions, please contact me by phone at (907) 451-2182 or by email at erica.blake@alaska.gov.

Sincerely,

Erica Blake
Environmental Program Specialist

Enclosure: 2025.05.19 DEC RTCs_LFAssessment

cc via email: Neil Lehner, DEC Solid Waste Program
Luci Farrell, DEC Solid Waste Program

REVIEW COMMENTS

PROJECT: Eareckson Air Station, Alaska

DOCUMENT: Draft Technical Memorandum –Landfill Assessments at LF024 and LF026, Eareckson Air Station, Shemya Island, Alaska; USACE – Alaska District Contract No. W911KB22D0016, Task Order W911KB22F0095

ALASKA DEPT. OF ENVIRONMENTAL CONSERVATION	DATE: 3/21/2025 REVIEWER: Erica Blake (907-451-2182), Luci Farrell (907-451-1650)	Action taken on comment by: USAF and its Contractor (AECOM)

Item No.	PDF page, Section, paragraph.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1	General	Based on this assessment report, the institutional controls discussed in the 2010 Record of Decision are not functioning as intended. How does the U.S. Air Force plan to correct the issues? Per the 2010 ROD the Eareckson Air Station Base General Plan was to be updated with boundaries of LF024 and LF026 noting restrictions on those areas. Unauthorized dumping and waste burning indicates these areas are being used, not restricted. In accordance with 18 AAC 60.396(b) deed notices or other instruments will be used to document that these sites are landfills, maintenance and repairs may be necessary to prevent pollution problems, and any activity that may damage the cover material will be corrected. With varied thicknesses of the landfill cover observed in 2024, how will these be repaired? These sites have not been approved for unlimited use/unrestricted exposure (UU/UE) and the institutional controls at these sites are not protective. How will the USAF ensure workers and visitors to the island do not get exposed with the eroding debris and waste present on the surface? How is the USAF currently informing workers and visitors to Shemya about the land use controls at LF024 and LF026?		The Air Force has planned a debris removal and landfill repair project for FY25/FY26 award; depending on availability of funding. USAF continues biennial monitoring and documentation of the landfills. The land use control management program is shared with onsite visitors. LUC signage at both areas requires replacement.	Accept.
2	General	Statement: "Any activity that is inconsistent with IC requirements, objectives, or controls, or any action that might interfere with the protectiveness of the ICs, will be reported to ADEC and addressed by the USAF as soon as practicable after discovery."		See RTC #1, project VNMH20XX7724 is being programmed for debris removal and landfill repair.	Accept based on the USAF programming

REVIEW COMMENTS

PROJECT: Eareckson Air Station, Alaska

DOCUMENT: Draft Technical Memorandum –Landfill Assessments at LF024 and LF026, Eareckson Air Station, Shemya Island, Alaska; USACE – Alaska District Contract No. W911KB22D0016, Task Order W911KB22F0095

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		Please provide DEC with a plan discussing how the activities inconsistent with the current institutional controls described in the 2010 Record of Decision, will be corrected.			debris removal/landfill repair at the LF24 and LF26.
3	General	It is unclear to DEC why open dumping and waste burning is occurring on this small island with a population of 60 or less, when there is an active landfill with about 17 years left in its lifespan. All personnel on this six square mile military controlled island should be trained in the proper disposal of waste, so it is confusing as to why these unauthorized activities are occurring.		Noted. The open dumping and waste burning was not recent and is no longer allowed at EAS. USAF provides a Site Orientation to all visitors indicating use of the active landfill.	Noted. It would be helpful if the tech memo discussed waste burning as not being allowed at EAS anymore. The document describes the waste burning like it could have been a recent development.
4	General	In the 2010 Record of Decision, the institutional controls for LF024 and LF026 refer directly to DEC Solid Waste regulations which direct post closure activities to include biennial visual inspections that are meant to ensure that the landfill cover thickness is maintained and vegetated. Should the remedies not comply, corrective actions would need to be performed timely, not fifteen years later (refer to 18 AAC 60.390, 60.396(b), 60.815)		Noted. See RTC #2.	Noted, see response to RTC #2.
5	Section 3.1, First Bullet	Statement: "Access to the landfill area was not limited (no gate or traffic control) and no signage posted (Land Use Control Signs)"		Noted. See RTC #2.	Noted, see response to RTC #2.

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		Based on the next bullet indicating there was unauthorized dumping and wood burning at LF024, signs should be posted notifying workers and visitors to Shemya about the hazards at LF024 and LF026.			
6	Section 3.1, Third Bullet	Statement: "Monitoring wells (labeled SW10W3 and SW10W2) were identified and visually found to be in good condition. There was no evidence of tampering, the wells were not frost jacked, and the well riser pipes were capped; however, the well lids were not locked, and the lid hinges had rusted off (Attachment B, Photographs 03 and 14)." What are these monitoring wells used for? Long-term monitoring only includes IC inspections. If these wells are not being used, and there are no plans to use them, rather than repair them, they should be decommissioned following the DEC Monitoring Well Guidance (September 2013).		Noted. USAF to recommend well decommissioning of wells that are no longer being used for any other planned or proposed purposes.	Agree with comment. The USAF should assess the wells being used, and decommission the wells no longer in use.
7	Section 4	There were observations of varying thickness of cover on both LF024 and LF026. Cover on closed landfills should be at least 2 feet in thickness. Areas of these two sites where landfill cover is less then 2 feet in thickness need to be repaired.		Noted. See RTC #2.	Noted, see response to RTC #2.
8	Section 4, Last Paragraph	Please coordinate with the DEC Solid Waste Program on the disposal of waste from LF024 and LF026. Please confirm that any waste placed in the active, permitted landfill is an authorized material. No petroleum contaminated material may be disposed of in the active landfill without DEC Solid Waste Program approval. An approved sampling plan under 18 AAC 60.025 and 18 AAC 60.240 will be required for any materials removed for disposal in the permitted landfill.		Noted. USAF will coordinate with DEC on disposal of any solid waste removed from LF024 and LF026. USAF will coordinate with the DEC Solid Waste Program prior to disposing waste into an active landfill.	Accept.

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9	Section 4, General	The last paragraph describes corrective actions needed for LF024 and LF026. DEC concurs with the repairs described. Please provide a timeline as to when these issues will be corrected.		See earlier responses - a contract to perform debris removal and landfill repair is being programmed; award is dependent on the availability of funds.	Accept.
10	References	Please add a reference to 18 AAC 75 and the 2010 Record of Decision.		Agree. The identified references will be added to the Report.	Accept with comment backcheck.
11	Figure 1	Please revise this figure to include an image of Shemya Island in focus. The image used for Figure 1 is blurry and detail cannot be viewed correctly.		Agree. The Figure will be revised so that it is clearer.	Accept with comment backcheck.
12	Attachment B Photograph Log, Photograph 09	This photograph is showing tar seeping out of a partial drum and oozing onto ground surface. Were there any odors by this partial drum with tar? Based on the photo showing tar seeping out if this partial drum to ground surface and causing staining, the DEC Prevention, Preparedness and Response (PPR) Program should have been notified of the release of hazardous substance to the environment per 18 AAC 75.300.		Noted. The tar material was solid, and no odors were noted. Understood.	Accept
13	Attachment B Photograph Log, Photograph 39	Was there an odor coming from the tar in this photo? This tar came out of something, and is evidence that a hazardous release has occurred. PPR should have been notified about this.		Noted. The tar material was solid, and no odors were noted. Understood.	Accept
14		--- END OF COMMENTS ---			

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