Draft Final Engineering Evaluation/Cost Analysis

Fort Glenn CON/HTRW Project 02

Formerly Used Defense Site F10AK029802

Umnak Island, Alaska

Contract W911KB-17-D-0020

Task Order W911KB-20-F-0034

April 2021

Prepared for:

U.S. Army Corps of Engineers

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
%	percent
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AGC	U.S. Army Geospatial Center
AHRS	Alaska Heritage Resources Survey
APE	Area of Potential Effect
ARAR	applicable or relevant and appropriate requirements
AST	aboveground storage tank
bgs	below ground surface
BLM	Bureau of Land Management
BTEX	benzene, toluene, ethylbenzene, and xylenes
C:N:P	carbon:nitrogen:phosphorus
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CON/HTRW	containerized hazardous, toxic, and/or radioactive waste
COPC	compound of potential concern
CSM	conceptual site model
CWA	Clean Water Act
cy	cubic yards
DRE	destruction or removal efficiency
DRO	diesel range organics
DTBR	depth to bedrock
DTW	depth to water
EA	environmental assessment
EC	engineering control
EE/CA	Engineering Evaluation/Cost Analysis
EMT	emergency medical technician
EPA	U.S. Environmental Protection Agency
FRTR	Federal Remediation Technologies Roundtable
FUDS	Formerly Used Defense Sites
GAC	granular activated carbon
GFM	Government Furnished Information
GPS	Global Positioning System
GRO	gasoline range organics
HQ	hazard quotient
IC	institutional control
ID	identification

ACRONYMS AND ABBREVIATIONS (CONTINUED)

IR	infrared spectrometer
ISM	incremental sampling methodology
Jacobs	Jacobs Engineering Group Inc.
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NA	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGS	National Geodetic Survey
NHL	National Historic Landmark
NRHP	National Register of Historic Places
NTCRA	non-time-critical removal action
PA	preliminary assessment
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PID	photoionization detector
POL	petroleum, oil, and lubricant(s)
PPE	personal protective equipment
ppm	parts per million
QC	quality control
RA	remedial action
RAO	removal action objective
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RRO	residual range organics
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
sf	square feet
SHPO	State Historic Preservation Office
SIM	selected ion monitoring
SRB&A	Stephen R. Braund and Associates
SSI	screening site inspection
TBC	to be considered
TSM	Technology Screening Matrix
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UTV	utility task vehicle
VEG	Vapor Energy Generator

ACRONYMS AND ABBREVIATIONS (CONTINUED)

VOC	volatile organic compound
WWII	World War II
XRF	X-ray fluorescence

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EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) was prepared by the U.S. Army Corps of Engineers (USACE), Alaska District, to identify and assess non-time-critical removal action (NTCRA) alternatives to support the selection of a remedial action (RA) for Project 02 (Drum Piles) at the Fort Glenn Formerly Used Defense Sites (FUDS) Property F10AK0298 on Umnak Island, Alaska (site). This EE/CA report was completed in general accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and prepared in accordance with the U.S. Environmental Protection Agency (EPA) guidance document *Guidance on Conducting Non-Time Critical Removal Actions under CERCLA* (EPA 1993).

Fort Glenn was established as an air base on the northeast coast of Umnak Island during World War II (WWII). In 1942, building began on Umnak with the construction of a 5,000-foot-long by 100-foot-wide airfield near Otter Point ("Main Airfield"). Two satellite fields were subsequently constructed on Umnak Island, one to the north near Cape Tanak ("Northern Airfield," also known as Berry Field) and one to the southwest between Kettle Cape and Black Rock ("Pacifier Airfield").

When fully operational, the Fort Glenn area, including Nikolski, supported over 10,000 officers and enlisted personnel, plus a medical detachment and civilian construction employees. Troops began withdrawing from Fort Glenn in 1943, and by late 1944, little more than a care-taking detachment and a communications mission remained. In all, over 700 buildings were constructed during the time that the Department of Defense occupied the island.

Multiple visits and investigations have been conducted on the Fort Glenn FUDS property by government employees and contractors from 1985 to 2019. Sampling to date indicates that unacceptable risk exists from petroleum, oils, and lubricant (POL) contamination, with potential for the presence of non-POL contaminants, from drums stockpiled on the site during past military activities; however, there are limited receptors at the site, allowing for planning of more than 6 months and indicating that a NTCRA is appropriate for the site. The NTCRA for the site is intended as one of a series of response actions, and additional RA may be warranted in the future after the removal action described in this EE/CA report has been conducted to meet future site goals.

The scope for the NTCRA alternatives for the Fort Glenn FUDS Project 02 features is removal of contaminant source soils to meet soil cleanup levels found in Alaska Department of Environmental Conservation (ADEC) 18 Alaska Administrative Code (AAC) 75 Table B1 Over 40-Inch Zone for human health and ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (the remedial goals) (ADEC 2020). The final outcome of this EE/CA report is to identify the most suitable alternative that ensures the risk posed from source areas in soil are mitigated. Due to limited data available, three estimates of soil volume were generated. The low estimate includes all drum features with indications that contamination is present; the middle estimate includes the low features, as well as additional drum features that are likely contaminated; and the high estimate includes all drum features for Project 02 except those that were determined to be uncontaminated or already remediated.

The NTCRA described in this EE/CA report is part of a holistic strategy for remediation at the site, and no additional investigation will occur prior to the NTCRA; therefore, the low soil volume estimate will be carried forward as it reflects known source soils. The middle and high estimates can be used to reflect possible volumes for complete remediation of the site that addresses residual soil contamination and contamination that may be present in media other than soil.

After screening of potential technologies and approaches, the following NTCRA alternatives were identified:

- **Alternative 1: No Action** – No additional action would occur. Retained for further consideration per CERCLA to serve as a baseline against which to compare other developed alternatives.
- **Alternative 2: Institutional Controls** – Controls such as environmental covenants would be applied to areas with remaining contaminant concentrations above the remedial goals. Requires concurrence from landowners as USACE does not retain ownership of the site.
- **Alternative 3: Onsite Ex Situ Incineration** – A mobile incineration unit would be transported to the site and used to treat excavated soil. Post-treatment soil would be used as backfill.
- **Alternative 4: Excavation and Offsite Disposal** – Contaminated material would be excavated and transported offsite for disposal. Excavations would be backfilled from a local borrow source and sloped and contoured for drainage.
- **Alternative 5: Onsite Landfarming** – Soil would be excavated and staged for landfarming. Landfarming can effectively treat POL contamination in soil, although treatment time would take multiple years. Post-treatment soil would be used as backfill.

These alternatives were evaluated individually for effectiveness, implementability, and cost. Based on this evaluation, recommended alternatives were identified for each estimate of soil volume:

- **Alternative 3: Onsite Ex Situ Incineration** is the recommended alternative for the low soil volume estimate. This alternative is the most cost effective for the volume of soil requiring treatment and would be effective no matter the concentrations of contaminants.
- **Alternative 5: Onsite Landfarming** is the recommended alternative for both middle and high soil volume estimates. This alternative is the most cost effective for the large volume of soil requiring treatment and would be effective for the likely overall concentrations of contaminants.

1.0 INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) report was prepared by the U.S. Army Corps of Engineers (USACE), Alaska District, to identify and assess non-time-critical removal action (NTCRA) alternatives to support the selection of a remedial action (RA) for Project 02 (Drum Piles) at the Fort Glenn Formerly Used Defense Sites (FUDS) Property F10AK0298 on Umnak Island, Alaska (site) (Figure 1-1). Project 02 (Drum Piles) is one of four projects covered under one USACE contract (Contract W911KB-17-D-0020, Task Order W911KB-20-F0034). The other three projects are Project 15 (Tanks with Pipelines and Pump Stations), Project 16 (Transformers), and Project 17 (Miscellaneous Abandoned Machinery), which will be addressed in separate EE/CA reports. This EE/CA report was completed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and prepared in accordance with the U.S. Environmental Protection Agency (EPA) guidance document *Guidance on Conducting Non-Time Critical Removal Actions under CERCLA* (EPA 1993).

The goal of this EE/CA report is to determine a removal action alternative to address known contamination at the Fort Glenn FUDS property. Sampling to date indicates that unacceptable risk exists due to exceedances of risk-based screening levels (RBSLs) in soil and the presence of gross contamination at some features. However, there are limited receptors at the site, allowing for planning of more than 6 months and indicating that a NTCRA is appropriate for the site. The NTCRA for the site is intended as one of a series of response actions, and additional RA may be warranted in the future after the removal action described in this EE/CA report has been conducted to meet future site goals.

1.1 Scope and Purpose

The primary purpose of this EE/CA report is to evaluate NTCRA alternatives for the Fort Glenn FUDS, Project 02 features that have contaminant concentrations in soil above RBSLs and/or show signs of gross contamination. Following CERCLA guidance, this EE/CA report identifies removal action objectives (RAOs), identifies potential NTCRA alternatives, and evaluates alternatives against criteria identified in EPA's *Guidance on Conducting Non-Time Critical Removal Actions under CERCLA* (EPA 1993). The final outcome of this EE/CA report is to identify the most suitable alternative that ensures the risk posed from source areas in soil are mitigated.

1.2 Report Organization

This report is organized as follows:

- Section 1 presents the introduction, scope and purpose, and report organization.
- Section 2 summarizes the site location, site background and description, and previous investigations and results.
- Section 3 includes the conceptual site model (CSM), which defines the nature and extent of contamination and includes three category-based soil volume estimates (low, middle, and high) for RA.
- Section 4 summarizes the cultural resource evaluation, including identification of archaeologically significant features and an approach for mitigation of adverse effects for these features.
- Section 5 summarizes the RAOs, cleanup scope, remedial goals, and schedule.

- Section 6 identifies and evaluates each alternative and discusses the applicable or relevant and appropriate requirements (ARARs).
- Section 7 presents a comparative analysis of the five alternatives.
- Section 8 presents the recommended alternative.
- Section 9 provides references.
- Appendix A presents the compiled analytical data that is associated with Project 02.
- Appendix B presents the CSM graphic and scoping forms.
- Appendix C presents the detailed cost estimates for each alternative.
- Appendix D presents the responses to stakeholder comments.

2.0 SITE CHARACTERIZATION

Fort Glenn is an abandoned Army Airfield and defense garrison covering an area of 102,062 acres on the eastern half of Umnak Island, approximately 850 miles southwest of Anchorage, Alaska, and 70 miles southwest of Dutch Harbor, Alaska (Figure 1-1). The property consists of a main cantonment area (labeled as "Main Airfield" on Figure 1-1) and two satellite airfields (labeled as "Northern Airfield" and "Pacifier Airfield" on Figure 1-1) (USACE 2014).

Project 02 was first approved on 17 September 1993 and originally addressed approximately 5,600 petroleum, oil, and lubricant (POL) drums scattered throughout the site; 41 tanks with pipelines and pumping stations; miscellaneous abandoned machinery, including four abandoned fuel trucks; and several transformers on Fort Glenn. However, this project was delineated in the September 2015 *Revised Inventory Project Report* (USACE 2015) to address only the drum piles remaining onsite. Project 02 now specifically refers to the drums and drum piles located within the three areas of Fort Glenn: the Main Airfield, the Northern Airfield, and Pacifier Airfield. This project consists of 54 drum dumps/drum areas ranging in size from 2 to 500 drums, and 17 isolated, individual drums also remaining onsite. Drum dumps are designated areas for staging and stacking drums, and drum areas are loosely delineated areas of scattered drums (USACE 2018a). Figures 2-1 to 2-13 display the locations of the drum areas, drum dumps, and individual drums.

The following subsections describe the background of Umnak Island and Fort Glenn; provide information on the climate and environmental setting of Umnak Island; and summarize previous investigations.

2.1 Umnak Island Background

Umnak Island is the third largest island of the Fox Island group located within the Aleutian Island Chain of the Pacific Ocean. The Bering Sea is north of Umnak Island, and Umnak Pass and the Pacific Ocean are south of the island. Umnak Island is approximately 70 miles long and 16 miles wide. The site is in the Aleutians West Census Area, EPA Region 10, located in the vicinity of 53°22'46"N and 167°56'38"W (Figure 1-1). The Alaska Maritime National Wildlife Refuge waters surround Umnak Island.

The Umnak area is home to the oldest identified archaeological site in the Fox Island group, dated to approximately 9,000 radiocarbon years before present, and located on Anangula Island off the southwestern shore of Umnak Island. Additional dated sites show continuous occupation of Umnak Island occurred from at least approximately 5,600 radiocarbon years before present (Aigner et al. 1976). Previous archaeological work on Umnak Island led to identification of archaeological sites along the coastline, particularly in the southwest and northeast, with undated features and artifacts including villages, housepits, umqans, middens, lithics, ground stone, pits, and burials.

Umnak Island is a largely uninhabited island, except for a small population of 39 people in the town of Nikolski on the western shore of the island, approximately 50 miles from Fort Glenn. The nearest permanent residents to the Project 02 site are the three people who live at Fort Glenn Lodge (a bunkhouse approximately 300 feet from the nearest drum feature) serving tourists who visit the military ruins. There are no schools or day care centers within 50 miles of the cantonment area. Seasonal ranching operations temporarily increase the Fort Glenn FUDS population to 10 people. Bering Pacific Ranches Limited of Priddis, Alberta, Canada, has leased the property since 1993 for a certified organic cattle and reindeer ranching operation with headquarters at Pustoi Bay (USACE 2020).

2.2 Fort Glenn Background

Fort Glenn was established as an air base on the northeast coast of Umnak Island during World War II (WWII). In 1942, building began on Umnak with the construction of a 5,000-foot-long by 100-foot-wide airfield near Otter Point ("Main Airfield"). The Main Airfield was composed of approximately 80,000 perforated steel mats placed directly on the tundra. A layer of volcanic cinder was placed over the steel matting to increase the structural stability of the runway. Two satellite fields were subsequently constructed on Umnak Island, one to the north near Cape Tanak ("Northern Airfield," also known as Berry Field) and one to the southwest between Kettle Cape and Black Rock ("Pacifier Airfield"). Each satellite field consisted of up to three runways, each measuring approximately 5,000 to 7,000 feet in length. The Northern Airfield near Cape Tanak was later extended to 7,500 feet in length.

When fully operational, the Fort Glenn area, including Nikolski, supported over 10,000 officers and enlisted personnel, plus a medical detachment and civilian construction employees. Housing on Fort Glenn consisted primarily of Quonset huts with arched, corrugated metal roofs, typically constructed within bermed depressions. Warehouse storage constructed between 1942 and 1944 included a total of 205,000 square feet (sf) and consisted of aircraft hangars, shops, a small hospital, and technical facilities. Aircraft assigned to Fort Glenn included P-40 fighters, B-26 bombers, PBY Catalinas used primarily for reconnaissance, B-18 bombers, B-24 liberator bombers, and at least one B-17 flying fortress. Fuel storage capacity at Fort Glenn was constructed to hold up to 2,075,000 gallons of reserve and tactical Army Air Corps gasoline; 504,000 gallons of general use gasoline; and 1,310,000 gallons of diesel oil stored in fifteen 2,000-barrel wood stave tanks and two 25,000-gallon welded steel tanks. In addition, 25,000 gallons of aviation gasoline was stored at the Northern Airfield. Barge docks and a ship dock (tanker moorage) were built at Pustoi Bay. Power for Fort Glenn was provided by diesel-fueled generators in a main powerhouse. In addition to the main powerhouse, each individual encampment had its own electrical distribution system and two auxiliary diesel generators.

During 1942 to 1944, over 10,000 military personnel were stationed at Fort Glenn (USACE 1987). Troops began withdrawing from Fort Glenn in 1943, and by late 1944, little more than a care-taking detachment and a communications mission remained. In all, over 700 buildings were constructed during the time that the Department of Defense occupied the island.

Post-WWII, Reeve Aleutian Airways was granted the right to use, operate, and maintain the Main Airfield from the late 1950s until sometime before 2000, when Reeve ceased operations. In May 1987, Fort Glenn was designated as a National Historic Landmark (NHL) (National Park Service 2020).

2.3 Climate and Environmental Setting

The following subsections describe the topography, climate, groundwater and surface water, geology, and ecological habitat of Umnak Island.

2.3.1 Topography

Umnak Island consists of rolling, grassy plains that rise gradually from sea level toward the center of the island where the Okmok Caldera is located. The terrain was formed by volcanic and glacial processes reflected in the volcanic bedrock, soils, and outwash materials. Active volcanoes are common in the region. The west side of Fort Glenn is bound by Okmok Caldera (elevation 3,619 feet) and Tulik Volcano (elevation 4,111 feet) (USACE 1987, 2001).

2.3.2 Climate

Umnak Island has a maritime climate characterized by persistently overcast skies, high winds, and frequent, often violent cyclonic storms. These storms can occur at any time of the year and are caused by a low-pressure zone centered in the Aleutian Islands originating in the northern Pacific Ocean and the Bering Sea. The most frequent and severe storms occur in the winter when wind speeds can exceed 100 knots but average from 17 to 21 knots. Summer wind speeds average 13 knots and periods of calm are short, averaging less than 5 percent (%) of the time.

Greatest precipitation occurs from late summer through mid-winter and the average annual precipitation is 46 inches, mostly from rain. Summer maximum temperatures range from 50 degrees Fahrenheit (°F) to 55°F and winter maximum temperatures range from 20°F to 36°F (USACE 1987).

2.3.3 Groundwater and Surface Water

Swift streams on the eastern end of Umnak Island drain radially off of Okmok Caldera and Tulik Volcano. Marsh Creek runs adjacent to the north side of the Fort Glenn cantonment area for approximately 2.5 miles before achieving a confluence with Thirty-Three Creek. Thirty-Three Creek continues 1.5 miles toward Idak Cove, where it discharges. Lake Manila is a predominant hydrologic feature on the east side of Fort Glenn, containing no fish and no known recreational uses by island residents. North of the cantonment area lies a wetland that is fed by Marsh Creek and Thirty-Three Creek. Umnak Island has not been systematically surveyed for wetlands; however, it is clear that the vegetation in many areas is indicative of muskeg and that the soils are saturated most of the year. Thirty-Three Creek and Marsh Creek would likely be classified as palustrine moss-lichen wetlands (URS Greiner 1997).

Groundwater on Umnak Island likely occurs in areas of high permeability, such as within areas of artificial fill, beach, alluvial, and eolian deposits in the low-lying areas, and within coarse-grained pyroclastic deposits in the upland areas. Smaller amounts of groundwater also occur within localized deposits and within fractured bedrock. Much of the upland areas of Umnak Island are covered by a composite layer of weathered volcanic ash that generally inhibits infiltration of precipitation. Subsequently, precipitation tends to flow toward discharge areas, primarily as surface water runoff, streamflow, and shallow groundwater flow through the vegetative mat above the ash layer. The general quality of surface waters is good with low mineral content. Thirty-Three Creek provides the potable drinking water on Fort Glenn for livestock and a free-flowing spring provides the drinking water for Bering Pacific Ranches (USACE 1987; URS Greiner 1997; USACE 2020). Groundwater depths taken during RI activities in 2001 found that groundwater ranges between approximately 3.15 to 64.15 feet below ground surface (bgs) at Fort Glenn (Jacobs 2003).

2.3.4 Geology

Volcanic eruptions and tectonic subduction created Umnak Island approximately 37.5 million years ago (Jicha et al. 2006). Advancing and receding glaciers, high winds, and frequent rainfall have shaped the island. Most of the Aleutian Chain is underlain by thick (approximately 8,000 feet) Tertiary and Quaternary basalts and andesite lava flows. This material developed during the last 50 to 60 million years as the result of an outpouring of lava, primarily below sea level. Surficial deposits on Umnak Island originated primarily through three geological processes: glaciation, volcanic activity, and erosion and deposition. Fort Glenn is located on gently rolling, grassy tundra underlain by tuffaceous earth combined with loamy sands high in organic content and peat in low-lying areas (USACE 1987; URS Greiner 1997).

Soil boring logs from 2001 RI activities indicate that the depth to bedrock ranges between 7.4 and 42.15 feet bgs, and the lithology is comprised of mostly poorly graded gravels and sands, silts, and some clay (Jacobs 2003).

2.3.5 Ecological Habitat

Vegetation on Umnak Island is composed largely of grasses and herbaceous plants, and all trees are introduced species. There are no known threatened or endangered plant species that occur in the area. Wetlands are intermittent within a 4-mile radius north of the Fort Glenn cantonment area in the Thirty-Three Creek and Marsh Creek drainages. The topsoil of the Fort Glenn area is composed of varying thicknesses of acidic peats, recent volcanic ashes, and cinders (USACE 1987, 2001; URS Greiner 1997).

All terrestrial mammals on Umnak Island have been introduced by humans. Ranching on Umnak Island dates back to the early 19th century when Russian settlers first brought cattle, and red foxes were introduced during fox farming in the 1930s. Today, cattle and reindeer graze freely on the grasses.

The marine waters of the Aleutian region support a rich abundance of migrating and nesting shorebirds, waterfowl, and pelagic seabirds. Seabirds nest on rocky islands approximately 1 mile offshore from the project area in the Alaska Maritime National Refuge, and terrestrial birds are relatively few in numbers on Umnak Island. Steller's eiders are a threatened species that are expected to use nearshore marine waters adjacent to the project area (USACE 2001).

Marine mammals present in the region include sea otters, Stellar sea lions, harbor seals, Dalls' and harbor porpoise, harbor northern fur seal, and minke, killer, humpback, and gray whale. Endangered species that are likely to occur in the nearshore waters of the Fort Glenn FUDS include Stellar sea lions, humpback whale, and gray whale. No major rookeries or haul out areas are in the project area (USACE 1987, 2001).

Approximately 135 species of fish occupy nearshore marine waters of Umnak Island. Migrating juvenile and adult salmon are present in Thirty-Three Creek, Marsh Creek, Idak Creek, and two streams east of Satellite Airfield No. 1. Many streams in the Fort Glenn area, such as Camp Creek and Tulik Creek, support resident fish species. The nearshore and intertidal habitat in the site area likely are used by a variety of species for spawning and as nursery habitat for juveniles of many marine species. It is likely that many low gradient streams in the Thirty-Three Creek valley provide spawning and rearing habitat for anadromous fishes (USACE 1987, 2001).

2.4 Previous Investigations

Multiple visits and investigations have been conducted on the Fort Glenn FUDS property by government employees and contractors. The *Final EE/CA Work Plan, Fort Glenn FUDS Property F10AK0298 CON/HTRW Projects 02, 15, 16, and 17* (USACE 2020) details previous investigation findings from all Fort Glenn projects. The following sections provide a summary of the previous environmental work conducted relevant to the Project 02 site at Fort Glenn.

2.4.1 Inventory Report, Defense Environmental Restoration Account, Umnak Island, Alaska (Woodward-Clyde Consultants 1985)

In 1985, Woodward-Clyde Consultants completed a debris inventory at the site. The largest percentage of debris was located within the Fort Glenn Main Airfield. Various outposts containing debris were also found north and southwest of Fort Glenn near the coastline. In general, all metal debris except concrete foundations was in an advanced stage of rusting at the time of the debris inventory. Many of the buildings

had collapsed and were partially overgrown with tundra and grasses. Roads were overgrown to a large extent, except for those used during post-WWII ranching operations. Unused runways and taxiways were also overgrown. Pipeline trenches and drainage ditches had become overgrown, although they were still visible from the air due to visual differences in vegetation.

Debris types, categories, and quantities were estimated for each of the sites. The quantities given were approximate, although debris types and quantities were field-checked on the ground. Areas were photographed for further documentation.

2.4.2 Contaminant Inventory and Preliminary Risk Assessment, Fort Glenn, Alaska (USACE 1987)

In 1987, USACE conducted a contaminant inventory and preliminary risk assessment at Fort Glenn. The report describes observations of stacked drums, sludge spills, fuel tanks, transformers, transformer platforms, and soil samples collected.

Applicable to Project 02, nearly 5,000 drums were estimated to exist in several locations and were stacked in groups of approximately 100 drums. The drums were empty except for residual POL, and most soils around the drum piles were free of visible POL contamination, with the exception of two locations exhibiting evidence of sludge spills. Sludge-contaminated soil pooled 2 to 3 inches thick was observed in these two locations with a surface area ranging from approximately 500 sf to 5,000 sf each. Soil samples collected at some of the drum areas/piles indicated soil contamination was present.

Soil samples were collected throughout the Fort Glenn area, focused on areas including drum piles; fuel tanks; transformer platforms; various buildings including the hangar, garage, generator building, and the Reeve Aleutian Airways shed area; and various surface water features.

2.4.3 Preliminary Assessment Report, Fort Glenn, Umnak, Alaska (URS 1996)

In 1996, URS Consultants, Inc. (URS) conducted a preliminary assessment (PA) of Fort Glenn. The PA documented any threat or potential threat to public health or the environment posed by the site, identified whether a potential emergency situation existed that required an immediate response, documented the presence or absence of uncontained or uncontrolled hazardous substances on the Fort Glenn FUDS, and confirmed site characteristics and area receptor information.

The PA noted that most of the former military infrastructure, except for the concrete foundations, was in an advanced state of decay. Many of the buildings had collapsed and were partially overgrown with tundra and grasses. Roads were overgrown to a large extent, except those used frequently by cattle ranchers. Drums observed during the site visit were severely damaged. Anecdotal reports from onsite workers and persons familiar with Umnak Island stated that most of the fuel left behind by the military was scavenged and used by private and commercial air carriers.

Aleutian Air Limited, a small charter company, was reported to maintain and use a small grass runway on the Fort Glenn FUDS where the north/south runway in the Main Airfield was located. The air charter company was observed to store an all-terrain vehicle and several drums of POL in a small shed near the runway for emergency maintenance and fuel needs.

2.4.4 Screening Site Inspection, Fort Glenn, Umnak, Alaska (URS Greiner 1997)

In 1997, URS Greiner performed a screening site inspection (SSI) sampling and photo documentation event as a supplement to the 1996 PA. The SSI report summarized the samples collected during the property

investigation and evaluated the analytical results for potential contaminants on the Fort Glenn FUDS property.

Soil, surface water, and sediment samples were collected as part of the 1997 SSI. Surface and subsurface soil samples were collected from locations where wastes were suspected to have been spilled. A total of 22 surface soil samples and three subsurface soil samples were collected. To assess impacts of past site practices, nearshore marine sediment samples and surface water samples were collected from island water bodies (e.g., stream, lake, nearshore marine). Samples were analyzed for a broad suite of analytes. Some soil sample results indicated POL from heavy equipment, drums, and tanks; however, samples collected in 1997 were not within 20 feet of drum features included in Project 02 and were therefore not applicable to this EE/CA report.

2.4.5 Environmental Assessment and Finding of No Significant Impact, Fort Glenn, Umnak Island, Alaska (USACE 2001)

In 2001, USACE assessed the environmental effects of the Fort Glenn FUDS RI in an environmental assessment (EA) in accordance with the National Environmental Policy Act of 1969, as amended. The EA was conducted prior to the RI planned for Summer 2001, as detailed below.

The EA determined that the proposed RI activity would not result in significant environmental impacts. No threatened or endangered species, critical habitat, marine mammals, wetlands, or cultural resources would be adversely impacted by the project. Essential fish habitat would not be substantially altered. These determinations were coordinated with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and State Historic Preservation Office (SHPO).

The EA supported the conclusion that the project did not constitute a major federal action significantly affecting the quality of the human environment, and it was determined that an environmental impact statement was not necessary to perform the RI at Fort Glenn.

2.4.6 Remedial Investigation Report, Umnak Island, Alaska (Jacobs 2003)

In 2001, Jacobs Engineering Group Inc. (Jacobs) performed an RI and site reconnaissance focused on the Main Airfield area. Investigation areas included the Quartermaster Gasoline Tank Farm/Marsh Creek, Lake Manila, Fuel Operation Storage System, Operation Reserve Tank Farm/Thirty-Three Creek, Camp Creek Truck Fill Stand and Dry-Cleaning Operations, Tactical Aviation Gasoline System/Birchwood Hangar, Deer Point, and Pustoi Point Spill Area. Of these areas, drum piles were noted at the Quartermaster Gasoline Tank Farm, Lake Manila, Operation Reserve Tank Farm/Thirty-Three Creek, Camp Creek, and Birchwood Hangar. These locations were investigated for residual oil and soil stains.

The approximate locations of two drum piles were delineated north of Pustoi Point at the Quartermaster Gasoline Tank Farm and approximately 12 drum storage areas were identified. Each area or pile contained empty 55-gallon drums and ranged in size from 20 to 200 drums per pile. Drums were stored horizontally and were rusted out. No signs of drum contents or visible contamination, including stressed vegetation or stained soil, were apparent. Several 55-gallon drums were noted on the southwest corner of Lake Manila; all drums were empty. Thirty-Three Creek was noted to be littered with drums near the Operations Reserve Tank Farm. Additionally, a “pile of empty 55-gallon drums” was noted in this vicinity. Camp Creek contained drum and debris piles that included approximately 100 to 125 drums surrounded by a dark orange and red-yellow sludge-like substance. Characterization results determined that the substance was not an oxidizer, contained neutral pH, was slightly combustible, was chlorinated (may contain polychlorinated biphenyls [PCBs]), and that the substance was within applicable used oil specifications. A

cluster of nine drum storage areas was noted at the Birchwood Hangar. The drums, which were rusted and stacked horizontally among overgrown vegetation, were all found to be dry, and no signs of surrounding contamination were evident. Due to these observations, no samples were collected from this area. The majority of drums at the site are believed to be fuels and oils that are not impacted with non-POL compounds such as PCBs and metals, and therefore POL are the focus of Project 02.

Surface soil, subsurface soil, groundwater, surface water, and sediment samples were collected throughout these areas and analyzed for gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), Resource Conservation and Recovery Act (RCRA) metals, pesticides, PCBs, volatile organic compounds (VOCs), and/or polycyclic aromatic hydrocarbons (PAH). However, only three surface soil samples, four subsurface soil samples, one sediment sample, and one product sample are within 20 feet of a feature (proximity criteria) and are applicable to Project 02 (see analytical data in Appendix A). At the time, analytical results were evaluated against the most stringent Alaska Department of Environmental Conservation (ADEC) Title 18 of the Alaska Administrative Code (AAC), Chapter 75 (18 AAC 75) Method Two Tables B1 and B2 cleanup levels for the Over 40-Inch Zone; however, for Project 02 purposes, analytical results have been screened against RBSLs to determine estimates of contaminated soil volume (Section 3.0). The surface soil samples had positive detections for DRO, RRO, several other metals, VOCs, and PAH. All results were either below the screening levels or did not have established RBSLs, except RRO and arsenic. RRO exceeded the RBSL at two surface soil sample locations near DM43-2017. Arsenic, which is considered naturally occurring, is not associated with drum contamination at the project site. Field notes indicated that the product sludge sample contained saturated surface soil from the spill area. Analytical results for the product sludge are presented in Section 3.0. After receiving the results, the sludge was removed from the surface and transported for offsite disposal.

2.4.7 U.S. Army Geospatial Center Historical Photographic Analysis, Fort Glenn, Umnak Island, Alaska (USACE 2014)

In 2014, the U.S. Army Geospatial Center (AGC) conducted a photographic analysis of Fort Glenn covering a timeframe between 1942 to 2013. The report presented historical information, figures that documented past site activity, and key site features at Fort Glenn. This analysis used existing aerial photographs, as-built drawings, and other archive information exclusive of field investigative reports conducted by USACE and contractors. There were no significant findings relevant to Project 02.

2.4.8 Site Reconnaissance (USACE 2018a)

In 2017, ChemTrack Alaska, Inc. conducted a site reconnaissance effort at Fort Glenn. The objectives of the effort were to address discrepancies identified during a review of previous investigations, conduct survey activities of all identified containerized hazardous, toxic, and/or radioactive waste (CON/HTRW) site features and sampling locations, and assess site access conditions for future RAs.

Applicable to Project 02, drums were found spread across the Main Airfield. A few drums/drum areas were found at Ashishik Point, Northern Airfield, Pacifier Airfield, and previously identified drum areas located on St. George Central Area property (also known as the drum piles north of Pustoi Point [Jacobs 2003]). A total of 54 drum dumps and drum areas plus 17 individual drums were located, inspected, and surveyed. An estimated 2,600 drums were identified during the 2017 site reconnaissance. All previously identified drum locations from the 1987 inventory assessment (USACE 1987) and from the 2001 site investigation (Jacobs 2003) were identified and surveyed. POL impacts were observed at nine

drum dumps and drum areas. The number of drums in Project 02 has been estimated in the various historical field efforts, and those estimates were updated during this 2017 field effort.

2.5 Project 02 Drum Features

Drum features for Project 02 were selected based on the 2017 site reconnaissance (USACE 2018a). Table 2-1 lists all drum features associated with Project 02 of the Fort Glenn FUDS and provides related information gathered from the 2017 site reconnaissance (USACE 2018a) such as correlating report identification (ID), field survey ID, subarea, feature type, estimated quantity of drums per site feature, description or notes of drum observations, observed environmental impacts, category of contamination (contaminated, likely, unlikely, clean), surface area containing the drum(s), volume of potentially impacted soil, and a reference to the historical document if applicable. The volume of potentially impacted soil was based on the surface area containing drums (increased by 25% to account for migration) and the assumed depths of 6 feet bgs for individual drums and drum areas or 15 feet bgs for drum dumps. If information was available that indicated either groundwater or bedrock was present at a depth shallower than the assumptions, then the known depth was used in volume estimates.

Table 2-1 Project 02 Drum Feature Summary

REPORT ID	FIELD SURVEY ID	SUBAREA	FEATURE TYPE	ESTIMATED QUANTITY	DESCRIPTION/NOTES	2017 ENVIRONMENTAL IMPACT	CATEGORY	SURFACE AREA (SF)	VOLUME (CY)	ESTIMATED WEIGHT (TONS)	REFERENCE
08SM	10008SM	F2	DD	0	Identified on map as barrels; no barrels or drums identified at this location.	No	Clean	--	--	--	
DM01-2017	100DM1	C1	D	1	Lone bung-top drum, partially buried.	No	Unlikely	7.19	3.99	5.99	
DM02-2017	200DM1-SLR-1 to 4	D2	DD	2	Two rusted 55-gallon drums. One empty with lid off. One with lid intact. No labels or markings. No liquids in either drum.	No	Likely	14.38	7.99	11.98	
DM03-2017	100DM2	C1	DA	4	Scattered drums near mound or loading ramp. Mix of open or perforated (corrosion) drums.	No	Likely	28.75	15.97	23.96	
DM04-2017	200DM2-SLR-1 to 5	D2	DD	29	Steel drums, all rusted, mostly breached. No labels all appear empty. All 55-gallon.	No	Likely	275.00	152.78	229.17	
DM05-2017	100DM3	C1	D	1	Scattered drums near mound or loading ramp. Mix of open or perforated (corrosion) drums.	No	Likely	7.19	3.99	5.99	Lake Manila drums (Jacobs 2003)
DM06-2017	200DM3-SLR-1 to 9	D2	DD	40	Drum area with four piles of drums. All 55-gallon; all rusted and breached.	No	Likely	887.19	492.88	739.32	
DM07-2017	100DM4	C1	D	1	Scattered drums near mound or loading ramp. Mix of open or perforated (corrosion) drums.	No	Unlikely	7.19	3.99	5.99	
DM08-2017	200DM4-SLR	D2	D	1	Single drum, rusted, several holes. 55-gallon. Isolated drum.	No	Unlikely	7.19	3.99	5.99	
DM09-2017	100DM5	C1	D	1	Scattered drums near mound or loading ramp. Mix of open or perforated (corrosion) drums.	No	Unlikely	7.19	3.99	5.99	
DM10-2017	200DM5-SLR	D2	D	1	Single drum, galvanized metal, partially rusted, 55 gallon. First galvanized metal drum observed.	No	Unlikely	7.19	3.99	5.99	
DM11-2017	100DM6	C1	D	1	Single bung-top drum near PL7.	No	Unlikely	7.19	3.99	5.99	
DM12-2017	200DM6-SLR	D2	D	1	Single galvanized metal, partially rusted, 55-gallon. Galvanized metal.	No	Unlikely	7.19	3.99	5.99	
DM13-2017	200DM7-SLR	D2	D	1	Single rusted drum, 55-gallon.	No	Unlikely	7.19	3.99	5.99	
DM14-2017	200DM8-SLR	D2	DA	3	Three rusted 55-gallon drums, all with holes.	No	Unlikely	21.56	11.98	17.97	
DM15-2017	100DM8-SLR	N1	D	1	Steel, bung-top drum. Lone drum, just outside N1 area.	No ground observation.	Likely	7.19	3.99	5.99	
DM16-2017	200DM9-SLR	D2	D	1	Galvanized 5-gallon drum, labeled property of Air Force. Some rust.	No	Unlikely	7.19	3.99	5.99	
DM17-2017	300NDRUMPILE1/ 100DM9-SLR	N1	DD	27	Drums on ground surface.	No	Likely	194.06	107.81	161.72	
DM18-2017	100DM10-SLR	C1	DA	1	All closed drums with bungs.	No	Likely	7.19	3.99	5.99	
DM19-2017	200DM10-SLR-1 to 9	C2 and D2	DD	43	Rusted steel drums, most with holes or decaying, 55-gallon, black tar like material in drums and on ground. Label indicating property of Air Force. Tar-like odor, no volatiles surveyed around area.	Staining. Odors. Stressed vegetation. Open drums containing product.	Contaminated	1,125.00	625.00	937.50	
DM20-2017	100DM11-SLR	C1	DA	1	All closed drums with bungs.	No	Likely	7.19	2.40	3.59	
DM21-2017	200DM11-SLR-1 to 2	D2	DD	19	Rusted steel drum in drainage ditch on north side of road. All drums have holes or missing lids, no fluids. No labels. Drums distributed over 84' length of drainage ditch. One machinery battery found.	No	Likely	136.56	75.87	113.80	

Table 2-1 Project 02 Drum Feature Summary

REPORT ID	FIELD SURVEY ID	SUBAREA	FEATURE TYPE	ESTIMATED QUANTITY	DESCRIPTION/NOTES	2017 ENVIRONMENTAL IMPACT	CATEGORY	SURFACE AREA (SF)	VOLUME (CY)	ESTIMATED WEIGHT (TONS)	REFERENCE
DM22-2017	100DM12-SLR	C1	DA	1	All closed drums with bungs. DM12 has spigot.	No	Likely	7.19	3.99	5.99	
DM23-2017	200DM12-SLR-1 to 2	D2	DD	9	Rusted drums on south side of road above drainage ditch. 55-gallon capacity, all breached and decaying. No labels.	No	Likely	61.43	34.13	51.19	
DM24-2017	200DM13-SLR-1 to 3	D2	DA	13	Rusted, decaying, 55-gallon steel drums, all open or breached. Spread out over in drainage ditch, north side of road.	No	Unlikely	93.44	51.91	77.86	
DM25-2017	200DM14-SLR	D2	DA	4	Rusted, steel, 55-gallon drums, one drum labeled unleaded gasoline. Drum on north side of road. Drums are decaying and crushed.	No	Likely	28.75	15.97	23.96	
DM26-2017	200DM15-SLR	D2	DA	5	Rusted steel drums, 55-gallon. Most with holes or missing lids. In drainage, south side of road.	No	Unlikely	35.94	19.97	29.95	
DM27-2017	200DM16-SLR	D2	DD	19	Rusted steel 55-gallon drums, decaying and breached, most without lids.	No	Likely	200.24	111.24	166.86	
DM28-2017	200DM17-SLR-1 to 4	D2	DD	120	Rusted steel drums 55-gallon, decaying, breached or open, in two piles within bermed area. Label on drum: Rheem, 16 55 43, 100- 5B	No	Likely	862.50	479.17	718.75	
DM29-2017	200DM18-1 to 16, 200DM20-SLR-1 to 10	B3	DA	39	Misc. drums near TR66. All empty, most rusted out on top/bottom. Some with spigots. 10 scattered, empty, bunged drums. Continuation of 200DM18-1 to 200DM18-19.	No	Unlikely	280.31	155.73	233.59	
DM32-2017	400DM32-SLR-E_edge 400DM32-SLR-W_edge	G1	DD	80	Drum dump with 80 drums including one drum containing grease.	Soil staining; open drum that contains product.	Contaminated	575.00	319.44	479.17	
DM34-2017	200DM21	B4	DD	30	Steel bung-top drums. No labels. All appear to be on ground surface.	No	Likely	215.63	119.79	179.69	
DM35-2017	100DM21-SLR-1 to 13	E2	DD	130	Rusted steel 55-gallon drums, most open or breached. Wood poles and planks, assorted other metal debris, and batteries. Small steel parts.	No	Likely	934.38	519.10	778.65	Birchwood Hangar drums (Jacobs 2003)
DM36-2017	200DM22-1 to 27	A5	DD	30	Scattered drums and 5-gallon kerosene (or similar) cans. All drums were bung-top, no intact drums. 5-gallon cans' lining contained kerosene or other heating oil. Thin walls and light construction suggest single-use design.	No	Contaminated	215.63	119.79	179.69	
DM37-2017	100DM22-SLR	E2	DA	26	Rusted steel drums. 55-gallon, drums open or breached, drum spread over area ~36' by 10'.	No	Unlikely	186.88	103.82	155.73	
DM38-2017	200DM23-1 to 10/200DM23-11	B5	DA/D	11	Scattered drums in B5. Rusted and empty. Bung-top. All drums empty. Lone drum.	No	Unlikely	79.06	43.92	65.89	
DM39-2017	100DM23-SLR	E2	DA	30	Rusted steel, 55-gallon drums, open or breached, assorted other debris includes engine parts, batteries, compress gas tank, and twisted metal. Drums/debris spread over area ~100' by 65'.	No	Unlikely	215.63	119.79	179.69	
DM40-2017	200DM24-1 to 4	B6	DA	4	Scattered drums.	No	Unlikely	28.75	9.89	14.84	

Table 2-1 Project 02 Drum Feature Summary

REPORT ID	FIELD SURVEY ID	SUBAREA	FEATURE TYPE	ESTIMATED QUANTITY	DESCRIPTION/NOTES	2017 ENVIRONMENTAL IMPACT	CATEGORY	SURFACE AREA (SF)	VOLUME (CY)	ESTIMATED WEIGHT (TONS)	REFERENCE
DM41-2017	100DM24-SLR	E2	DD	30	Rusted steel, 55-gallon drum, 22 empty and laying on side. 8 filled with yellow greasy material (likely lube oil). Filled drums have open lids. Drums spread over area ~31' by 24'. Black stain around filled drum. Some drums leaking content, no vegetation in black stained areas.	Soil staining. Stressed vegetation. Open drums containing product.	Contaminated	930.00	516.67	775.00	03SM (USACE 1987)
DM42-2017	100DM25-SLR	E2	DA	17	Rusted drums, 55-gallon, lids on, drum bodies appear intact, no breaches. Drums lined up.	No	Unlikely	122.19	67.88	101.82	
DM43-2017	100DM26-SLR-1 to 4	F2	DD	160	Rusted, 55-gallon drums, breached and leaking in bermed containment area. Drums in center of containment have leaked. Black stain around drums. No vegetation in stain area. Drums laying on side stacked two high.	Soil staining. Stressed vegetation.	Contaminated	5,625.00	3,125.00	4,687.50	
DM45-2017	100DM27-SLR-1 to 4	F2	DD	130	Rusty, steel 55-gallon drums, most breached. Do not appear to have leaked contents. Stacked horizontally in center of bermed cell open in SW corner.	No	Likely	6,750.00	3,750.00	5,625.00	
DM47-2017	100DM28-SLR-1 to 4	F2	DD	80	Rusty, 55-gallon steel drums, breached or open. Drums contained in berm area, ~ 60' by 60'.	Soil staining. Stressed vegetation.	Contaminated	4,500.00	2,500.00	3,750.00	
DM49-2017	100DM29-SLR-1 to 4	E3	DA	51	Rusted steel. 55-gallon drum, lids off or breached, no liquid. No containment area, drum dumped in open area.	No	Unlikely	366.56	203.65	305.47	
DM50-2017	200DM30-1	A6	D	1	Lone bung-top drum.	No	Unlikely	7.19	3.99	5.99	
DM51-2017	100DM30-SLR-1 to 4	B6	DA	5	Several buried drums, weathered tar/asphalt, appear less than 55-gallon. Took 5 PID readings, all 0.	Weathered tar.	Contaminated	35.94	19.97	29.95	
DM52-2017	200DM31-1 to 6	G1	DD	2	Trash, metal, bottles, ceramics, 2 drums. General trash dump, 2 drums present.	No	Likely	14.38	7.99	11.98	
DM53-2017	100DM31-SLR	B6	DD	100	Drums in a pile inside cattle corral on concrete pad. Found one drum with Mobil GARD 312 9460 23J6.	No	Contaminated	718.75	399.31	598.96	
DM54-2017	200DM32-1 to 7	C2	DA	8	~8 drums, some new, some galvanized.	Soil staining.	Contaminated	57.50	31.94	47.92	
DM55-2017	100DM32-SLR	B6	DA	2	Jet A fuel. 55-gallon drums from Crowley Petroleum Distribution 201 Arctic Slope Ave. Contains fuel, no signs of leaks.	No	Contaminated	14.38	7.99	11.98	
DM56-2017	100DM35-SLR-1 to 4	B6	DD	46	55-gallon drum, all deteriorated, open. Two 55-gallon drums full of grease. No signs of contamination.	No	Contaminated	330.63	183.68	275.52	
DM57-2017	100DM36-SLR	B6	DD	2	55-gallon drum full of grease. Full of grease in each drum.	Soil staining; open drums containing product.	Contaminated	14.38	7.99	11.98	
DM58-2017	300SLR005/DM12	P2	D	1	One drum viewed from helicopter.	No ground observation.	Unlikely	7.19	3.99	5.99	
DM59-2017	300SLR006/DM13	P2	D	1	Lone drum.	No ground observation.	Unlikely	7.19	3.99	5.99	Assumed to be 20SM (USACE 1987)
DM60-2017	300SLR007/DM14	P2	D	1	Lone drum, open end.	No ground observation.	Unlikely	7.19	3.99	5.99	
DM61-2017	300SLR009 to 300SLR011 DM16	St. George	DA	500	Six separate drum piles observed from helicopter. Area outside of project grid.	No ground observation.	Unlikely	3,593.75	1,996.53	2,994.79	Birchwood Hangar drums (Jacobs 2003), 12SM, 16SM (USACE 1987)

Table 2-1 Project 02 Drum Feature Summary

REPORT ID	FIELD SURVEY ID	SUBAREA	FEATURE TYPE	ESTIMATED QUANTITY	DESCRIPTION/NOTES	2017 ENVIRONMENTAL IMPACT	CATEGORY	SURFACE AREA (SF)	VOLUME (CY)	ESTIMATED WEIGHT (TONS)	REFERENCE
DM62-2017	300SLR017/DM17	Ashishik	DA	4	Rust, steel drum, labeled as Chevron marine oil SAE 55-gallon. Small drum pile adjacent to radio site support building.	No	Clean	--	--	--	Drum feature DM62-2017 was not included in the estimates of soil volume because it is associated with a Federal Aviation Administration project, and is therefore not addressed in this EE/CA report.
DM63-2017	300SLR020/DM13	Ashishik	D	1	One drum viewed from helicopter in large depression.	No ground observation.	Unlikely	7.19	3.99	5.99	
DM65-2017	100DM34-SLR	B6	DA	4	55-gallon drums, area 30' by 20'. Product in drums is tar. One item next to a drum molded, solidified tar.	Soil staining. Stressed vegetation at location of oozing product (tar).	Contaminated	28.75	15.97	23.96	03SM (USACE 1987)
DM66-2017	100DM33-SLR	B6	DD	10	Pile 55-gallon steel drums, deteriorated, holes. 15' by 20' area. All 4 PID readings = 0 ppm.	No	Likely	375.00	208.33	312.50	
DM67-2017	200DM18-SLR-1	D2	DD	20	Scattered drums in large depression	No	Likely	143.75	79.86	119.79	
DM68-2017-2*	200DM18-SLR-2	D2	DD	125	7 bermed cells containing rusted steel drums and identified as DM18-SLR-1 to 7. Survey points taken in center of each cell. Cells typically open at one section of berm. The center of cell floors was slightly raised relative to the cell inside edges.	Slight odor south pile. Stained soil.	Contaminated	898.44	499.13	748.70	08SM (USACE 1987)
DM68-2017-3*	200DM18-SLR-3	D2	DD	70		Drums stacked on south side of bermed area.	Contaminated	503.13	279.51	419.27	
DM68-2017-4*	200DM18-SLR-4	D2	DD	80		No	Contaminated	575.00	319.44	479.17	
DM68-2017-5*	200DM18-SLR-5	D2	DD	125		No	Contaminated	898.44	499.13	748.70	Camp Creek drums (Jacobs 2003)
DM68-2017-6*	200DM18-SLR-6	D2	DD	75		No	Contaminated	539.06	299.48	449.22	
DM68-2017-7*	200DM18-SLR-7	D2	DD	7		No	Contaminated	50.31	27.95	41.93	Camp Creek drums (Jacobs 2003)
DM74-2017**	100DM19-SLR	D2	DD	100	Rusted steel 55-gallon drum, most open or breached. Drums in bermed cell, ~100' by 100', open on east side. Survey point taken at center of cell.	No	Likely	12,500.00	6,944.44	10,416.67	
DM75-2017	100DM20-SLR	E1	DA	3	Rusted steel 55-gallon drum located structure depression ~10' deep, drum open, breached, crushed.	No	Unlikely	21.56	11.98	17.97	
DM77-2017	200DM18-SLR-8 to 32	D2	DA	24	Larger drum area encompassing 23 scattered drums and 7 bermed drum cells comprising drum dump areas DM68-2017, DM27-2017, DM28-2017, DM68-2017, DM74-2017.	Slight odor; stained soil.	Contaminated	172.50	95.83	143.75	20SM
DM78-2017	300SLR004/DM11	P2	DA	2	Two steel drums, closed-top.	No ground observation.	Unlikely	14.38	7.99	11.98	
DM79-2017	200DM23-12, 13, and 29 to 33	B5	DA	7	Scattered drums in B5. Rusted and empty. Bung-top. All drums empty.	No	Unlikely	50.31	27.95	41.93	
DM80-2017	200DM23-14 to 16/200DM23-19 to 28 and 35	B5	DA	15	--	No	Likely	107.81	59.90	89.84	
	200DM23-17 to 18 200DM33-1, -2	C5		4	Continuation of drum area from B5.			28.75	15.97	23.96	
DM81-2017	200DM23-34	B5	D	1	Lone drum.	No	Unlikely	7.19	3.99	5.99	
DM82-2017	200DM20-11 to 13	B3	DA	3	3 to 5 drums clustered together, heavily rusted, closed-bung.	No	Unlikely	21.56	11.98	17.97	12SM and 16SM (USACE 1987) and drums north of Pustoi Point (Jacobs 2003)

Table 2-1 Project 02 Drum Feature Summary

REPORT ID	FIELD SURVEY ID	SUBAREA	FEATURE TYPE	ESTIMATED QUANTITY	DESCRIPTION/NOTES	2017 ENVIRONMENTAL IMPACT	CATEGORY	SURFACE AREA (SF)	VOLUME (CY)	ESTIMATED WEIGHT (TONS)	REFERENCE

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
* DM68-2017-2 through -7 were reported as DM68-2017 in Table 2 of the 2018 report based on the field survey ID 200DM18-SLR-2 through -7, however, separate drum piles exist in each feature with separate drum counts, so they are listed separately here.
** DM74-2017 was reported as DM76-2017 in Table 2 of the 2018 report based on the field survey ID 100DM19-SLR. The coordinates of 100DM19-SLR are within the boundary of DM74-2017 in the feature class Drum_Dump provided as GFM.

Categories:
Contaminated – A feature at which contamination has been confirmed by screening exceedances, visual observation, or some combination thereof.
Likely – A feature at which the presence of contamination is likely, but there is inadequate data to make a determination.
Clean – A feature that has analytical data available and field records that confirm cleanup of drums and/or contamination is complete.
Unlikely – A feature at which the presence of contamination is unlikely, but there is inadequate data to make a determination.
Feature Types:
D – Drum; isolated, individual drum
DA – Drum Area; loosely delineated areas of scattered drums
DD – Drum Dump; designated areas for staging/stacking drums

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3.0 CONCEPTUAL SITE MODEL

Two areas of the Project 02 site have been evaluated for the development of the CSM: the drum piles, which include the drum areas and drum dumps; and isolated, individual drums. The CSMs for the drum piles and the individual drums were developed in general accordance with EM 200-1-12 (USACE 2012) and ADEC *Guidance on Developing Conceptual Site Models* (ADEC 2017) for the Fort Glenn FUDS Project 02 features.

The CSMs include identification of the following elements:

- Source and release mechanisms
- Impacted media
- Transport mechanisms
- Known or potential receptors
- Known and potential pathways and routes of exposure

Exposure pathways are considered complete if the following four elements exist:

- A source
- A mechanism of release, retention, or transport of a given chemical in a given medium
- A contact point with the affected medium
- An exposure route at the contact point (e.g., ingestion, dermal absorption, or inhalation)

If any of these elements are missing, the pathway is considered incomplete and does not present a means of exposure. The CSM process results in a schematic representation of the links between sources, release and transport mechanisms, potentially affected media, exposure routes, and potentially exposed human receptors. Appendix B presents the CSM graphic and scoping forms.

3.1 Land Ownership and Status

As part of CSM development, potential future receptors were evaluated based on the desires of the landowners and stakeholders, as well as the status of the land.

Landowners at the Fort Glenn FUDS property are the Alaska Department of Transportation and Public Facilities, Tanadgusix Corporation (surface estate), St. George Tanaq Corporation (surface estate), USFWS (surface estate), Aleut Corporation (subsurface estate), and the Bureau of Land Management (BLM) (subsurface estate), depending on location.

The property was acquired by the military in 1942 by the U.S. Army. The property was excessed between 1952 and 1955 to the U.S. Department of Interior BLM and subsequently transferred to numerous owners, both public and private in the 1960s.

Although Fort Glenn's status as an NHL impacts the current and future uses of the site as well as the potential receptors, it does not preclude development and residential use of the site. A cleanup complete without institutional controls (ICs) designation at the site was therefore evaluated.

3.2 Source and Release Mechanisms

Drum piles and isolated, individual drums were identified on the Project 02 site of Fort Glenn in 2017 during site reconnaissance (USACE 2018a). Drum piles include both the drum dumps and drum areas. A drum dump is defined as a designated area for staging and stacking drums, while a drum area is loosely delineated areas of scattered drums. There are 54 drum piles, 17 isolated, individual drum locations, and a total of 2,554 drums estimated to be present in the investigated areas of Project 02. Many drums (especially the isolated, individual drums) were observed to be perforated, corroded, and/or empty; additionally, soil staining, odors, stressed vegetation, open drums, and fluid/product were observed in some drum dumps and drum areas (USACE 2018a). Due to these observations, the compounds of potential concern (COPCs) that may be present in surface and subsurface soils for the drum piles and isolated, individual drums on Fort Glenn include petroleum hydrocarbons (various fuels) and petroleum-related constituents (benzene, toluene, ethylbenzene, and xylenes [BTEX] and PAH).

The soil removal actions for the Project 02 site will be conducted to meet soil cleanup levels found in ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (the remedial goals, further described in Section 5.2) (ADEC 2020). Since the drums may have contained POL-related contents, exceedances of ADEC Table B2 cleanup levels for petroleum hydrocarbon fractions will be used to determine where gross petroleum contamination may exist. After the NTCRA is conducted, the preliminary CSM will be updated and will be used to determine if an additional RA is required.

3.3 Impacted Media and Transport Mechanisms

Directly impacted media from the drum piles and individual drums include surface and subsurface soils, air, and biota. The drum piles and individual drums potentially affect groundwater due to the potential of contaminants migrating from soil to groundwater; they also potentially affect indoor air due to the potential of future development and residential use. Additionally, surface water and sediment are potentially affected media by the drum piles due to the proximity to nearby streams. Contaminants from isolated, individual drums are not expected to impact surface water or sediment because field screening results indicated no environmental impacts beneath or around the individual drums; there are no surface waters near the isolated, individual drums; and there were no visual signs of contamination. Since exceedances and gross contamination were not associated with individual drums, surface water and sediment are incomplete.

Environmental fate and transport processes vary depending on the types of contamination present. Petroleum hydrocarbons and volatile POL-related compounds (BTEX and PAH) have been identified in surface and subsurface soil, and contaminant migration to subsurface soil from individual drums is potentially complete. Therefore, migration to subsurface soil, migration to groundwater, fugitive dust, volatilization, and biota uptake were retained as transport mechanisms for both the drum piles and individual drums. Overland flow, runoff, sedimentation, and erosion have been retained as transport mechanisms for the drum piles only. Currently, the fate of the contaminants present at the site is attenuation over decades due to the slow natural degradation via microbial and chemical processes.

Drum piles near surface water bodies potentially impact sediment within those surface water bodies, but no individual drums were identified near surface water. Additionally, although there are no individual drums known to be directly within surface water features, surface water near drum piles may be impacted. This pathway is considered potentially complete for current and future receptors.

3.4 Potential Receptors and Exposure Pathways

Fort Glenn is an NHL, which impacts the current and future uses of the site as well as the potential receptors. Residents, site visitors, recreational users, subsistence harvesters, subsistence consumers, and ranchers are considered current child and adult receptors. Future receptors include all current receptors as well as construction workers. Exposure is insignificant for all current site visitors, trespassers, and recreational users because of the remote site location and site visitors are expected to spend little time onsite. Exposure is potentially complete for future receptors based on the potential for future development and residential use. Ecological receptors were not evaluated for this EE/CA report.

Complete, incomplete, and insignificant exposure pathways for all exposure media are discussed in the following paragraphs.

Incidental Soil Ingestion. Many drums that were visually inspected at the Fort Glenn FUDS (especially the isolated, individual drums) were noted to be perforated, corroded, and/or empty. Soil staining, odors, stressed vegetation, open drums, and fluid/product were observed in some drum dumps and drum areas. Due to these observations, the COPCs that may be present in surface and subsurface soils include petroleum hydrocarbons (various fuels) and petroleum-related constituents (BTEX and PAH), in which all current receptors may incidentally ingest soil by consuming fine particles that adhere to skin surfaces, particularly on the hands. Future exposure is likely the same. Future construction workers are likely to be engaged in soil-moving activities; therefore, exposure to contaminants through incidental soil ingestion is a complete exposure pathway.

Dermal Absorption of Contaminants from Soil. The EPA Regional Screening Level (RSL) tables and calculator (EPA 2020a) list compounds that should be considered for dermal absorption. The PAH listed here are potentially present in the surface soil for both the drum piles and isolated, individual drums; thus, the dermal contact exposure pathway is considered a complete exposure pathway for all current and future receptors.

Inhalation of Fugitive Dust. Inhalation of fugitive dust is an incomplete pathway because the site area, which is used for cattle grazing, is covered by grasses, limiting the formation of dust. Additionally, significant rainfall at the site reduces the likelihood of particulate inhalation.

Groundwater Ingestion, Dermal Absorption of Contaminants in Groundwater, and Inhalation of Volatile Compounds in Tap Water. There are no current receptors of groundwater resources, as the drinking water is currently sourced from Thirty-Three Creek. Although Bering Pacific Ranches obtains drinking water from a free-flowing spring north of the ranch, it is approximately 300 feet away from the nearest drum feature and therefore not within proximity of the Project 02 features. Groundwater ingestion is an incomplete pathway for current receptors for the isolated, individual drums because no environmental impacts were indicated from field screening results and no visual signs of contamination were noted; however, this pathway is considered potentially complete for future receptors based on the potential for future development and residential use. Groundwater ingestion is a potentially complete pathway for the drum piles because product has been detected at the drum dumps and drum areas. It is possible for contaminants to migrate to groundwater in the future, which could affect future receptors on Fort Glenn. Although the area's remote setting and NHL designation makes future residential development in the area very unlikely, including the development of groundwater as a residential drinking water source, it is retained as a potentially complete pathway for future receptors to be protective of the potential for future development and residential use.

For the drum piles, BTEX and PAH are potentially present in groundwater and many are considered dermally absorptive contaminants; therefore, this is considered a complete pathway for future receptors. For isolated, individual drums, dermal absorption of contaminants in groundwater is considered an incomplete pathway because field screening results did not indicate environmental impacts, and no visual signs of contamination were noted.

BTEX and many PAH are listed in the EPA RSL tables and calculator (EPA 2020a) as volatile compounds. Since the project site on Umnak Island is currently uninhabited, the contaminated water is not currently being used. The potential for future residents to use surface water or groundwater for household purposes is unlikely because Fort Glenn is an NHL. However, in the instance of future potential residential use, the inhalation of volatile compounds in tap water is a potentially complete pathway for drum piles but an incomplete pathway for individual drums.

Inhalation of Outdoor Air. BTEX and many PAH are listed in the EPA RSL tables and calculator (EPA 2020a) as volatile compounds. The inhalation of outdoor air exposure pathway is considered potentially complete but insignificant for the isolated, individual drums due to the remote locations of these lone drums and the remote location of the site; however, for the drum piles, this exposure pathway is considered complete for all current and future receptors due to the presence of product at some of the drum dumps and drum areas.

Inhalation of Indoor Air. As noted in the previous section, volatile POL constituents are potentially present in surface and subsurface soils. Bering Pacific Ranches is currently occupied on Umnak Island; however, it is approximately 300 feet away from the closest Project 02 features. No other occupied buildings are currently present at the drum piles and isolated, individual drums; therefore, indoor air exposure is considered an incomplete pathway for current site conditions. Although future development of these areas is not anticipated, this pathway is considered potentially complete for future receptors to be protective of the potential for future development and residential use.

Ingestion of Wild or Farmed Foods. Bioaccumulative compounds listed in Appendix C of the ADEC CSM Guidance (ADEC 2017) are potentially present in soil (some PAH). For the drum piles, game hunting and plant and berry picking could potentially occur, and bioaccumulative compounds are likely present due to product being previously observed; therefore, ingestion of chemically impacted foods is considered a complete pathway for current and future receptors. For the isolated, individual drums, some lone drums were observed to be partially buried with no signs of stressed vegetation, visual staining, or odors. Due to these observations of the isolated, individual drums, the ingestion of chemically impacted foods is considered a potentially complete pathway. However, this pathway is likely to be insignificant since a household is unlikely to obtain all their subsistence resources from that location (due to remote location, logistical challenges, accessibility, probability of infrequent visits, etc.) for a chronic lifetime exposure in their diet (ADEC 2018).

3.5 Extent of Soil Contamination

Several historical investigations have been conducted at the Project 02 site, but analytical data at the isolated, individual drum features are limited; therefore, three estimates of contaminated media volume are presented:

- Low – Reflecting confirmed contaminated media
- Middle – Reflecting likely contaminated media
- High – Reflecting unlikely contaminated media

Information gathered during the 1997 (URS Greiner 1997), 2001 (Jacobs 2003), 2017 (USACE 2018a), and 2019 (USACE 2020) field efforts was used to estimate the quantity of containers and the surface area of assumed contaminated media at each identified feature. The estimated volumes are based on the surface area and the assumed depths of 6 feet bgs for individual drums and drum areas or 15 feet bgs for drum dumps. If information was available that indicated either groundwater or bedrock was present at a depth shallower than the assumptions, then the known depth was used in volume estimates. This review focuses solely on POL-impacted surface and subsurface soils based on the project scope outlined in the Work Plan; depth assumptions for drum and drum area features without analytical data have been updated to provide a more realistic estimate of contaminated volume (USACE 2020). Contamination that has spread to other media will be addressed in future removal actions. Additionally, disposal of materials contaminated with non-POL compounds such as PCBs that are found to be associated with drum features will be included either as part of the effort described in this EE/CA report using methods appropriate to the contaminants present or potentially in a separate FUDS project. A summary of the information gathered for each location is presented in Table 3-1.

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Table 3-1 Criteria for Determination of Extent at Identified Drum Features

REPORT ID	FEATURE TYPE	ESTIMATED QUANTITY	RELATED LOCATION	DISTANCE (feet)	SAMPLE ID	MATRIX	DEPTH (feet)	TYPE	PID (ppm)	IR (ppm)	XRF (ppm)	IMPACT	CATEGORY	VOLUME ESTIMATE	DIMENSIONS (feet)	DTW (feet)	DTBR (feet)	SURFACE AREA (sf)	VOLUME (cy)
08SM	DD	0	10008SM	0.00	10008SM	SS	0.5-1	Screening	0	--	--	No	Clean	None	--	--	--	--	--
DM01-2017	D	1	100DM1	0.00	100DM1	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM02-2017	DD	2	200DM1-SLR-1	3.23	200DM1-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	14.38	7.99
DM03-2017	DA	4	CUP010	12.23	CUP010-SURFACE	SB	0	Screening	--	12	--	No	Likely	Middle	--	--	--	0.00	15.97
					CUP010-3	SB	3	Screening	--	8	--								
					CUP010-6	SB	6	Screening	--	22	--								
DM04-2017	DD	29	200DM2-SLR-1	4.41	200DM2-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	20x11	--	--	275.00	152.78
DM05-2017	D	1	CUP010	13.94	CUP010-SURFACE	SB	0	Screening	--	12	--	No	Likely	Middle	--	--	--	0.00	3.99
					CUP010-3	SB	3	Screening	--	8	--								
					CUP010-6	SB	6	Screening	--	22	--								
DM06-2017	DD	40	200DM3-SLR-1	4.32	200DM3-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	9x14, 9x17, 25x5, 30x10, +1 isolated, individual drum	--	--	887.19	492.88
DM07-2017	D	1	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM08-2017	D	1	200DM4-SLR	0.00	200DM4-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM09-2017	D	1	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM10-2017	D	1	200DM5-SLR	0.00	200DM5-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM11-2017	D	1	100DM6	0.00	100DM6	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM12-2017	D	1	200DM6-SLR	0.00	200DM6-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM13-2017	D	1	200DM7-SLR	0.00	200DM7-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM14-2017	DA	3	200DM8-SLR	0.00	200DM8-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	21.56	11.98
DM15-2017	D	1	100TK2-SLR	21.86	100TK2-SLR	SS	0.5-1	Screening	0.3	--	--	No ground observations	Likely	Middle	--	--	--	7.19	3.99
DM16-2017	D	1	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM17-2017	DD	27	100DM9-SLR	0.00	100DM9-SLR	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	194.06	107.81
DM18-2017	DA	1	100DM10-SLR	0.00	100DM10-SLR	SS	0.5-1	Screening	0.9	--	--	No	Likely	Middle	--	--	--	7.19	3.99
DM19-2017	DD	43	200DM10-SLR	0.00	200DM10-SLR	SS	0.5-1	Screening	0	--	--	Staining. Odors. Stressed vegetation. Open drums with product.	Contaminated	Low	30x30	--	--	1,125.00	625.00
DM20-2017	DA	1	100DM11-SLR	0.00	100DM11-SLR	SS	0.5-1	Screening	1.4	--	--	No	Likely	Middle	--	9	--	7.19	2.40
			CUP021	0.00	CUP021-SURFACE	SB	0	Screening	--	4	--								
					CUP021-3	SB	3	Screening	--	8	--								
					CUP021-9	SB	9	Screening	--	8	--								
DM21-2017	DD	19	200DM11-SLR-1	0.00	200DM11-SLR-1	SS	0.5-1	Screening	8.1	--	--	No	Likely	Middle	--	--	--	136.56	75.87
DM22-2017	DA	1	100DM12-SLR	0.00	100DM12-SLR	SS	0.5-1	Screening	6.2	--	--	No	Likely	Middle	--	--	--	7.19	3.99
			100TK14	3.70	100TK14	SS	0.5-1	Screening	1	--	--								

Table 3-1 Criteria for Determination of Extent at Identified Drum Features

REPORT ID	FEATURE TYPE	ESTIMATED QUANTITY	RELATED LOCATION	DISTANCE (feet)	SAMPLE ID	MATRIX	DEPTH (feet)	TYPE	PID (ppm)	IR (ppm)	XRF (ppm)	IMPACT	CATEGORY	VOLUME ESTIMATE	DIMENSIONS (feet)	DTW (feet)	DTBR (feet)	SURFACE AREA (sf)	VOLUME (cy)
DM23-2017	DD	9	200DM12-SLR-1	0.00	200DM12-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	61.43	34.13
DM24-2017	DA	13	200DM13-SLR-1	2.27	200DM13-SLR-1	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	93.44	51.91
DM25-2017	DA	4	200DM14-SLR	0.00	200DM14-SLR	SS	0.5-1	Screening	1.7	--	--	No	Likely	Middle	18x5	--	--	28.75	15.97
DM26-2017	DA	5	200DM15-SLR	0.00	200DM15-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	16x5	--	--	35.94	19.97
DM27-2017	DD	19	200DM16-SLR	0.00	200DM16-SLR	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	Triangle: 18x24x24	--	--	200.24	111.24
DM28-2017	DD	120	200DM17-SLR-1	0.00	200DM17-SLR-1	SS	0.5-1	Screening	0.6	--	--	No	Likely	Middle	--	--	--	862.50	479.17
DM29-2017	DA	39	TR66	7.68	17FG-HT03	SS	0.5	PCBs	0	--	--	No	Unlikely	High	--	--	--	280.31	155.73
					17FG-HT97	SS	0.5	PCBs	0	--	--								
DM32-2017	DD	80	--	--	--	--	--	--	--	--	--	Soil staining, open drum with product.	Contaminated	Low	--	--	--	575.00	319.44
DM34-2017	DD	30	200DM21	0.00	200DM21	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	215.63	119.79
DM35-2017	DD	130	100DM21-SLR-1	0.00	100DM21-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	934.38	519.10
			200TK131	0.00	200TK131	SS	0.5-1	Screening	0.3	--	--								
DM36-2017	DD	30	200DM22-1	2.42	200DM22-1	SS	0.5-1	Screening	6.4	--	--	No	Contaminated	Low	--	--	--	215.63	119.79
			200QRTK14	17.39	200QRTK14	SS	0.5-1	Screening	6.4	--	--					--	--		
			DAT54A	1.03	DAT54A-10.0-12	SB	10-12	AK Series, Metals, BTEX, PAH	1.1	--	--					--	>21.5		
					DAT54A-10-20	SB	10-20	Screening	--	0	--								
					DAT54A-15.0-17	SB	15-17	AK Series, Metals	1.1	20	--								
					DAT54A-19.5-20.5	SB	19.5-21.5	Screening	1.1	0	--								
					DAT54A-2-4	SB	2-4	Screening	1.3	0	--								
			DAT59A	7.24	DAT59A-2-4	SB	2-4	Screening	1.1	66	--					--	>32		
					DAT59A-8-10	SB	8-10	AK Series, Metals	1.0	10	--								
					DAT59A-11-13	SB	11-13	AK Series, Metals	1.1	10	--								
					DAT59A-30-32	SB	30-32	Screening	1.1	0	--								
DM37-2017	DA	26	100DM22-SLR	0.00	100DM22-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	36x10	--	--	186.88	103.82
DM38-2017	DA/D	11	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	79.06	43.92
DM39-2017	DA	30	100DM23-SLR	0.00	100DM23-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	100x65	--	--	215.63	119.79
DM40-2017	DA	4	TR103-2017	0.00	17FG-T22	SS	0.5	PCBs	--	--	--	No	Unlikely	High	Two adjacent drums x2.	9.29	--	28.75	9.89
			H203	24.7	H203	SB	9.5	--	--	--	--								

Table 3-1 Criteria for Determination of Extent at Identified Drum Features

REPORT ID	FEATURE TYPE	ESTIMATED QUANTITY	RELATED LOCATION	DISTANCE (feet)	SAMPLE ID	MATRIX	DEPTH (feet)	TYPE	PID (ppm)	IR (ppm)	XRF (ppm)	IMPACT	CATEGORY	VOLUME ESTIMATE	DIMENSIONS (feet)	DTW (feet)	DTBR (feet)	SURFACE AREA (sf)	VOLUME (cy)
DM41-2017	DD	30	100DM24-SLR	0.00	100DM24-SLR	SS	0.5-1	Screening	0	--	--	Soil staining. Stressed vegetation. Open drums with product.	Contaminated	Low	31x24	--	--	930.00	516.67
DM42-2017	DA	17	100DM25-SLR	0.00	100DM25-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	122.19	67.88
DM43-2017	DD	160	100DM26-SLR-1	3.93	100DM26-SLR-1	SS	0.5-1	Screening	0	--	--	Soil staining. Stressed vegetation.	Contaminated	Low	50x90	--	--	5,625.00	3,125.00
			FDD01A[1]	28.30	FDD01A0-0.5	SS	0.5	--	--	--	--								
			FDD01B[1]	59.59	FDD01B0-0.5	SS	0.5	AK Series Pest, PCB, Metals VOC, PAH	--	--	--								
			FDD01C	0.00	FDD01C-0-0.5	SS	0.5	AK Series Pest, PCB, Metals VOC, PAH	--	90	--								
					FDD01C0-0.5	SL	0.5	OBS	--	--	--								
DM45-2017	DD	130	100DM27-SLR-1	3.68	100DM27-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	60x90	--	--	6,750.00	3,750.00
DM47-2017	DD	80	100DM28-SLR-1	0.00	100DM28-SLR-1	SS	0.5-1	Screening	0	--	--	Soil staining. Stressed vegetation.	Contaminated	Low	60x60	--	--	4,500.00	2,500.00
DM49-2017	DA	51	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	366.56	203.65
DM50-2017	D	1	200DM30-1	0.00	200DM30-1	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM51-2017	DA	5	100DM30-SLR	0.00	100DM30-SLR	SS	0.5-1	Screening	0	--	--	Weathered tar	Contaminated	Low	--	--	--	35.94	19.97
DM52-2017	DD	2	--	--	--	--	--	--	--	--	--	No	Likely	Middle	--	--	--	14.38	7.99
DM53-2017	DD	100	100DM31-SLR	3.62	100DM31-SLR	SS	0.5-1	Screening	0	--	--	Mobil GARD	Contaminated	Low	--	--	--	718.75	399.31
DM54-2017	DA	8	TR58	0.00	17FG-T24	SS	0.5	PCBs	--	--	--	Soil staining	Contaminated	Low	--	--	--	57.50	31.94
DM55-2017	DA	2	100DM32-SLR	0.00	100DM32-SLR	SS	0.5-1	Screening	0	--	--	Jet A fuel	Contaminated	Low	--	--	--	14.38	7.99
DM56-2017	DD	46	100DM35-SLR	21.26	100DM35-SLR	SS	0.5-1	Screening	0	--	--	Drums containing grease	Contaminated	Low	--	--	--	330.63	183.68
			100DM36-SLR	21.54	100DM36-SLR	SS	0.5-1	Screening	0	--	--								
			FDC02A	0.00	FDC02AWS-01	SW	--	DRO/RRO BTEX, PAH	--	--	--								
			FDC02B	0.00	FDC02BSE-01	SD	--	DRO/RRO BTEX, PAH	--	--	--								
DM57-2017	DD	2	100DM36-SLR	0.00	100DM36-SLR	SS	0.5-1	Screening	0	--	--	Soil staining, open drums containing product.	Contaminated	Low	--	--	--	14.38	7.99

Table 3-1 Criteria for Determination of Extent at Identified Drum Features

REPORT ID	FEATURE TYPE	ESTIMATED QUANTITY	RELATED LOCATION	DISTANCE (feet)	SAMPLE ID	MATRIX	DEPTH (feet)	TYPE	PID (ppm)	IR (ppm)	XRF (ppm)	IMPACT	CATEGORY	VOLUME ESTIMATE	DIMENSIONS (feet)	DTW (feet)	DTBR (feet)	SURFACE AREA (sf)	VOLUME (cy)
DM58-2017	D	1	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	7.19	3.99
DM59-2017	D	1	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	7.19	3.99
DM60-2017	D	1	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	7.19	3.99
DM61-2017	DA	500	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	3,593.75	1,996.53
DM62-2017	DA	4	--	--	--	--	--	--	--	--	--	No	Clean	None	--	--	--	--	--
DM63-2017	D	1	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	7.19	3.99
DM65-2017	DA	4	100DM34-SLR	0.00	100DM34-SLR	SS	0.5-1	Screening	0.1	--	--	Soil staining Stressed vegetation at a location of oozing product (tar).	Contaminated	Low	30x20	--	--	28.75	15.97
DM66-2017	DD	10	100DM33-SLR	0.00	100DM33-SLR	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	15x20	--	--	375.00	208.33
DM67-2017	DD	20	200DM18-SLR-1	0.00	200DM18-SLR-1	SS	0.5-1	Screening	0	--	--	No	Likely	Middle	--	--	--	143.75	79.86
DM68-2017-2*	DD	125	200DM18-SLR-2	0.00	200DM18-SLR-2	SS	0.5-1	Screening	0	--	--	Slight odor south pile. Stained soil.	Contaminated	Low	--	--	--	898.44	499.13
DM68-2017-3*	DD	70	200DM18-SLR-3	0.00	200DM18-SLR-3	SS	0.5-1	Screening	0	--	--	Drums stacked on south side of bermed area.	Contaminated	Low	--	--	--	503.13	279.51
DM68-2017-4*	DD	80	200DM18-SLR-4	0.00	200DM18-SLR-4	SS	0.5-1	Screening	0.6	--	--	No	Contaminated	Low	--	--	--	575.00	319.44
DM68-2017-5*	DD	125	200DM18-SLR-5	0.00	200DM18-SLR-5	SS	0.5-1	Screening	0	--	--	No	Contaminated	Low	--	--	--	898.44	499.13
DM68-2017-6*	DD	75	200DM18-SLR-6	0.00	200DM18-SLR-6	SS	0.5-1	Screening	0	--	--	No	Contaminated	Low	--	--	--	539.06	299.48
DM68-2017-7*	DD	7	200DM18-SLR-7	0.00	200DM18-SLR-7	SS	0.5-1	Screening	0.1	--	--	No	Contaminated	Low	--	--	--	50.31	27.95
DM74-2017**	DD	100	--	--	--	--	--	--	--	--	--	No	Likely	Middle	100x100	--	--	12,500.00	6,944.44
DM75-2017	DA	3	100DM20-SLR	0.00	100DM20-SLR	SS	0.5-1	Screening	0	--	--	No	Unlikely	High	--	--	--	21.56	11.98
DM77-2017	DA	24	100DM19-SLR	0.00	100DM19-SLR	SS	0.5-1	Screening	0	--	--	Slight odor, soil staining.	Contaminated	Low	--	--	--	172.50	95.83
			200DM16-SLR	5.01	200DM16-SLR	SS	0.5-1	Screening	0	--	--								
			200DM17-SLR-1	0.00	200DM17-SLR-1	SS	0.5-1	Screening	0.6	--	--								
			200DM18-SLR-1	0.00	200DM18-SLR-1	SS	0.5-1	Screening	0	--	--								
			200DM18-SLR-2	0.00	200DM18-SLR-2	SS	0.5-1	Screening	0	--	--								
			200DM18-SLR-3	0.00	200DM18-SLR-3	SS	0.5-1	Screening	0	--	--								
			200DM18-SLR-4	0.00	200DM18-SLR-4	SS	0.5-1	Screening	0	--	--								
			200DM18-SLR-5	0.00	200DM18-SLR-5	SS	0.5-1	Screening	0	--	--								

Table 3-1 Criteria for Determination of Extent at Identified Drum Features

REPORT ID	FEATURE TYPE	ESTIMATED QUANTITY	RELATED LOCATION	DISTANCE (feet)	SAMPLE ID	MATRIX	DEPTH (feet)	TYPE	PID (ppm)	IR (ppm)	XRF (ppm)	IMPACT	CATEGORY	VOLUME ESTIMATE	DIMENSIONS (feet)	DTW (feet)	DTBR (feet)	SURFACE AREA (sf)	VOLUME (cy)
			200DM18-SLR-6	0.00	200DM18-SLR-6	SS	0.5-1	Screening	0	--	--								
			200DM18-SLR-7	0.00	200DM18-SLR-7	SS	0.5-1	Screening	0.1	--	--								
DM78-2017	DA	2	--	--	--	--	--	--	--	--	--	No ground observations.	Unlikely	High	--	--	--	14.38	7.99
DM79-2017	DA	7	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	50.31	27.95
DM80-2017	DA	15	200TK7-SLR	6.21	200TK7-SLR	SS	0.5-1	Screening	0.3	--	--	No	Likely	Middle	--	--	--	107.81	59.90
			200TK8-SLR	0.00	200TK8-SLR	SS	0.5-1	Screening	0.3	--	--								
			200TK9-SLR	0.00	200TK9-SLR	SS	0.5-1	Screening	0.3	--	--								
			TR18	0.00	17FG-HT07	SS	0.5	PCBs	--	--	--								
		4	--	--	--	--	--	--	--	--	--							28.75	15.97
DM81-2017	D	1	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	7.19	3.99
DM82-2017	DA	3	--	--	--	--	--	--	--	--	--	No	Unlikely	High	--	--	--	21.56	11.98
																LOW SOIL VOLUME TOTAL			**9,893.23**
																MIDDLE SOIL VOLUME TOTAL			**23,110.79**
																HIGH SOIL VOLUME TOTAL			**26,015.64**

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
Where more than one screening result is available, the highest reported value is presented.
Related locations are those placed within 25 feet of drum feature, unless otherwise noted.
[1] Locations FDD01A and FDD01B are greater than 25 feet from the DM43-2017 survey location however, the survey location was on the perimeter of the drum area, and field notes from the 2001 field effort placed these sample locations within 10 feet of the nearest drum and/or known contamination.
[*] DM68-2017-2 through -7 were reported as DM68-2017 in Table 2 of the 2018 report based on the field survey ID 200DM18-SLR-2 through -7, however, separate drum piles exist in each feature with separate drum counts, so they are listed separately here.
[**] DM74-2017 was reported as DM76-2017 in Table 2 of the 2018 report based on the field survey ID 100DM19-SLR. The coordinates of 100DM19-SLR are within the boundary of DM74-2017 in the feature class Drum_Dump provided as GFM.
-- Not analyzed or not applicable.

Categories:
Contaminated - A feature at which contamination has been confirmed by screening exceedances, visual observation, or some combination thereof (Low Volume).
Likely - A feature at which the presence of contamination is likely, but there is inadequate data to make a determination (Middle Volume).
Clean - A feature that has analytical data available and field records that confirm cleanup of drums and/or contamination is complete.
Unlikely – A feature at which the presence of contamination is unlikely, but there is inadequate data to make a determination.

Feature Types:
D – Drum; isolated, individual drum
DA – Drum Area; loosely delineated areas of scattered drums
DD – Drum Dump; designated areas for staging/stacking drums

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3.5.1 Screening Levels

For the purposes of determining the extent of soil contamination in the context of this EE/CA report, the limited historical analytical data was compared to RBSLs. The RBSLs were defined as the most conservative value between 1/10th ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B1 for human health (ADEC 2020) or EPA's Human Health RSLs at the Excess Lifetime Cancer Risk level of 10^{-6} and hazard quotient (HQ) of 0.1. RBSLs for petroleum range organics (GRO/DRO/RRO) were also defined as the most conservative value between ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B2 for inhalation or ingestion; however, they were not divided by 10 for screening purposes since they are not included in cumulative risk analysis (ADEC 2020).

3.5.2 Basis of Determination

The following resources were used to make determinations about each of the identified drum features:

3.5.2.1 Spatial Data

Spatial data collected during the 2017 field effort was used as the basis of identification of existing drum features and gross contamination from drums. Related locations were identified based on spatial proximity of less than 25 feet from drum features. Location information from the 1997, 2001, 2017, and 2019 reports were used to identify nearby locations where field screening, analytical sampling, or drilling activities occurred.

3.5.2.2 Field Notes

Field forms and field logbooks were reviewed for relevant information regarding drum features and locations meeting proximity criteria. Field notes were used to confirm details such as the number of drums at a location, dimensions of drum areas and drum dumps, visual signs of contamination, field screening results, and depth information. Where available, the dimensions recorded on 2017 field forms for drum areas and drum dumps were used to calculate the estimated surface area of affected soil. Otherwise, the surface area was determined by multiplying the number of drums by their footprints. In both cases, an additional 25% was added to the estimated area, per the EE/CA Work Plan (USACE 2020).

3.5.2.3 Photographs

Photographs taken during the 2017 field effort were used to verify signs of visual contamination and number of drums, and to determine resting position of drums at each feature. When possible, the resting position of each drum was recorded (upright, resting on side) and used to estimate drum footprint more accurately. In the absence of comprehensive photographs, drums were assumed to be resting on their sides as this is the more probable scenario and more conservative estimate, based on available information. All drums were assumed to be 55-gallon drums measuring 34.5 inches tall with a 24-inch diameter. Drum feature notes indicated that some drums appeared to be smaller, such as DM36-2017 and DM51-2017, but quantities were not clear from photographs or written records. A conservative estimate was based on 55-gallon size.

3.5.2.4 Analytical Data

Multiple investigations were performed at Fort Glenn beginning as early as 1985; however, for the purpose of characterization, only validated analytical results from 1997 to present were reviewed. Surface and subsurface soils were the primary focus, but nearby sampling locations for sediment, groundwater,

and surface water were also reviewed for potential impact. To identify potential areas of gross contamination, samples within 20 feet of a drum feature (proximity criteria) were considered in addition to samples collected directly from drum features. All associated analytical results are included in Appendix A. Analytical results for surface and subsurface soil were compared to the RBSLs described in Section 3.5.1.

In 2017, a total of six surface soil samples collected near drum areas met proximity criteria. Each sample was analyzed for PCBs due to the presence of nearby transformers. No target analytes were detected in any of the samples.

In 2001, a total of one surface soil and four subsurface soil samples were collected at four locations that met proximity criteria for drum dumps. Two additional surface soil samples collected at locations FDD01A and FDD01B were included based on field notes that placed these samples within 10 feet of drums and spilled product in DM43-2017 (Jacobs 2003). A summary of detected analytes is presented in Table 3-2. Surface soil samples collected in 2001 were analyzed for GRO, DRO, RRO, RCRA metals, pesticides, PCBs, VOCs, and PAH. Arsenic exceeded the RBSLs in all three samples but is considered naturally occurring and is not associated with drum contamination at the project site. Positive detections were noted for DRO, RRO, several other metals, Endrin ketone, VOCs, and PAH but were either below the RBSLs or did not have an established RBSL. Positive detections for RRO exceeded the RBSL at FDD01A and FDD01B. Several non-detect results for pesticides and VOCs had reported limits that exceeded the screening level, likely due to sample dilution.

The four subsurface soil samples were collected at two boring locations in 2001 and were analyzed for GRO, DRO, RRO, and RCRA metals. One sample was also analyzed for BTEX and PAH. Arsenic was detected above the RBSL in all four samples but is considered naturally occurring and was not related to drum contamination. Several other metals, DRO, RRO, and PAH were detected as well but were below the RBSL or did not have screening criteria. A summary of detected results is presented in Table 3-3.

Other sample media were also reviewed for proximity to drum features. A sediment sample was within 25 feet of drum feature DM56-2017. The area was described as a low-lying, marshy pond approximately 1 foot deep. No visual signs of contamination were present and the field samplers noted a layer of organic matter at the bottom of the pond. The sediment sample was analyzed for DRO, RRO, BTEX, and PAH. DRO, RRO, toluene, and several PAH compounds were detected in the sediment sample. A summary of detections is presented in Table 3-4. A product sample was also collected from an observed spill near the previously discussed surface soil samples. Field notes indicated that the product sludge sample contained saturated surface soil from the spill area. Analytical results for the product sludge are presented in Table 3-5. The arsenic detection is likely due to the presence of surface soil at the site and is considered naturally occurring. The 2001 field effort included removal of the spilled material, but soil staining was noted at this location during the 2017 field effort.

For all field samples, only detections for RRO exceeded the RBSL at FDD01A and FDD01B; all other results were below the RBSLs.

Table 3-2 Detected Analytes in Surface Soil Near Drum Dumps

SAMPLE ID[1] DRUM FEATURE COLLECTION DATE MATRIX		FDD01A0-0.5 DM43-2017 8/4/2001 SURFACE SOIL	FDD01B0-0.5 DM43-2017 8/4/2001 SURFACE SOIL	FDD01C0-0.5 DM43-2017 8/4/2001 SURFACE SOIL
ANALYTE	RBSL[2]			
DRO	8,250	2,400	6,300	12
RRO	8,300	19,000	54,000	98
Arsenic	0.68	1.2	1.4	1.2
Barium	1,500	33.4	51.5	42.8
Cadmium	7.1	0.04	0.04	0.04
Chromium	10,000	1.5	1.5	2
Lead	40	1.26	1.84	2.3
Selenium	39	0.2	0.4	0.3
Silver	39	0.062	0.037	0.054
Mercury	0.31	ND [0.02]	0.04	0.02
Endrin ketone	NS	ND [0.037]	0.043	ND [0.0047]
Acetone	6,100	0.5 UBRL	0.87 UBRL	0.62 UBRL
Methylene chloride	35	0.04 UBRL	0.057 UBRL	0.069 UBRL
Styrene	18	0.012 UBRL	0.015 UBRL	0.022
2-Methylnaphthalene	24	0.0031	ND [0.0065]	ND [0.0071]
Benzo(a)anthracene	1.1	0.052	ND [0.0065]	ND [0.0071]
Benzo(b)fluoranthene	1.1	0.045	0.042	ND [0.0071]
Benzo(g,h,i)perylene	NS	0.026	0.029	ND [0.0071]
Benzo(k)fluoranthene	11	0.034	0.024	ND [0.0071]
Chrysene	110	0.36	1.3	ND [0.0071]
Dibenzo(a,h)anthracene	0.11	0.014	ND [0.0065]	ND [0.0071]
Fluoranthene	240	0.0088	0.005	ND [0.0071]
Indeno(1,2,3-cd)pyrene	1.1	0.01	ND [0.0065]	ND [0.0071]
Naphthalene	2	0.0042	0.0028	ND [0.0071]
Phenanthrene	190	0.026	0.0045 UBRL	ND [0.0071]
Pyrene	180	0.055	0.077	ND [0.0071]

Notes:

For definitions, refer to the Acronyms and Abbreviations section.

All RBSLs and results are presented in milligrams per kilogram.

1 Sample IDs are abbreviated for brevity. All IDs included the prefix "JE01" and suffix "SO-01."

2 RBSLs are defined as the most conservative value between 1/10th ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B1 for human health or EPA's Human Health RSLs at the Excess Lifetime Cancer Risk level of 10^{-6} and HQ=0.1. RBSLs for petroleum range organics (GRO/DRO/RRO) were defined as the most conservative value between ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B2 for inhalation or ingestion.

ND – not detected; limit of detection shown in brackets []

NS – not specified

UBRL – The result may be biased due to method blank detection and is recommended rejected.

Table 3-3 Detected Analytes in Subsurface Soil Near Drum Dumps

SAMPLE ID[1] DRUM FEATURE COLLECTION DATE MATRIX DEPTH (feet bgs)		DAT54A-10.0-12 DM36-2017 7/31/2001 SUBSURFACE SOIL 10.0-12.0	DAT54A-15.0-17 DM36-2017 7/31/2001 SUBSURFACE SOIL 15.0-17.0	DAT59A-8.0-10.0 DM36-2017 7/31/2001 SUBSURFACE SOIL 8.0-10.0	DAT59A-11.0-13 DM36-2017 7/31/2001 SUBSURFACE SOIL 11.0-13.0
ANALYTE	**RBSL[2]**				
DRO	8,250	2.8 UBRL	12	10 UBRL	2.8 UBRL
RRO	8,300	ND [140]	120	50	ND [120]
Arsenic	0.68	2.4	5.3	0.9	0.9
Barium	1,500	65.6	71	44.1	31
Cadmium	7.1	0.05	0.13	0.03	0.02
Chromium	10,000	2.3	5.2	1.2	1.3
Lead	40	3.1	5.11	1.69	1.41
Selenium	39	0.2	0.5	0.1	ND [1.2]
Silver	39	0.161	0.283	0.157	0.107
Mercury	0.31	0.07	0.09	ND [0.02]	ND [0.02]
Benzo(b)fluoranthene	1.2	2	--	--	--
Indeno(1,2,3-cd)pyrene	1.2	0.0022 UBRL	--	--	--

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
All RBSLs and results are presented in milligrams per kilogram.

1 Sample IDs are abbreviated for brevity. All IDs included the prefix "JE01" and suffix "SO-01."

2 RBSLs are defined as the most conservative value between 1/10th ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B1 for human health or EPA's Human Health RSLs at the Excess Lifetime Cancer Risk level of 10^{-6} and HQ=0.1. RBSLs for petroleum range organics (GRO/DRO/RRO) were defined as the most conservative value between ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B2 for inhalation or ingestion.

-- = not available
ND – not detected; limit of detection shown in brackets []
NS – not specified
UBRL – The result may be biased due to method blank detection and is recommended rejected.

Table 3-4 Detected Analytes in Sediment Near Drum Dumps

	SAMPLE ID[1] DRUM FEATURE COLLECTION DATE MATRIX	FDC001BSE DM56-2017 7/23/2001 SEDIMENT
ANALYTE	**RBSL[2]**	
DRO	8,250	860
RRO	8,300	2,900
Toluene	20	0.042 J-S
2-Methylnaphthalene	24	36
Anthracene	1800	21
Benzo(a)anthracene	1.1	22
Benzo(a)pyrene	0.11	26
Benzo(b)fluoranthene	1.1	65
Benzo(g,h,i)perylene	190	29
Benzo(k)fluoranthene	11	30
Chrysene	110	98
Dibenzofuran	7.3	14
Fluoranthene	240	150
Fluorene	240	15
Naphthalene	2	17
Phenanthrene	190	110
Pyrene	180	98

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
All RBSLs and results are presented in milligrams per kilogram.

1 Sample IDs are abbreviated for brevity. All IDs included the prefix "JE01" and suffix "SO-01."

2 RBSLs are defined as the most conservative value between 1/10th ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B1 for human health or EPA's Human Health RSLs at the Excess Lifetime Cancer Risk level of 10^{-6} and HQ=0.1. RBSLs for petroleum range organics (GRO/DRO/RRO) were defined as the most conservative value between ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B2 for inhalation or ingestion.

J-S – Result is considered estimated due to surrogate recovery.

Table 3-5 Summary of Results for Product Samples Near Drum Dumps

SAMPLE ID[1]	ANALYTES						
	TOTAL HALOGENS	IGNITABILITY	ARSENIC	CADMIUM	CHROMIUM	LEAD	TOTAL PCBS
	ppm	°F	mg/kg	mg/kg	mg/kg	mg/kg	ppm
FDD01CO-0.5	ND [131]	200	1.44	ND [0.3]	ND [1]	3.94	ND [0.96]

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
[1] Sample IDs are abbreviated for brevity. All IDs included the prefix "JE01" and suffix "MH-01."
ND – not detected; limit of detection shown in brackets [ ].

3.5.2.5 Field Screening Data

The 1997, 2001, 2017, and 2019 field efforts included field screening either at or near drum features. Due to the limited analytical data available, historical screening results were the primary source of information evaluated to determine the likelihood of contamination at drum features. Several screening methods were reviewed as part of this analysis including photoionization detector (PID), infrared spectrometer (IR) and X-ray fluorescence (XRF). Field screening results are included in Table 3-1 and Appendix A.

Screening results were compared to screening cutoff criteria. Historical reports did not specify cutoff criteria for PID and XRF screening efforts, so they were selected based on standard screening practices. The *2001 Fort Glenn Remedial Investigation/Interim Removal Action Report* included a correlation study that recommended a conservative estimate of 6.5 times the reported IR result to estimate DRO levels in soil at the project site (Jacobs 2003). To determine the presence of petroleum-related contamination, IR screening values were compared to the 18 AAC 75, Tables B2 cleanup criteria for the Over 40-Inch Zone, Migration to Groundwater cleanup level for DRO. IR field screening results were assigned a conservative screening level of 35 parts per million (ppm), based on the correlation study presented in the 2001 Final Report (Jacobs 2003).

3.5.2.6 Boring Logs

Soil boring logs were included in the 2001 Remedial Investigation Report for Fort Glenn (Jacobs 2003). Several locations, DAT54A, DAT59A, DAT056, DAT059, and H203, met proximity criteria to drum features. Boring logs were reviewed for information about depth to groundwater or bedrock. Where this information was not available, an excavation depth of 15 feet bgs was used to calculate contaminated soil volume for drum dumps, and an excavation depth of 6 feet bgs was used to calculate contaminated soil volume for individual drums and drum areas.

3.5.3 Determination of Extent

Using the historical information available, drum features were placed in three categories: contaminated, clean, and those without enough information for a definitive determination. Drum features that were considered contaminated either had documented visual indicators of contamination, analytical results that exceeded the screening levels, or field screening results that exceeded cutoff levels. Drum features that were considered clean were required to have analytical results that confirmed contamination was not present or that removal had occurred. Features included in low, middle, and high soil volume

estimates were based on these categories; clean features are considered remediated and were not included in volume estimates.

A total of 15 drum features were placed in the contaminated category. One feature, DM43-2017, had two associated surface soil samples with RRO detections greater than the RBSL. Two features, DM36-2017 and DM43-2017, had IR field screening results that exceeded the screening cutoff. The remaining features were identified based on visual inspection. These features exhibited soil staining, detectable odors, stressed vegetation, and/or were documented as containing product. Of the 15 drum features, 5 features were drum areas and 10 were drum dumps. The low soil volume estimate is comprised of these 15 contaminated features. Features included in the low soil volume estimate are shown on Figures 3-1 through 3-10.

The remaining 54 features did not have historical analytical data available to determine whether contamination was present. These locations were divided into the middle (likely) and high (unlikely) soil volume estimates based on field screening detections and feature type. The middle soil volume estimate expanded upon the screening criteria to include any drum feature that had a screening result above background. It was considered likely that these features have contamination present. Drum dumps were identified as more likely to be contaminated due to the nature of use and were, therefore, included in the middle estimate of soil volume. A total of 24 features (in addition to the 15 in the low estimate) were included in the middle soil volume estimate. Features included in the middle soil volume estimate are shown on Figures 3-1 through 3-10.

The characteristics of the remaining 30 features suggest that the presence of associated contaminated media is less likely. These 30 features were included in the high quantity estimate and are shown on Figures 3-1 through 3-10. The high soil volume estimate would remediate all identified features at the Project 02 site and includes all identified drum features except DM62-2017 and 08SM (described below).

Drum feature DM62-2017 was not included in the estimates of soil volume because it is associated with a Federal Aviation Administration project, and is therefore not addressed in this EE/CA report.

Drum feature 08SM was categorized as not applicable to Project 02 based on the 2017 site reconnaissance. No drums were found at the location, and no evidence of gross contamination was present (including a screening result within background). Therefore, per the Work Plan, it was decided that this feature would not be included as part of soil removal because only features with drums or signs of gross contamination are scoped under the NTCRA described in this EE/CA report.

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4.0 CULTURAL RESOURCE EVALUATION

Following the attack on Pearl Harbor, U.S. leadership authorized a top-secret airfield on Umnak Island. Army engineers and Navy Seabees deployed to Umnak dressed in civilian clothes for secrecy. Supplies were labeled "Blair Fishing Packing Company." Crews worked in three shifts, 24 hours a day, laying the runways and constructing support facilities. Work on Fort Glenn began in January 1942, and the first runway—5,000 feet long and made of pierced steel planking called Marston matting—was completed 4 months later. During the first Japanese raids, U.S. Army 11th Air Force fighters were in place for defense of Dutch Harbor. On 3 June 1942, P-40 Warhawks from Fort Glenn surprised the attacking Japanese, destroying two enemy observation planes and crippling two more. On 4 June, they shot down five Japanese aircraft, with the loss of two of their own. In 1942, Fort Glenn was the westernmost U.S. Aleutian airfield and main staging and bomb-loading base for the "Kiska Blitz"—round the clock bombing missions on the Japanese forces on Kiska and Attu. Construction continued throughout Summer 1942 as planes roared overhead on combat missions. By July, three additional runways were completed along with the Naval Air Facility at nearby Otter Point. The 11th Air Force maintained its advanced command post at Fort Glenn from July until October, when it moved to the new airfield completed at Adak farther west. Fort Glenn eventually had facilities for 10,579 officers and enlisted men, and housed fighters, medium and heavy bombers, and transport and reconnaissance aircraft. As U.S. forces pushed west across the Aleutians and airfields were completed closer to the invading Japanese, combat sorties from Fort Glenn were downgraded. The installation, however, continued to provide important logistics, transport, and aircraft support through the end of the war.

Fort Glenn's Main Airfield was designated as an NHL and listed on the National Register of Historic Places (NRHP) in 1986 (Klein et al. 1987) with a re-evaluation and revised listing in 1994 (Cook 1994). The NHL is significant under National Register Criterion A (events) for its association with WWII in the Aleutians and Criterion C (design/construction) in that it embodies the distinctive characteristics of WWII military construction in the Aleutians (Cook 1994). The revised listing (Cook 1994) states that "all WWII period construction, infrastructure, objects, and landscape features are contributing resources" to the NHL, and provides additional detail on contributing objects to include "all WWII period material, especially all airplane parts and wreckage, steel pierced matting, wall murals, furniture, military personal effects, hardware, tools, cables, fixtures, barrels, vehicles, and machinery (Cook 1994)." These types of features are not normally considered NRHP-eligible; however, given that Fort Glenn is one of the best remaining examples of military history associated with WWII in the Aleutians, as defined in its NRHP listing, these objects are considered vital components contributing to the NHL's integrity (Cook 1994; Alaska SHPO 2018). The revised listing also lists all landscape features such as revetments, runways, berms, and other landscape features, as well as all buildings and structures as essential contributing elements to the NHL (Cook 1994).

For the 2017 CON/HTRW Site Reconnaissance, archaeologists from Stephen R. Braund and Associates (SRB&A) conducted cultural resources monitoring of reconnaissance fieldwork and archaeological survey of potential future action and logistical areas. Their work identified 371 individual WWII-era cultural resources in the CON/HTRW project area. While the documentation provided in the cultural resources report (SRB&A 2018) was determined by SHPO to be insufficient for determining NRHP eligibility for these resources (SHPO 2018), SRB&A's (2018) identification of these resources in combination with documentation of preliminary site boundaries for known Alaska Heritage Resources Survey (AHRS) sites within the Fort Glenn area is useful to inform potential future removal actions, such as the NTCRA alternatives evaluated in this report.

4.1 Area of Potential Effect

The Area of Potential Effect (APE) for Project 02 Drum Piles RA includes a 5-meter buffer around all of the drums and drum piles that will be removed and all areas of potential ground disturbance associated with soil removal, as well as mobilization, access, and logistical areas such as potential barge landings, campsites, and staging areas.

4.2 Historic Properties within APE

Historic properties are cultural resources that are listed on, or are eligible for listing on the NRHP (National Park Service 1997). As discussed above, all of the WWII features, including drums, drum piles and landscape features in Fort Glenn are listed as contributing elements to the NHL, and thus qualify as historic properties within the APE. In addition, six prehistoric archaeological sites are in the Fort Glenn area (Figures 4-1 and 4-2). Three of these sites—UNL-00145, UNL-00324, and JJA-0003—are in the NHL at the main airfield (Figure 4-1) in the vicinity of Project 02 features. Of these, site UNL-00145 is in immediate proximity within the APE of drum DM50-2017, which is scheduled for remediation (Figure 4-3). Drum piles DM55-2017, DM40-2017, DM56-2017, DM57-2017, DM53-217, and DM-2066 are within 500 feet of UNL-00145 boundaries, which may result to impacts to UNL-00145 from access, mobilization, or logistical activities. Although the prehistoric sites in the northern project area (Figure 4-2) are outside the RA direct effects APE, they should be considered, along with sites JJA-0003 and UNL-00324, when planning logistics and access to RA areas.

For the purposes of this EE/CA report, it is assumed that all of these resources are significant historic properties, either individually or as contributing elements to the Fort Glenn NHL. To further refine RA cultural resource impacts analysis, it is necessary to define the boundaries and contributing and non-contributing elements of UNL-00317—the AHRS designation for portions of Fort Glenn that were not included within the NHL at the time of designation. It is also necessary to register other sites within the project area, such as JJA-00003, with the AHRS and evaluate potential significance and qualification as historic properties.

4.3 Assessment of Effect

Removal of drums and drum piles and soil removal from associated features such as revetments and berms and other WWII features and objects will constitute an adverse effect to contributing elements of the Fort Glenn NHL. Drum removal and soil excavation at prehistoric site UNL-00145 has the potential to disturb intact prehistoric archaeological deposits. In addition, mobilization, access, logistical activities, and the required areas for treatment alternatives such as landfarming and incineration have the potential to impact additional contributing features to the NHL, or to the prehistoric archaeological sites located in the project area.

4.4 Resolution of Adverse Effects

The recommended strategy to mitigate adverse effects to the NHL's contributing elements that are subject to RA activities (i.e., drums, drum piles, and associated WWII features) is documenting and recording the affected WWII features and objects to professional archaeological standards prior to removal, and documenting work locations after project activities. The recommended strategy to avoid or minimize potential inadvertent impacts to prehistoric archaeological remains, or inadvertent impacts to NHL contributing elements from mobilization or site activities, is monitoring of RA actions, including mobilization, site access, logistical activities, and the setup of areas required for treatment options such

as landfarming and incineration by a qualified archaeologist. These recommended strategies will require an archaeologist, who meets the Secretary of Interior's Professional Qualification Standards (Title 36 of the *Code of Federal Regulations* [CFR], Part 61 [36 CFR 61], Appendix A) to: (1) engage and participate in pre-field planning: (2) be onsite during all project activities, including mobilization and demobilization; and (3) produce a post-field technical report, which will include pre- and post-RA conditions, and meet the Secretary of Interior's and Alaska state standards for archaeological documentation. In addition, it is recommended that USACE develop, publish, and distribute a book about Fort Glenn's WWII history, the NHL, and the need to remove contaminants from the NHL and other areas in Fort Glenn, as a public interpretative mitigation measure.

4.4.1 Pre-Remedial Action Documentation

To mitigate impacts to NHL contributing elements, immediately prior to remediation or removal activities, the archaeologist shall document affected WWII surface features, structures, and artifacts, including, but not limited to drums and drum piles, and associated landscape features such as berms, revetments, or depressions, and any other affected WWII object. Documentation shall include: (1) high quality (at least 2- to 5-megapixel) photography of the site setting, drum and/or feature details, all site features, and all other WWII objects or features that will be removed or impacted. A photograph log shall be included, providing a description of the subject, features photographed, date of photograph, direction, and photographer's name; (2) metric and qualitative descriptions of isolated, individual drums, or of a sample of drums for large drum piles, with an emphasis on recording base marks, International Code Council (ICC) codes, manufacturer information, or military identifying marks, and/or other affected WWII features; (3) mapping- or survey-grade Global Positioning System (GPS) recording of drum locations, extent of drum piles, and/or location and extent of other affected WWII features; and (4) drone aerial imagery of work zones, access routes, and each removal location prior to work activities.

4.4.2 Archaeological Monitoring

To avoid or minimize potential inadvertent cultural resource impacts, the archaeologist shall conduct monitoring of project activities (to include mobilization and site setup, site logistics, excavation activities, treatment location setup activities, and all other activities associated with the NTCRA), evaluate sensitive areas and cultural resources in proximity to project activities, assess proposed mobilization and RA activities, determine the applicable protocols, and make recommendations as necessary. The monitor will work alongside project personnel during project activities that may impact cultural resources and will coordinate with the USACE program manager on the scope and schedule and communicate those to the project field team.

The archaeological monitor will conduct on-the-ground reviews of sensitive locations with other project crews as needed and will be responsible for notification to the project manager and field director of any work stoppage. The archaeological monitor will complete daily monitoring logs, complete any work stoppage logs, and will also be responsible for identification of human remains, if discovered. The archaeological monitor will ensure that excavation or disturbance to an inadvertent discovery is halted and that appropriate laws are followed if human remains are discovered. The archaeological monitor will help ensure that Alaska Native human remains and any associated grave items are treated with culturally appropriate dignity, consistent with applicable state and federal law and USACE standard operating procedures for cultural resources and human remains discovery. Inadvertent cultural resource discoveries will include notifications to the Alaska SHPO, and respective landowner.

Inadvertent cultural resource discoveries will be recorded by a professional archaeologist using standard archaeological techniques found in 48 Federal Register 44716. Site overviews, features, artifacts, and context of findings will be photographed. Stratigraphic profiles and soil/sediment descriptions will be prepared. Discovery locations will be documented on scaled site plans and site location maps. The discovery will be evaluated for significance, or to determine if it is an element of a site already determined as a significant cultural resource.

4.4.3 Post Remedial Action Documentation

At the conclusion of fieldwork, the archaeologist will document each removal location in a manner identical to the pre-RA documentation, including: (1) high quality photography of the work and removal area, along with a photograph log; (2) metric and qualitative descriptions of the removal area; (3) mapping- or survey-grade GPS recording of the removal area; and (4) drone aerial imagery of work zones, access routes, and each removal location after work activities to allow for a "before and after" comparison.

4.4.4 Workforce Cultural Resources Awareness Briefing

The archaeological monitor will brief all project personnel directly involved in field activities on field identification of potential cultural resources. Personnel will also be cautioned on the legal and/or regulatory implications of destroying cultural resource or removing artifacts, human remains, and other cultural materials from the site of initial discovery. The briefing will also include instruction regarding stipulations provided in the following cultural resources protocols, with emphasis on actions to be taken in the event of unanticipated discovery of a cultural resource or of human remains in the field during project activities. The briefing will be completed by all project personnel before they participate in RA activities.

4.4.5 Reporting

Upon the completion of fieldwork, a technical report conforming to the guidelines set forth in the Secretary of Interior's Standards for Archaeological Documentation (48 Federal Register 44734-37) and State of Alaska guidelines for monitoring reports found at Historic Preservation Series No. 15 will be prepared. The report will include, at a minimum (note this list is not exhaustive):

- Pre-RA conditions and documentation
- Description of mobilization and remediation activities
- Map showing project activities
- Monitoring methods
- Results of fieldwork and analysis
- Project effects
- Description of cultural resource finds, including NRHP evaluations and recommendations
- Updated AHRS forms, and updated description and condition of previously documented cultural resource sites
- AHRS forms for newly discovered sites, if applicable
- Photographs and imagery

4.4.6 Public Interpretative Materials: Fort Glenn History Book

As a creative mitigation measure that serves the public interest, it is recommended that USACE prepare a book that describes the WWII history of Fort Glenn. The book should contain photos, figures, and simple text that is responsive to professional standards, yet easily understood by the general public. The book should include: (1) The history of Fort Glenn and its critical role in WWII in the Aleutians; (2) a description of construction efforts, including the efforts to maintain secrecy; (3) specific missions and sorties launched from the fort such as the defense of Dutch Harbor, the Kiska Blitz, and others; (4) historic and modern photographs and figures of the Fort Glenn NHL and associated elements; (5) locations of the Fort Glenn facilities; (6) lifeways and experiences of personnel stationed at Fort Glenn; and (7) the need and effort to remove contaminants from the NHL.

Data sources for the book should include the RA documentation and other recent investigations; and archival sources such as USACE records, the National Archives and Records Administration repositories, museums, libraries, and, if possible, informant interviews with personnel stationed at Fort Glenn during the war, or with first-hand knowledge of the fort's history.

The book should be widely distributed to public institutions in Alaska. At a minimum, this should include: the Alaska Resources Library and Information System; the Museum of the Aleutians; the Aleutian WWII Visitor Center; the University of Alaska Fairbanks Rasmussen Library; the University of Alaska Anchorage/Alaska Pacific University Consortium Library; the Alaska Department of Natural Resources; the Alaska State Library; Anchorage Museum; and the Fort Glenn landowners, as well as libraries and schools across the state.

4.4.7 Qualifications

It is recommended that these cultural resource tasks be performed by a person or persons with appropriate professional qualifications. At a minimum, the archaeologist or historian employed to perform the recommended cultural resource measures should meet the professional qualifications set forth in the Secretary of Interior's Professional Qualification Standards (36 CFR 61, Appendix A). Previous experience with the WWII and prehistoric resources of the Aleutian Islands is also strongly recommended.

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5.0 IDENTIFICATION OF REMOVAL ACTION SCOPE, GOALS, AND OBJECTIVES

Identifying the scope, goals, and objectives for a removal action is a critical step in the EE/CA and in the conduct of NTCRAs. The overall goal of this EE/CA report is to evaluate NTCRA alternatives to address unacceptable risk from known contamination at the Fort Glenn FUDS property. The selected NTCRA is intended to remove potential contaminant sources, which consist of the drums and soil impacted from direct discharges and leaks from these drums. To determine which drum features have exceedances, the most conservative of either 1/10th ADEC 18 AAC 75 Method Two Over 40-Inch Zone Table B1 for human health, Table B2 for inhalation or ingestion, or EPA RSLs was used (the RBSLs) (EPA 2020b. The primary objective of the NTCRA will be to remove contaminants that exceed the soil cleanup levels found in ADEC Method Two Over 40-Inch Zone Table B1 for human health and Table B2 for inhalation or ingestion as shown in Table 5-1 (remedial goals) (ADEC 2020), while protecting and documenting archaeological and historic resources on the island.

The selected NTCRA for the site is intended as one of a series of response actions, with additional RA in the future possibly warranted after the NTCRA has been conducted. This NTCRA will be focused on removing the source contaminants, and future remediation activities conducted at the site will deal with additional ARARs and ecological concerns (if applicable).

5.1 Statutory Limits on Removal Actions

There are statutory limits for Fund-financed removal actions under CERCLA; pursuant to Section 104(e)(1) of CERCLA, these limits are $2 million for cost and 12 months for duration (not including preparation of the EE/CA report). Because the EE/CA is not Fund-financed, these statutory limits do not apply to this report.

5.2 Removal Scope

The scope of this EE/CA report will only include CON/HTRW Project 02 features, which consist of isolated, individual drums, drum areas, and drum piles from former military activities at Fort Glenn. Only existing drums or gross contamination from drums will be considered for treatment, as noted in Section 2.5. There is qualitative evidence found from observations and screening that gross contamination is present and associated with the individual drums and drum piles. Note that drum feature DM62-2017, listed in the report, is not included in the estimates of soil volume because it is associated with a Federal Aviation Administration project and is therefore not included for the NTCRA.

For this project, it will be assumed that all drums and drum contents will be removed from the site, and any associated contaminated source soil will be treated onsite or transported offsite for disposal or treatment. The majority of drums at the site are believed to be fuels and oils that are not impacted with non-POL compounds such as PCBs and metals. Disposal of materials contaminated with non-POL compounds such as PCBs that are found to be associated with drum features will be included either as part of the effort described in this EE/CA report using methods appropriate to the contaminants present or potentially in a separate FUDS project. A total of 2,554 drums will be assumed for removal and disposal offsite.

Soil removal actions will be conducted to meet the remedial goals (Table 5-1). The remedial goals are defined as the ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and the most conservative

of the ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (ADEC 2020). COPCs are limited to POL constituents based on previous investigations and site history.

Although various investigations have occurred in regard to Project 02, sampling at individual features has been limited. Therefore, three different categories for estimated volumes (low, middle, and high) of contaminated soil will be assumed for evaluation separately in subsequent sections of this report. These estimates are shown in Section 3.4 and are based on evaluation of available analytical data, as well as qualitative observations and screening data.

Additionally, previous investigations have indicated that drum features either have associated contamination or do not have enough information to conclude the site feature is uncontaminated, with the exceptions of DM62-2017, which is part of a Federal Aviation Administration project, and 08SM, where no drums or signs of contamination were found. Therefore, all other features were included in the soil volume estimates.

Table 5-1 Remedial Goals for COPCs

METHOD[1]	ANALYTE	UNITS	REMEDIAL GOAL[2]
AK101	GRO	mg/kg	1,400
AK102	DRO	mg/kg	8,250
AK103	RRO	mg/kg	8,300
SW8260D	1,2,4-Trimethylbenzene	mg/kg	43
SW8260D	1,2-Dibromoethane	mg/kg	0.31
SW8260D	1,2-Dichloroethane	mg/kg	3.9
SW8260D	1,3,5-Trimethylbenzene	mg/kg	37
SW8260D	Benzene	mg/kg	8.1
SW8260D	Ethylbenzene	mg/kg	35
SW8260D	Isopropylbenzene (Cumene)	mg/kg	54
SW8260D	n-Butylbenzene	mg/kg	20
SW8260D	sec-Butylbenzene	mg/kg	28
SW8260D	tert-Butylbenzene	mg/kg	36
SW8260D	Toluene	mg/kg	200
SW8260D	Xylenes (total)	mg/kg	57
SW8270E SIM	1-Methylnaphthalene	mg/kg	68
SW8270E SIM	2-Methylnaphthalene	mg/kg	250
SW8270E SIM	Acenaphthene	mg/kg	3800
SW8270E SIM	Acenaphthylene	mg/kg	1900
SW8270E SIM	Anthracene	mg/kg	19000
SW8270E SIM	Benzo(a)anthracene	mg/kg	12
SW8270E SIM	Benzo(a)pyrene	mg/kg	1.2
SW8270E SIM	Benzo(b)fluoranthene	mg/kg	12
SW8270E SIM	Benzo(g,h,i)perylene	mg/kg	1900
SW8270E SIM	Benzo(k)fluoranthene	mg/kg	120
SW8270E SIM	Chrysene	mg/kg	1200
SW8270E SIM	Dibenzo(a,h)anthracene	mg/kg	1.2

Table 5-1 Remedial Goals for COPCs

METHOD[1]	ANALYTE	UNITS	REMEDIAL GOAL[2]
SW8270E SIM	Fluoranthene	mg/kg	2500
SW8270E SIM	Fluorene	mg/kg	2500
SW8270E SIM	Indeno(1,2,3-cd)pyrene	mg/kg	12
SW8270E SIM	Naphthalene	mg/kg	20
SW8270E SIM	Phenanthrene	mg/kg	1900
SW8270E SIM	Pyrene	mg/kg	1900

Notes:

1 Methods as defined in the ADEC Field Sampling Guidance (ADEC 2019).

2 Remedial goals are defined as the ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and the most conservative of the ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion.

5.3 Removal Schedule

Because Fort Glenn is on Umnak Island, part of the remote Aleutian Islands; any NTRCA fieldwork in this region is limited to the summer months (May through August). The initiation for any NTCRA will be dictated by USACE funding availability, as an emergency condition does not exist that would necessitate immediate action.

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6.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Before alternatives can be determined, treatment technologies must be assessed and screened as determined by site-specific factors. The following sections describe the potential treatment technologies, screening of the treatment technologies based on site-specific factors, and identification of treatment technologies into alternatives for individual analysis.

6.1 Potential Treatment Technologies

There is a large number of treatment technologies with potential for inclusion as alternatives for NTCRAs. The Federal Remediation Technologies Roundtable (FRTR) Technology Screening Matrix[1] (TSM) was consulted to limit the list of potential treatment technologies for contaminants associated with Project 02 at Fort Glenn. Based on previous investigations, contamination from the drums at Fort Glenn is limited to POL constituents. Based on this information and assumptions, the list of all treatment technologies from the FRTR TSM was reduced during evaluation to those that showed demonstrated effectiveness for fuels contamination.

This list of technologies was then limited based on site-specific factors. First, it was limited to those that are commercially available nationwide and those available at full scale, as Fort Glenn is located in a remote area of Alaska where only the most proven commercially available technologies will be used. Various alternatives were evaluated for source soil remediation; however, drum removal is additionally included to remove source chemicals from the site prior to soil remediation. Drum removal is discussed as part of each selected alternative and the approach for drum removal is identical in each alternative. Additionally, because the Project 02 areas are widespread across Umnak Island, the list of technologies was limited to those that can attain cleanup goals in multiple sites. Lastly, only technologies applicable to contaminated soil were retained. These retained technologies were combined with the presumptive remedies described in the Work Plan (USACE 2020).

The treatment technologies presented in the following subsections describe a broad range of approaches and are those that can generally be applicable to fuel contamination based on the above preliminary screening; they are discussed below in terms of site-specific concerns for each of the estimates of contaminated soil volume to determine applicability for inclusion as NTCRA alternatives. The following subsections provide a description of the technologies and final screening rationale.

6.1.1 No Action

No action assumes no RA is performed. This provides a baseline for comparison with the other potential NTCRAs. Because this requires no action, it can be implemented immediately at no cost, but has no effect on contaminants present at Fort Glenn.

This option is required and is retained as a baseline for comparison with the other alternatives.

[1] https://frtr.gov/matrix/Full-Matrix/

6.1.2 Land Use Controls

Under Land Use Controls, ICs and/or engineering controls (ECs) may be established to protect human health by preventing or limiting the risk of exposure to contaminated material. While land use controls are used to restrict or prevent access to a site and are to be evaluated per the Work Plan, it should be noted that the FUDS program does not own the land at this site and, therefore, cannot restrict access to or uses of the land without landowner concurrence. ICs and ECs are discussed separately below.

ICs may include administrative and/or legal controls, public awareness efforts, and/or a combination of these to minimize the potential for exposure to contaminants. ICs are informational and do not include physical barriers to site access; however, as the affected area is currently remote without permanent residents, ICs may be appropriate and are retained for consideration in compliance with the Work Plan.

ECs are engineered or physical barriers, such as fences or guards, used to eliminate the potential for exposure to contaminants. Physical access restrictions, such as installation of a fence, would eliminate human exposure to contaminated soil; however, this site presents particular challenges associated with the ongoing maintenance of the physical restrictions into perpetuity at such a remote site, the large area over which contamination is present, and complications associated with potential future transfers of land ownership. This option is eliminated from consideration based on these site-specific characteristics.

6.1.3 Biopiles

A biopile is an ex situ treatment technology that leverages biological processes to convert contaminants to low-toxicity byproducts. Excavated soil is placed in piles onto an impermeable base or pad equipped with aeration to optimize and control the rate of biodegradation. Pads typically are constructed with a cover and adequate drainage to manage exposure to precipitation and with probes to monitor temperature, moisture content, and contaminant concentrations. Optional equipment can include a moisture addition system, leachate collection system, and off-gas treatment based on site-specific properties and regulatory requirements. Storm events in the Aleutian Islands occur multiple times annually, presenting very strong wind events. These have the potential to cause damage to wind-driven devices, and could lead to breakup of constructed biopiles. These storm events typically take place in the winter months when it is very difficult to get to the site. Additionally, nutrient amendment would be difficult to add to biopiles periodically, as they are constructed to be more permanent configurations (in comparison to landfarming soil, where tilling is planned). Without means to power active nutrient addition, a passive system would need to be incorporated into the biopile configuration. This would be less effective than tilling or active means. Due to the frequency of strong storm events, difficulty providing biopiles with nutrients, and lack of infrastructure at Fort Glenn required for this treatment, this technology is eliminated from consideration.

6.1.4 Bioventing

Bioventing is an in situ treatment technology that involves stimulating indigenous microorganisms through the addition of a gas (typically air) to degrade organic contaminants (typically petroleum hydrocarbons) present in unsaturated soil. Air most often is injected into the vadose zone, but at some sites, can be extracted from the vadose zone. Bioventing generally is performed using blowers, a process referred to as active bioventing. However, at some sites, it may be possible to perform bioventing by relying on barometric changes or tidal fluctuations as opposed to using blowers; this process is commonly referred to as passive bioventing. However, the petroleum hydrocarbon releases at Fort Glenn are over 75 years old; and as low solubility of the residual product and cool soil temperature are limiting factors,

this technology would not be very effective. Due to these factors, bioventing is eliminated from consideration.

6.1.5 Composting

Composting is used to treat excavated soils contaminated with a variety of pollutants. The contaminated media are mixed with bulking agents and organic amendments such as mature compost, wood chips, hay, manure, and vegetative (e.g., potato) wastes. Composting differs from technologies such as biopiles and landfarming in that a sufficient quantity of organic material is added to maintain thermophilic temperatures during the degradation process. Proper amendment selection ensures adequate porosity and aeration and provides a balance of carbon and nitrogen to promote microbial activity. Although composting can rely on natural aeration, many times it is enhanced by the design of the compost piles, including mechanical mixing or the introduction of air using blowers. This technology is eliminated from consideration due to lack of infrastructure at Fort Glenn and the need to import organic material that is fundamental to the approach.

6.1.6 Desorption and Incineration

Desorption and incineration involve the removal of contaminated soil and transporting it to a permitted offsite thermal desorption or incineration facility, or treating it onsite with a mobile treatment unit. Thermal desorption is a physical process designed to remove contaminants at relatively low temperatures, ranging from 90 degrees Celsius (°C) to 560°C, from the solid matrix. Semi-volatile organic compounds, including DRO and coal tar, can be volatilized but require higher temperature treatment. The contaminated media is heated to volatilize water and organic contaminants, followed by treatment in a gas treatment system. Incineration is a similar principle, but at higher temperatures (typically between 760 and 1,650°C) to decompose the volatilized compounds. This technology can treat all concentrations of POL contaminants, and a mobile treatment unit would mean that backfill material would not be required as the processed material would be placed back in the original excavation. This technology is retained for consideration.

6.1.7 Excavation and Offsite Disposal

Open excavation is a standard method of removing material that may be restricted by stability of soils and sloping requirements. Excavation into groundwater and saturated zones is complicated by these soil stability limitations, as material cohesiveness generally decreases under saturated conditions. Therefore, this technology is not ideal where groundwater depths are shallow or where contaminated material extends to groundwater or saturated zones. Open excavation has proven effective at sites with any level of contaminant concentrations. While onsite treatment is preferred, CERCLA does provide for offsite disposal of contaminated soil where onsite treatment is not viable or is cost prohibitive. This technology is retained for consideration.

6.1.8 Ex Situ Vapor Energy Generator

Much like thermal desorption and incineration, the Vapor Energy Generator (VEG) technology uses heat to treat contaminants; however, the VEG process uses a highly efficient, patented vapor generator to treat soils thermally, while eliminating emissions through the use of vapor collection and filters. The technology also utilizes the vapors generated through thermal treatment of soils to serve as fuel for operation of the system. However, this technology was determined to be unfeasible for this project due to the high volume of soil and the requirement for propane as fuel. Although VEG technology could be modified to run on

diesel fuel, the modification has not been implemented previously. Additionally, VEG is unproven on remote sites without infrastructure, nor has it ever been used on volumes of soil as high as would be required, even for this project's low soil volume estimate. Therefore, this option is inappropriate for this application and is eliminated from consideration.

6.1.9 In Situ Mixing (in FRTR TSM as Large-Diameter Auger Mixing)

In situ mixing is a treatment technology that involves aggressive mixing of amendments into soil to treat or sequester a variety of contaminants including petroleum hydrocarbon constituents. Amendments can include binding agents (such as cement mixtures), degradation enhancing agents (such as oxygen releasing compounds), or air or steam to facilitate bioremediation, soil vapor extraction, or multi-phase extraction. However, due to the large area over which the large number of potential features for remediation are spread, implementability for this technology would be very low. Based on this information, the in situ mixing technology is eliminated from consideration.

6.1.10 Landfarming

Landfarming is an ex situ, solid-phase biotreatment technology that involves using agricultural practices to promote biodegradation of organic contaminants. Soils or sediments are spread in thin layers across a large open space, allowing natural processes to degrade and immobilize the contaminants. Contaminated soils are spread in a layer no more than 18 inches thick and aerobic microbial activity is stimulated by aerating the soils (tilling). Amendments, including the addition of minerals and nutrients, can be added to enhance treatment. Although implementation is challenging at such a remote site, landfarming is an onsite treatment approach that can fully treat POL contamination and has been conducted successfully at other remote locations (USACE 2018b). Once treatment has reduced contaminant levels to below target cleanup levels, the landfarmed soil may be used as backfill in the excavation(s) where it originated. Based on this information, landfarming is retained for consideration.

6.1.11 Landfill and Soil Capping

Landfill and soil capping are containment technologies that form a barrier between a waste body or contamination source area and the ground surface, thereby minimizing the exposure of the contaminated media to humans and environmental receptors. The cap is typically designed to restrict surface water and rainwater infiltration into the subsurface waste body or contamination source area to reduce the potential for leaching of site contaminants. Because of the remoteness of the site, the landfill and capping alternative presents challenges associated with the ongoing maintenance of the cap into perpetuity. This option is eliminated from consideration.

6.2 Identification of NTCRA Alternatives

The treatment technologies remaining from the broad screening described above are shown in Table 6-1 as NTCRA alternatives; these technologies are developed into alternatives applicable to Fort Glenn in Section 6.4.

While the Work Plan specified a separate set of NTCRA alternatives for each estimate of soil volume (low, middle, and high), the difference between the volumes was not enough to create separate sets of alternatives; the significant volume of soil for each estimate is such that considerations for implementation and effectiveness are therefore generally the same, with the primary differentiator being cost. Therefore, only one set of NTCRA alternatives was created.

Table 6-1 NTCRA Alternatives

NUMBER	NAME	BRIEF DESCRIPTION
1	No Action	No additional action would occur. Retained for further consideration per CERCLA to serve as a baseline against which to compare other developed alternatives.
2	Institutional Controls	Controls such as environmental covenants would be applied to areas with remaining contaminant concentrations above remedial goals. Requires concurrence from landowners as FUDS does not retain ownership of the site.
3	Onsite Ex Situ Incineration	A mobile incineration unit would be transported to the site and used to treat excavated soil. Post-treatment soil would be used as backfill.
4	Excavation and Offsite Disposal	Contaminated material would be excavated and transported offsite for disposal. Excavations would be backfilled from a local borrow source and sloped and contoured for drainage.
5	Onsite Landfarming	Soil would be excavated and staged for landfarming. Landfarming can effectively treat POL contamination in soil, although treatment time would take multiple years. Post-treatment soil would be used as backfill.

Notes:
For definitions, refer to the Acronyms and Abbreviations section.

6.3 Applicable or Relevant and Appropriate Requirements

ARARs are described in this section, as pertaining to the NTCRA alternatives retained above.

6.3.1 Introduction

Section 121(d) of CERCLA, as amended by Superfund Amendments and Reauthorization Act (SARA), requires that onsite RAs attain or waive federal environmental ARARs, or more stringent state environmental ARARs, upon completion of the RA. The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP) also requires compliance with ARARs during removal and RAs to the extent practicable. Attainment of ARARs is a “threshold requirement” in SARA, as is the requirement that the remedies be protective of human health and the environment. If a requirement is applicable or relevant and appropriate, it must be met, unless an ARAR waiver can be used (EPA 1991). EPA’s *CERCLA Compliance with Other Laws Manual* (EPA 1988, 1989) provides additional guidance on identifying and complying with ARARs.

As defined in the NCP, applicable requirements are “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable” (40 CFR 300.5). Relevant and appropriate requirements are “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not ‘applicable' to a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate” (40 CFR 300.5).

The selection of ARARs is dependent on the hazardous substances at a site, the site characteristics and location, and the RA performed. Therefore, ARARs are chemical-, location-, and action-specific, as described below:

- **Chemical-Specific**: Chemical-specific requirements are usually health- or risk-based standards that limit the concentration of a chemical or chemical compound at a site. Chemical-specific ARARs generally set human or environmental criteria which result in the establishment of preliminary remediation goals and cleanup levels in the designated media. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Chemical-specific ARARs are also used to determine treatment and disposal requirements for removal actions. In the event a chemical has more than one requirement, the more stringent of the two requirements is used.
- **Location-Specific**: Location-specific requirements relate to the geographic or physical position of the site and set restrictions on the types of removal actions that can be performed. In determining the use of the location-specific ARARs for selection of RAs at CERCLA sites, the jurisdictional prerequisites of each regulation must be investigated. Alternative removal actions may be restricted or precluded based on federal and state laws for hazardous waste facilities or proximity to faults, floodplains, caves, salt-dome formations, salt-bed formations, underground mines, wetlands, wilderness areas, wildlife refuges, wildlife resources, and scenic rivers.
- **Action-Specific:** Action-specific requirements are usually technology- or activity -based limitations that set controls or restrictions on the design, implementation, and performance levels of removal activities related to the management of hazardous substances, pollutants, or contaminants. If no RA was selected under the CERCLA process, compliance with action-specific ARARs would not be required.

6.3.2 Potential Chemical-Specific ARARs

A review of the regulations indicated there are no potential federal chemical-specific ARARs for any of the alternatives being considered in this EE/CA report for the media and COPCs. If non-POL contaminants are present, Alaska state human health cleanup levels would be applicable as preliminary remediation goals.

6.3.3 Potential Action-Specific ARARs

For the NTCRA alternatives, only ICs and approaches involving excavation of contaminated material for ex situ treatment are included. Implementing an excavation and disposal alternative would include generating and managing contaminated media. These excavation activities would create a soil disturbance in excess of 1 acre in area, which would trigger the stormwater requirements in 40 CFR Part 450.

In addition, soil disturbance activities associated with the landfarming alternative would encompass an area greater than 1 acre, which would trigger the stormwater requirements found at 40 CFR Part 450. These requirements mandate that erosion and sedimentation control measures be designed and implemented to control erosion and sediment runoff.

6.3.4 Potential Location-Specific ARARs

Location-specific requirements include those established for potential remedial activities conducted within environmentally sensitive areas, including wetlands and those that contain threatened and

endangered species. Under CERCLA Section 121(d), relevance and appropriateness are related to the circumstances presented by the release of hazardous substances, with the goal of protecting human health and the environment. Wetlands are known to be near Project 02 features, although endangered species are not at the site (USACE 1987, 2001).

In addition to the requirements identified as ARARs, any action taken by the federal government must consider the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, and federal and state wetland and floodplain considerations. Actions to protect cultural resources are described in Section 4.4.

6.3.5 Summary of Potential ARARs

"Applicable" requirements are defined in CERCLA as "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site." "Potentially applicable" requirements are applicable per the definition above but contingent on site conditions encountered.

If a requirement does not satisfy the definition of applicability, then it is evaluated against the definition of "relevant and appropriate." "Relevant and appropriate" requirements are defined as "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not 'applicable' to a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site" (EPA 1988).

Table 6-2 summarizes the potential ARARs noted above, with applicability as defined above.

Table 6-2 Potential Applicable or Relevant and Appropriate Requirements

REGULATION	DESCRIPTION	APPLICABILITY	RATIONALE
Chemical-Specific ARARs			
National Primary Drinking Water Standards (40 CFR 141.11/51/62)	Identifies standards for public water systems and Maximum Contaminant Levels.	Not Applicable	Not applicable as the NTCRA only applies to soil contamination.
18 AAC 75.325(g)	Identifies that a responsible person shall ensure that, after completing site cleanup, the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways and does not exceed a cumulative non-carcinogenic risk standard at a hazard index of one, reported to one significant figure, across all exposure pathways.	Not Applicable	This requires that after site cleanup, the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways. A risk calculation is not a cleanup standard or a standard of control. Accordingly, this is not an ARAR.

Table 6-2 Potential Applicable or Relevant and Appropriate Requirements

REGULATION	DESCRIPTION	APPLICABILITY	RATIONALE
18 AAC 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75.340(j), 18 AAC 75.341 [cleanup levels in Tables B1/B2])	Identifies Alaska state cleanup levels for soil.	Potentially Applicable	If non-POL contaminants are identified, the ADEC soil cleanup levels for human health would be applicable as preliminary remediation goals; however, it is unknown at this time if non-POL contaminants are present. For POL-contaminants, these are considered for remedial goals for the NTCRA but are not applicable as an ARAR.
18 AAC 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75.345 [cleanup levels in Table C])	Identifies Alaska state cleanup levels for groundwater.	Not Applicable	Not applicable since only source soils are being addressed as part of the NTCRA.
Action-Specific ARARs			
40 CFR Part 450	Stormwater requirements at construction sites. These rules require that stormwater controls be employed at construction sites that exceed 1 acre.	Applicable	Operations for Onsite Ex Situ Incineration, Excavation and Offsite Disposal, and Onsite Landfarming will each result in land disturbance exceeding 1 acre in size.
18 AAC 70.010	Identifies that a person may not conduct an operation that causes or contributes to a violation of the water quality standards	Not Applicable	This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; RA; or remedial locations. This regulation does not impact how the remediation would happen, and therefore is not an ARAR. As a best management practice, remedial activities are conducted in a manner that will not impact surface water.
18 AAC 75.355(b)	Identifies that the collection, interpretation, and reporting of data, and the required sampling and analysis is to be conducted or supervised by a qualified environmental professional.	Not Applicable	This requires sampling and analysis associated with the preferred alternative are conducted or supervised by a qualified environmental professional. This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; RA; or remedial location. This regulation does not impact how the remediation would happen, and therefore is not an ARAR. As a best management practice, sampling and analysis are conducted or supervised by a qualified environmental professional.

Table 6-2 Potential Applicable or Relevant and Appropriate Requirements

REGULATION	DESCRIPTION	APPLICABILITY	RATIONALE
Location-Specific ARARs			
Clean Water Act (CWA) Section 404	Establishes the requirements to evaluate any action taken within a wetland to ensure that impacts are minimized or averted.	Potentially Applicable	Wetlands are located near some of the Project 02 features.
18 AAC 75.370(a)	Identifies that contaminated soil must be stored 100' or more from surface water.	Potentially Applicable	Potentially applicable since this NTCRA is being conducted near locations with surface water.
National Environmental Policy Act (42 USC §4321 et seq.)	Establishes the national policy that federal agencies properly consider how a proposed plan might affect the environment.	TBC	This is a federal regulation that is not an ARAR itself; however, it is to be considered when implementing this NTCRA.
National Historic Preservation Act (54 USC §300101 et seq.)	Requires federal agencies to evaluate the impact of proposed plans on national historic and archaeological sites and adhere to regulations found in 36 CFR 800.	TBC	This is a federal regulation that is not an ARAR itself; however, it is to be considered when implementing this NTCRA.
Endangered Species Act (16 USC 35 §1531 et seq.)	Establishes the protection of endangered or threatened species of plants and animals and the ecosystems upon which they depend.	TBC	This is a federal regulation that is not an ARAR itself; however, it is to be considered when implementing this NTCRA.

Notes:
For definitions, refer to the Acronyms and Abbreviations section.

6.4 Individual Analysis of Removal Action Alternatives

The EPA *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA 1993) specifies that the NTCRA alternatives are evaluated against the short- and long-term aspects of three broad criteria: effectiveness, implementability, and cost. While the Work Plan (USACE 2020) states that three sets of alternatives will be evaluated separately for the low, middle, and high estimates of soil volume, each of these estimates includes a large volume of soil to be addressed as part of the NTCRA. This results in the same sets of alternatives for each estimate of soil volume. Therefore, each alternative is evaluated for effectiveness and implementability for all estimates of soil volume, with any soil-volume-specific concerns noted. Costs are provided separately for each estimate of soil volume.

6.4.1 Individual Analysis Methodology

The evaluation methodology is described below.

6.4.1.1 Description

The NTCRA alternative will be described so that an adequate understanding of the approach can be used to demonstrate how the individual analysis was conducted.

6.4.1.2 Effectiveness

The effectiveness of an alternative refers to its ability to meet the objective within the scope of the removal action. Each alternative will be evaluated against the scope of the removal action as defined in Section 5.2. These objectives will be discussed in terms of protectiveness of public health and the environment, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

To satisfy this criterion, the alternative must demonstrate how it achieves and maintains protection of human health and the environment. This discussion draws on assessments conducted under other evaluation criteria, including long-term effectiveness and permanence, short-term effectiveness, and compliance with remedial goals, and will identify any unacceptable short-term impacts.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

To satisfy this criterion, the alternative must demonstrate how it complies with the ARARs identified in Section 6.3.

Long-Term Effectiveness and Permanence

This criterion evaluates the longevity of the effectiveness of the alternative, by assessing the ability, upon implementation, to provide and maintain protection of human health and the environment.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion evaluates the effectiveness of the alternative in treating the contamination. The discussion will consider:

- The treatment process(es) employed and the material(s) it will treat
- The amount of the hazardous materials to be destroyed or treated
- The degree of reduction expected in toxicity, mobility, or volume
- The degree to which the treatment will be irreversible
- The type and quantity of residuals that will remain after treatment
- Whether the alternative will satisfy EPA's preference for treatment

Short-Term Effectiveness

This criterion evaluates the effects of the alternative during implementation before the RAOs have been met, with respect to their effects on human health and the environment following implementation. The discussion will consider:

- Protection of the community
- Protection of the workers
- Environmental impacts
- Time until NTCRA objectives are achieved

6.4.1.3 Implementability

The implementability describes the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. The following factors will be used for the evaluation.

Technical Feasibility

The ability of the technology to implement the remedy will be evaluated. Each alternative should be evaluated for implementation factors such as assembling, staffing, and operating the alternative within the limitations of the removal schedule noted in Section 5.3.

Each alternative will be evaluated for the following:

- Technology maturity
- Prior use under similar conditions for similar wastes
- Possible difficulty in operation once it is constructed
- Environmental conditions not only with respect to the operation phase of the alternative, but also to the setup and construction phase
- Difficulty of potential future RAs
- The ability to monitor the effectiveness of the alternative

While potential future RAs are typically considered under technical feasibility, since the scope of the NTCRAs described in this EE/CA report are limited to source soils with residual contamination to remain at least in other media, these are not considered.

Administrative Feasibility

Each alternative will be evaluated for the need to coordinate with other offices and agencies. Factors for consideration include permits and waivers. While statutory limits on NTCRAs are typically evaluated as part of administrative feasibility, these statutory limits do not apply to this EE/CA report as this project is not Fund-financed.

Availability of Services and Materials

Each alternative will evaluate the availability of offsite treatment, storage, and disposal capacity, equipment, personnel, services and materials, and other resources necessary to implement the alternative to maintain the removal schedule.

Each alternative will be evaluated for availability of the following:

- Personnel and technology
- Offsite treatment, storage, and disposal
- Services and materials

While the availability of prospective technology is typically evaluated as part of this criterion, all of the alternatives are commercially available, full-scale technologies.

State Acceptance

This criterion reflects the state's preferences and concerns among the proposed alternatives.

Community Acceptance

This criterion reflects the community's preferences and concerns among the proposed alternatives.

6.4.1.4 Cost

Each removal action alternative will be evaluated to determine costs to implement the alternative; costs will be presented separately for each estimate of soil volume. The present worth of alternatives that will last longer than 12 months will be calculated. A sensitivity analysis will be presented that shows cost per cubic yard (cy) treated.

Costs will include the following components:

- Direct capital costs:
  - Construction costs
  - Equipment and material costs
  - Land and site acquisition costs
  - Buildings and services costs
  - Relocation expenses
  - Transport and disposal costs
  - Analytical costs
  - Contingency allowances
  - Treatment and operating costs
- Indirect capital costs:
  - Engineering and design expenses
  - Legal fees and license or permit costs
  - Startup and shakedown costs

Annual post-removal site control costs are typically included as part of NTCRA alternatives; however, since the scope of the NTCRAs described in this EE/CA report are limited to source soils with residual contamination to remain at least in other media, these are not considered.

6.4.2 Alternative 1: No Action

The No Action alternative is described below.

6.4.2.1 Description

The No Action alternative provides a baseline for comparison with the other alternatives. This alternative assumes no RA (treatment, removal, or monitoring) would be performed. As such, this alternative would not reduce contamination or risk of exposure to contaminants in soil. However, the fate of the contaminants present at the site is attenuation over decades due to the slow natural degradation via microbial and chemical processes.

6.4.2.2 Effectiveness

The overall effectiveness of this alternative would be very low, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

This alternative would not provide adequate protection of human health and the environment from POL-contaminated soils. Natural attenuation of POL constituents would occur over the course of decades, which would eventually mitigate risks to potential receptors.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

This alternative would not mitigate potential exposure to contaminated soils; as contaminated media would remain onsite, this alternative would not comply with the remedial goals for soil. As there are no actions associated with this alternative, there are no applicable location- or action-specific ARARs.

Long-Term Effectiveness and Permanence

This alternative would eventually provide long-term protection for sites with contaminated soils. Although concentrations of POL constituents degrade naturally over the course of decades, there is potential risk to receptors in the interim.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Treatment of soil contamination is not proposed as part of this alternative; therefore, this alternative would not reduce the toxicity, mobility, or volume of contaminants.

Short-Term Effectiveness

This alternative would not provide short-term protection for sites with contaminated soils, as risk to potential receptors has been identified and this alternative does not include RA.

6.4.2.3 Implementability

Overall implementability of this alternative is low, based on the criteria below. However, state and community pushback would make this alternative infeasible.

Technical Feasibility

There is no technical feasibility to consider for this alternative, as it includes no RA.

Administrative Feasibility

Administrative feasibility would be low. There are multiple stakeholders involved that would like to see the site advanced to cleanup complete without ICs land use scenario, and no action would require decades of natural attenuation of contaminants until this would occur (and with no action, there would be no verification when this has occurred).

Availability of Services and Materials

This alternative does not include services or materials.

State Acceptance

State acceptance of this alternative is not anticipated. A minimum of monitoring or ICs is required for sites with known contamination.

Community Acceptance

Community acceptance is not anticipated. Community expectations are generally to proceed with options that will result in a cleanup complete without ICs land use scenario.

6.4.2.4 Cost

Costs for each estimate of soil volume are presented below.

Low Soil Volume Estimate

This alternative has no associated costs.

Middle Soil Volume Estimate

This alternative has no associated costs.

High Soil Volume Estimate

This alternative has no associated costs.

6.4.3 Alternative 2: Institutional Controls

The ICs alternative is described below.

6.4.3.1 Description

Alternative 2 consists of ICs to prevent exposure to contaminated material without soil treatment and involves the documentation of the location of contamination at the site. This alternative assumes concurrence from the landowners to implement restrictions and would address the complete exposure pathways of soil ingestion, dermal absorption, and future exposure to groundwater. ICs employed with this alternative would involve an excavation prohibition, notation on plat or master planning document, and periodic reviews to verify land use has not changed. This alternative would not reduce contamination; however, it would reduce risk of exposure to contaminants in soil by minimizing exposure. Complete pathways that would not be eliminated by ICs include inhalation of outdoor air and ingestion of wild food. Components of this NTCRA alternative include:

- Planning and preparation of planning documents
- A site inspection
- Reporting
- Periodic reviews and recurring notice to landowners

A project management team would oversee all activities to manage cost, schedule, and scope; and to ensure effective communications between stakeholders occurs. Initial implementation is expected to take 2 years, from 2021 to 2022. Periodic reviews are assumed to occur approximately every 5 years for 30 years following the initial site inspection.

Planning and Planning Documents

Before implementation can begin, this alternative requires coordinating NTCRA activities with USACE, landowners, and other stakeholders associated with the site. Requirements would include funding from

USACE, approval from regulators, and access permissions from landowners. Also, landowner agreement of the proposed IC would need to be obtained prior to implementation of this alternative.

Once coordination with stakeholders has occurred, a Site Inspection Work Plan would be developed that summarizes the activities to implement this alternative. A site visit would be conducted to verify current site conditions; this information would be used to generate a periodic review. The Work Plan would outline the objectives of the site inspection, the methodologies to be used to collect all the appropriate information, logistics, and health and safety considerations.

Assumptions:

1. Preliminary Draft, Draft, and Final Work Plan versions would be prepared in 2021.
2. Land access is granted for the necessary site visits.

Site Inspection

A site inspection would be conducted to confirm site conditions for the Project 02 features. Two technical staff would fly from Anchorage to Dutch Harbor commercially, staying the night in Dutch Harbor. A chartered aircraft would be taken from Dutch Harbor to Fort Glenn; if necessary, the personnel would stay overnight at the Fort Glenn Lodge. Electric bikes would be mobilized to the site with the crew to provide transportation on Umnak Island. Demobilization would occur via chartered aircraft from Fort Glenn to Dutch Harbor and commercial flights from Dutch Harbor to Anchorage.

Assumptions:

1. The site inspection duration would depend on the number of site features (15 features per day), with 1 day to mobilize and 1 day to demobilize. Overnights would be in Dutch Harbor. Only features included in the estimate of soil volume would be inspected.
2. The Fort Glenn runway is in useable condition.
3. Land access is granted for the necessary site inspections.

Reporting

Although there is no federal regulation or requirement for a Five-Year Review Report, a Periodic Review Report would be generated for administrative consistency, which would generally follow the guidance related to a Five-Year Review Report under CERCLA after the site inspection is complete. It would be submitted to stakeholders for review and comment prior to finalization.

Assumptions:

1. Preliminary Draft, Draft, and Final Report versions would be prepared.

Periodic Reviews

The costs for this alternative include a periodic review every 5 years for 30 years, in general accordance with CERCLA requirements. For each periodic review, a site inspection would be completed to confirm that site conditions have not changed. Only features included in each estimate of soil volume would be included.

Assumptions:

1. Effort and cost would be the same for each periodic review, which is equal to that for the initial periodic review.
2. Only features included in the estimate of soil volume would be inspected.

6.4.3.2 Effectiveness

The overall effectiveness of this alternative would be low, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

This alternative would provide adequate protection of human health, as it would prevent potential receptors from interacting with contaminated material; however, the environment would not be protected as the contamination would remain in place (if ecological risk is present). Natural attenuation of POL constituents would occur over the course of decades, which would eventually mitigate risks to potential receptors.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

This alternative would mitigate potential exposure to contaminated soils; however, as contaminated media would remain onsite, this alternative would not comply with the remedial goals for soil.

Long-Term Effectiveness and Permanence

This alternative would mitigate potential human exposure to contaminated soils; therefore, this alternative would provide long-term protection for sites with remaining contaminated soils. However, contamination would be left in place and would require periodic evaluation of site conditions (i.e., periodic reviews) to ensure compliance with control measures. Although concentrations of POL constituents degrade naturally over the course of decades, there is potential risk to ecological receptors in the interim.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Treatment of soil contamination is not proposed as part of this alternative; therefore, this alternative would not reduce the toxicity, mobility, or volume of contaminants. However, it should be noted that natural attenuation of POL constituents would occur over the course of decades, which would eventually reduce the volume of contaminants.

Short-Term Effectiveness

This alternative would quickly mitigate potential exposure to contaminated soils for human receptors; therefore, this alternative would provide short-term protection. However, for ecological receptors there would be no short-term protection, as POL constituents degrade over the course of decades by natural attenuation.

6.4.3.3 Implementability

Overall implementability of this alternative is medium, based on the criteria below.

Technical Feasibility

Technical feasibility of ICs is high. Many sites use ICs for management of known contaminated media. The associated periodic reviews would include site visits, which are the most technically feasible form of fieldwork because a site visit presents a minimum level of effort that can be conducted onsite.

Administrative Feasibility

Each alternative would be evaluated for the need to coordinate with other offices and agencies. Factors for consideration include permits and waivers. While statutory limits on NTCRAs are typically evaluated as part of administrative feasibility, these statutory limits do not apply to this EE/CA report as this project is not Fund-financed.

Availability of Services and Materials

Services and materials for ICs would include transportation to the site, lodging, and equipment to record observations. These services and materials are readily available. However, lodging onsite at the Fort Glenn Lodge may not be available into the future, as the property may be up for sale.

State Acceptance

As stated in the ADEC *Guidance on Using Institutional Controls in Oil and Other Hazardous Substance Cleanups* (ADEC 2011), state acceptance is anticipated if landowner concurrence is received. The state has accepted ICs as the implemented remedy for similar sites, as long as periodic reviews are conducted to ensure site conditions and use will not change.

Community Acceptance

Community acceptance is not anticipated. Community expectations are generally to proceed with options that will result in cleanup complete without ICs. This alternative poses potential difficulties to implement because of the requirements for periodic reviews and concurrence from the landowners.

6.4.3.4 Cost

Costs for each estimate of soil volume are presented below.

Low Soil Volume Estimate

For the low soil volume estimate, the present worth cost of the alternative is $938,905 (in base year 2021 dollars); there is no cost per cy as this alternative does not involve treatment. Appendix C provides a detailed description of all associated costs.

Middle Soil Volume Estimate

For the middle soil volume estimate, the present worth cost of the alternative is $1,099,086 (in base year 2021 dollars); there is no cost per cy as this alternative does not involve treatment. Appendix C provides a detailed description of all associated costs.

High Soil Volume Estimate

For the high soil volume estimate, the present worth cost of the alternative is $1,345,704 (in base year 2021 dollars); there is no cost per cy as this alternative does not involve treatment. Appendix C provides a detailed description of all associated costs.

Assumptions:

1. Periodic reviews are included in the costs to generally comply with CERCLA and state requirements (and includes recurring notice to landowners).
2. The cost for each estimate of soil volume only includes inspection of features included in that estimate of soil volume (not all features are included for the low and middle estimates of soil volume).

6.4.4 Alternative 3: Onsite Ex Situ Incineration

The ex situ incineration alternative is described below.

6.4.4.1 Description

Alternative 3 consists of excavation and onsite, ex situ thermal treatment using a mobile soil incinerator. Components of this NTCRA alternative include:

- Planning and preparation of planning documents, including a site visit
- Mobilization and demobilization
- Fieldwork
- Reporting

A project management team would oversee all activities to manage cost, schedule, and scope; and to ensure effective communications between stakeholders occurs. Implementation depends on the soil volume and is expected to take one field season to complete treatment for the low soil volume estimate and 3 years total, including planning and reporting (from 2021 to 2023). Implementation is expected to take 5 years total, including planning and reporting, for the middle and high soil volume estimates (from 2021 to 2025).

Planning and Planning Documents

Before implementation can begin, this alternative requires coordinating NTCRA activities with USACE, landowners, and other stakeholders associated with the site. Requirements include funding from USACE, approval from regulators, and access permissions from landowners.

Once coordination with stakeholders has occurred, a site visit would be conducted to confirm barge landings and road conditions, identify a treatment location, and identify a surface water body where freshwater can be obtained. Two technical staff (one scientist and one archaeologist) would fly from Anchorage to Dutch Harbor commercially, staying the night in Dutch Harbor. Travel from Dutch Harbor to Fort Glenn would occur via chartered aircraft; personnel would stay overnight at the Fort Glenn Lodge. Electric bikes would be mobilized to the site with the crew to provide transportation on Umnak Island. Demobilization would involve a charter flight from Fort Glenn to Dutch Harbor and commercial flights from Dutch Harbor to Anchorage.

Once the site visit is complete, a Removal Action Work Plan would be developed to summarize the activities to implement the selected alternative. Information from the site visit would be used to generate a more fully developed Work Plan. The Work Plan would include an outline of planned transportation and logistics; site preparation activities (e.g., staging and equipment storage areas, camp setup, and stormwater controls); drum removal and preliminary sampling activities; the extent of soil removal; the sequence of excavation activities; treatment methodology; analytical sampling; decontamination; backfill and site restoration activities; and segregation, transportation, and disposal of the waste. The health and safety methodology would be detailed in a site-specific health and safety plan. Lastly, the Work Plan would include archaeological methodology for mitigation of adverse impacts (as described in Section 4.4).

Assumptions:

1. Three total stakeholder meetings (4 hours each) would be held for planning purposes.
2. Preliminary Draft, Draft, and Final Work Plan versions would be prepared in 2021.
3. Land access is granted for excavation and planned treatment.
4. The site visit would include 3 full days onsite with 1 day to mobilize and 1 day to demobilize. Overnights would be in Dutch Harbor.
5. A site visit would take place in 2021 during Work Plan development.
6. The Fort Glenn runway is in useable condition.
7. All necessary air permits would be obtained.

Mobilization and Demobilization

Mobilization of equipment, supplies, materials, and personnel would be via air and water. Labor has been estimated for gathering and loading purchases and rentals, plus time to travel to Fort Glenn.

Mobilization would begin in late-April from Anchorage for barging activities; it is assumed that the first barge would land on Fort Glenn on 1 May of each year and depart the next day. A preliminary management crew and operators would arrive in Dutch Harbor for transport to Fort Glenn via chartered aircraft. The following equipment would be mobilized via barge:

- Utility task vehicles (UTVs)
- 2,000-gallon portable aboveground storage tanks (ASTs) for gasoline
- Eleven 20-foot shipping containers for equipment storage
  - Two for mechanical repair equipment and supplies
  - One for drum overpacks and isotanks for free product
  - One for water supply equipment
  - One for camp supply
  - One for personal protective equipment (PPE)
  - One for analytical sampling equipment and supplies
  - One for miscellaneous tools and equipment
  - Two for transport of UTVs; secondarily to be used for staging equipment
  - One for granular activated carbon (GAC), decontamination, and pumping equipment
- Mobile incinerator unit
- Two light plants
- Heavy equipment

- 500 feet of tundra mats
- 15 open-top shipping containers for drum disposal

Diesel fuel would be supplied by separate barging in two 25,000-gallon ASTs staged near the barge landing area, with additional fuel stored in a 15,000-gallon AST located at the Fort Glenn Lodge.

Remaining personnel would mobilize the day after equipment is unloaded via commercial flight from Anchorage and charter flight from Dutch Harbor. It is assumed that camp setup and incinerator setup would take 1 week. Baseline incremental sampling methodology (ISM) samples would be collected from the footprint of the treatment area during this time. One ISM sample would be collected for each 0.5-acre area (corresponding to the EPA's definition of area for residential exposure).

Following completion of fieldwork each year, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors. No equipment or materials would be left onsite.

Assumptions:

1. Barging from Anchorage to Fort Glenn takes 6 days.
2. Once the barge is offloaded, the field team would arrive via commercial flight to Dutch Harbor and charter flight to Fort Glenn.
3. All equipment and materials would be barged from Anchorage to Fort Glenn.
4. The primary barge landing location near the Main Airfield is useable. 25,000-gallon ASTs can be used and staged near this location.
5. The AST at the Fort Glenn Lodge is in useable condition.
6. Weather contingency is not included.
7. The Fort Glenn runway is in usable condition.

Fieldwork

After mobilization, startup activities would begin. This would include incineration treatment system startup, as well as ensuring access to site features by grading access to washed out roads and laying tundra mats to enable low water crossings; this is assumed to take 1 week. During this time, it is assumed that the treatment system would operate at half capacity (processing 70 tons per day).

After startup, implementation of the NTCRA alternative would begin with four teams conducting the work simultaneously. Total duration would be determined by the soil treatment rate (140 tons per day), and all activities are assumed to be completed in that timeframe (which, for middle and high soil volume estimates, is over multiple field seasons). One team each would perform the following activities:

- **Excavation Team**: Soil excavation of features identified in Section 2.5 for each estimate of soil volume
  - Personnel
    - Operator
    - Truck driver
    - Archaeologist
    - Laborer
    - Scientist

        - Field team lead
    - Heavy equipment
        - Excavator
        - Rock truck
        - Morooka (as needed instead of the rock truck)
        - Two UTVs
- **Treatment Team**: Soil treatment of all excavated soil using the incineration treatment system
    - Personnel
        - Two operators
        - Two technicians
        - Scientist
    - Heavy equipment
        - Loader
        - Excavator
        - Fuel truck
        - Water truck
- **Backfill Team**: Drum removal, preliminary sampling, and excavation backfill using treated soil
    - Personnel
        - Operator
        - Truck driver
    - Heavy equipment
        - Rock truck
        - Marooka (as needed)
        - Bulldozer
- **Site Management Team**: Work oversight, camp operation, and maintenance activities
    - Personnel
        - Superintendent
        - Mechanic
        - Cook
        - Housekeeper
        - Camp manager
        - Emergency medical technician (EMT)
    - Heavy Equipment
        - UTV
        - Skid steer
- **Survey Team**: Survey activities
    - Personnel
        - Surveyor
        - Assistant surveyor
    - Heavy equipment
        - UTV

The Excavation Team would conduct soil excavation of features identified in Section 2.5 for each estimate of soil volume. An excavator would load contaminated material into a rock truck or Marooka for transport to the treatment area, with the scientist performing field screening to determine excavation extents (assumed to correspond with the estimates of soil volume) and resultant confirmation sampling. The archaeologist would document all drum removal and monitor all intrusive activities.

The Treatment Team would conduct soil treatment of all excavated soil. Soil from the excavations would be screened for oversize material and stockpiled near the incineration unit. An excavator would be used to put the screened material on a belt feeding into the treatment unit. Oversize material would be stockpiled with treated material, but is assumed to be a minimal amount of the overall treatment volume.

The contaminated soil would undergo ex situ thermal treatment by incineration. Incineration operates at temperatures sufficiently high to generate the necessary cracking and oxidation reactions to convert contaminants to non-toxic combustion end products. Incinerators are typically operated between 760 and 1,650°C to ensure removal of contaminants. In addition to the temperature applied, the residence time and adequate mixing of the media are important to adequately remove contaminants and ensure efficient operation of the incinerator. It is assumed that 140 tons of excavated material can be processed per day.

Incinerators typically consist of a primary combustion chamber (i.e., primary burner or kiln) into which the contaminated media is fed. Contaminated soil would be fed directly into the chamber by being placed onto a conveyor. In this unit, the organic contaminants are volatilized and destroyed. Incineration systems require permitting for off-gas, particulates, and/or other byproducts that are emitted into the air. It is assumed that permitting would take place as part of planning.

After treatment, the soil would be rehydrated and stockpiled into approximately 93-cy (139.5-ton) stockpiles (i.e., daily stockpiles). One composite sample would be taken for each stockpile and analyzed to confirm that treatment is complete and the soil can be used for backfill.

The Backfill Team would conduct drum removal prior to excavation activities during camp and soil incinerator setup (borrowing the archaeologist from the Excavation Team). Drums would have any product pumped into isotanks or treated with a GAC filtration unit, then crushed, placed in open-top containers, and finally staged near the treatment area for transport off-island; drums with heavy oils would be put into overpacks for shipment offsite for disposal. Once the drums have been removed, pre-excavation analytical samples would be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples would be collected beneath each individual drum feature and composite samples would be collected from each drum area and drum dump feature. The samples would be analyzed for GRO, DRO/RRO, VOCs, PAH, RCRA metals, PCBs, and pesticides. If results indicate non-POL contaminants are comingled with POL contamination, the soil would either be addressed as part of this effort using methods appropriate to the contaminants present or potentially under a separate FUDS project at a later date. Once soil incineration operations begin, the Backfill Team would backfill open excavations with treated material. A loader would load treated material into a rock truck or Marooka for transport to the open excavation, with a bulldozer used to backfill the excavation. After the area is backfilled and graded, restored areas would be inspected and monitored consistent with best management practices.

The Site Management Team would perform work oversight, camp operation, and maintenance activities. This would allow excavation, treatment, and backfill activities to proceed without significant delays. This team would coordinate weekly charter flights from Anchorage to Fort Glenn, which would be used to bring any needed supplies, for crew rotations, and to transport analytical samples to Anchorage for 24-hour turnaround analysis.

The Survey Team would perform survey activities. The survey team would mobilize every other resupply plane, meaning that this team would only be onsite for half of the field duration after setup and treatment startup. They would survey all excavations prior to backfill, as well as all sample locations.

Assumptions:

1. The rate of treatment is assumed to be 140 tons per day. This rate is dependent on site conditions encountered, and could possibly extend the field duration.
2. Rock trucks would be used to access site features on or near roads; the Morooka would be used as needed for features away from established roads.
3. Field days are based on a 12-hour day, 7-day work week; treatment is assumed to occur 10 hours per day.
4. Drum removal would be conducted concurrently with other operations, with all drums crushed, placed in open-top containers, and staged at the treatment area for offsite disposal by the end of the first year of treatment duration.
5. Once drums are emptied of product or liquid, they can be disposed of as-is.
6. Drum contents can be consolidated and can be disposed of as non-hazardous waste. GAC material used to treat any liquid drum contents can also be disposed of as non-hazardous waste.
7. Temporary roads would not need to be constructed. Existing roads would be used to access the feature locations, with tundra mats providing access for features away from roads and for stream/washout crossings.
8. Screening and confirmation sampling for excavations would be conducted per ADEC field sampling guidance.
9. Crew rotations would occur as needed as part of the charter flight resupplies for incinerator technicians only.
10. Contingency is not included for equipment failure, weather delays, or archaeological discoveries that delay site work.
11. No seeding would take place to avoid the introduction of non-native or invasive species.

Reporting

Until the NTCRA alternative is complete, an annual technical memorandum would be prepared to summarize the work completed each year. After the NTCRA alternative is complete, a report would be created in accordance with appropriate federal and state regulations, guidance, and manuals to summarize the implemented remedy. At the same time as the report, public interpretative materials would be prepared according to the approach described in Section 4.4.6.

Assumptions:

1. Preliminary Draft, Draft, and Final Report versions would be prepared.
2. Chemical data quality review activities are included in this task.

6.4.4.2 Effectiveness

The overall effectiveness of this alternative would be high, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

This technology effectively isolates site receptors from the contaminated soil. Furthermore, incineration destroys POL in soil allowing the soil to be reused or recycled. EPA guidance notes that incinerators should meet a destruction or removal efficiency (DRE) of 99.99%. Based on known initial contaminant concentrations, it is assumed that a DRE of 99.99% would reduce the contaminant concentrations to below the applicable remedial goals. This would be confirmed with post-treatment soil samples. The associated disturbance to vegetation, however, introduces separate impacts to the environment. Excavated and disturbed areas would take years to fully revegetate.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

This alternative would meet remedial goals through treatment of contaminants. Although current analytical data are limited, this technology would be effective regardless of the concentrations that are present.

Long-Term Effectiveness and Permanence

This alternative would have high long-term effectiveness, as it would permanently reduce contaminant concentrations without accumulating hazardous waste or byproducts. This method quickly destroys contaminants during the treatment process.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative would reduce the volume of contaminated material through treatment. Although analytical data are limited, incineration can effectively treat POL contamination in soil regardless of concentrations present. This method quickly destroys contaminants during the treatment process, which leads to contaminated material being available for use as backfill.

Short-Term Effectiveness

This alternative would have high short-term effectiveness by rapidly addressing the risk posed by soil contamination, as described below.

- Protection of the community: The community would be effectively protected in the short term due to the rapid nature of the excavations and subsequent treatment that quickly destroys contaminants.
- Protection of the workers: Workers would be protected in the short term, as there are no hazardous byproducts from the excavations or treatment (assuming contaminants are completely decomposed and emissions are controlled).
- Environmental impacts: Vegetation would be disturbed in the excavated areas, which would introduce short-term environmental degradation.
- Time until NTCRA objectives are achieved: Excavations rapidly remove contaminated material, with rapid treatment of the excavated soil allowing backfill to occur shortly thereafter. While stockpiling of soil both before and after treatment would be required to verify contaminant concentrations, total processing time would be on the order of weeks from excavation, treatment, and backfill for individual Project 02 features.

6.4.4.3 Implementability

Overall implementability of this alternative is medium, based on the criteria below.

Technical Feasibility

Technical feasibility of this alternative is medium; it consists of proven technologies (i.e., excavation and incineration), though implementation of this alternative would be complicated by site-specific concerns and large treatment volumes, as described below:

- Technology maturity: This alternative consists of proven technologies (i.e., excavation and incineration). Incineration as a treatment for POL-contaminated soil is common with proven approaches for implementation. Mobile units are available.
- Prior use under similar conditions for similar wastes: This approach has been used for POL-contaminated soils in Alaska. However, the large volumes of soil to be treated means that the rate of treatment would determine the overall schedule for the NTCRA; given the limited field season in the Aleutians, this would take multiple years for the middle and high estimates of soil volume, lowering the feasibility. Additionally, multiple barge loads of equipment would be required at setup.
- Possible difficulty in operation once it is constructed: This alternative would use mobile incineration units, so construction of the remedy would be straightforward and would occur simultaneously with site setup. However, the large volume of soil to be treated means that a large amount of fuel would need to be transported to the site, as well as heavy equipment and labor for processing treated soil prior to backfill. Therefore, the logistics of the remote site location lower feasibility.
- Environmental conditions not only with respect to the operation phase of the alternative, but also to the setup and construction phase: The site is in a very remote location, with a short 4-month window over which work can be conducted each year. Additionally, there is essentially no infrastructure available for site use (aside from a runway). The incredibly challenging logistics for mobilization, resupply, and demobilization over the course of multiple years to fully implement the remedy lowers the feasibility.
- Difficulty of potential future RAs: Since this EE/CA report is scoped for soils exceeding the remedial goals, future action to bring the site to a cleanup complete without ICs condition is likely for other media. Excavation extents would be discrete, and would allow for adequate determination of locations with the potential for other contaminated media, increasing feasibility.
- The ability to monitor the effectiveness of the alternative: Screening would guide excavations, which would be verified with confirmation sampling. Contaminated soils would be treated onsite, with complete destruction of the contaminants and no residual wastes. Therefore, monitoring of effectiveness would be straightforward, increasing feasibility.

Administrative Feasibility

Administrative feasibility of this alternative is low-medium. While it is assumed that landowner concurrence would be granted, obtaining approval for an onsite treatment lasting multiple years lowers

feasibility. Additionally, air permits would be required for incinerating this volume of material, which also lowers feasibility. This approach is generally approved by regulators, but other stakeholders may introduce requirements for environmental concerns since the approach removes vegetation from source areas; archaeological mitigation is included in the cost estimates.

Availability of Services and Materials

Availability of services and materials for this alternative is medium-high; while heavy equipment and personnel are readily available, barging and transportation services are limited, as described below:

- Personnel and technology: Excavation of soils uses readily available heavy equipment, including loaders, excavators, low boys, and skid steers; operators for this equipment are readily available for hire. Soil screening and confirmation sampling are routine and performed by environmental professionals that are readily available. Mobile incineration units are available in Alaska. Transportation services, including charter flights and barging, are available, but are limited.
- Offsite treatment, storage, and disposal: Treatment for soil would be conducted on-island. While Umnak Island is sparsely inhabited, finding an area for treatment may be difficult due to the volume of soil required for stockpiling before and after treatment.
- Services and materials: Contracted services include analytical laboratory services for chemical data, remote camp rental, mobile incineration rental, barging, and charter flights. Analytical laboratory services are readily available. Lodging to house personnel is available, but limited. Mobile incineration units are available in Alaska. Barging services are available, but limited due to high use during the summer months; the same is true for charter services, as only two companies currently fly to Umnak Island. Getting fuel to the site would be challenging, although vendors were identified that could deliver the volume of diesel required for each estimate of soil volume; this would require staging large ASTs near the barge landing area.

State Acceptance

State acceptance is anticipated. The state has accepted incineration as the implemented remedy for similar sites, since it typically advances the site closer to a cleanup complete without ICs condition.

Community Acceptance

Community acceptance is anticipated. Community expectations are generally to proceed with options that will result in cleanup complete without ICs land use scenarios; however, this alternative is invasive and therefore poses potential difficulties to implement due to required concurrence from the large number of stakeholders, each needing to represent the goals of their organizations. Additionally, the implementation for this alternative would take years for the middle and high soil volume estimates, which would lower community acceptance.

6.4.4.4 Cost

Costs for each estimate of soil volume are presented below.

Low Soil Volume Estimate

For the low soil volume estimate, the present worth cost of the alternative is $9,428,600 (in base year 2021 dollars); the cost per cy is $963. Appendix C provides a detailed description of all associated costs.

Middle Soil Volume Estimate

For the middle soil volume estimate, the present worth cost of the alternative is $23,064,664 (in base year 2021 dollars); the cost per cy is $1,005. Appendix C provides a detailed description of all associated costs.

High Soil Volume Estimate

For the high soil volume estimate, the present worth cost of the alternative is $23,909,110 (in base year 2021 dollars); the cost per cy is $992. Appendix C provides a detailed description of all associated costs.

6.4.5 Alternative 4: Excavation and Offsite Disposal

The excavation with offsite disposal alternative is described below.

6.4.5.1 Description

Alternative 4 consists of excavation and offsite disposal. Components of this NTCRA alternative include:

- Planning and planning documents, including a site visit
- Mobilization and demobilization
- Fieldwork
- Reporting

A project management team would oversee all activities to manage cost, schedule, and scope; and to ensure effective communications between stakeholders occurs. Implementation is expected to take 3 years, from 2021 to 2023.

Planning and Planning Documents

Before implementation can begin, this alternative requires coordinating NTCRA activities with USACE, landowners, and other stakeholders associated with the site. Requirements include funding from USACE, approval from regulators, and access permissions from landowners.

Once coordination with stakeholders has occurred, a site visit would be conducted to confirm barge landings and road conditions, identify a treatment location, and identify a surface water body where freshwater can be obtained. Two technical staff (one scientist and one archaeologist) would fly from Anchorage to Dutch Harbor commercially, staying the night in Dutch Harbor. A chartered aircraft would be taken from Dutch Harbor to Fort Glenn; the personnel would stay overnight at the Fort Glenn Lodge. Electric bikes would be mobilized to the site with the crew to provide transportation on Umnak Island. Demobilization would occur via chartered aircraft from Fort Glenn to Dutch Harbor and commercial flights from Dutch Harbor to Anchorage.

Once the site visit is complete, a Removal Action Work Plan would be developed to summarize the activities to implement this alternative. Information from the site visit would be used to develop the Work Plan more fully. The Work Plan would include an outline of planned transportation and logistics; site preparation activities (e.g., staging and equipment storage areas, and camp setup); drum removal activities; the extent of soil removal; the sequence of excavation activities; analytical sampling;

decontamination; backfill and site restoration activities; and segregation, transportation, and disposal of the waste. The health and safety methodology would be detailed in a site-specific health and safety plan. Lastly, the Work Plan would include archaeological methodology for mitigation of adverse impacts (as described in Section 4.4).

Assumptions:

1. Three total stakeholder meetings (4 hours each) would be held for planning purposes.
2. Preliminary Draft, Draft, and Final Work Plan versions would be prepared in 2021.
3. Land access is granted for the site visit and excavation activities.
4. The site visit would include 3 full days onsite with 1 day to mobilize and 1 day to demobilize. Overnights would be spent in Dutch Harbor.
5. A site visit would take place in 2021 during Work Plan development.
6. The Fort Glenn runway is in useable condition.

Mobilization and Demobilization

Mobilization of equipment, supplies, materials, and personnel would be via air and water. Labor has been estimated for gathering and loading purchases and rentals, plus time to travel to Fort Glenn.

Mobilization would begin in late-April from Anchorage for barging activities; it is assumed that the barge would land on Fort Glenn on 1 May and depart the next day. A preliminary management crew and operators would arrive in Dutch Harbor for transport to Fort Glenn via chartered aircraft. The following equipment would be mobilized via barge:

- UTVs
- 2,000-gallon portable ASTs for gasoline
- Between 15 and 22 (20-foot) shipping containers for equipment storage
  - Two for mechanical repair equipment and supplies
  - One for drum overpacks and isotanks for free product
  - One for water supply equipment
  - One for camp supply
  - One for PPE
  - One for analytical sampling equipment and supplies
  - One for miscellaneous tools and equipment
  - Two for transport of UTVs; secondarily to be used for staging equipment
  - One for GAC, decontamination, and pumping equipment
  - Between 4 and 11 (depending on soil volume) empty 5-cy (7.5-ton) super sacks.
- Heavy equipment
- 500 feet of tundra mats
- 15 open-top shipping containers for drum disposal

Diesel fuel needed for heavy equipment would be supplied by separate barging in two 25,000-gallon ASTs staged near the barge landing area, with additional fuel stored in a 15,000-gallon AST located at the Fort Glenn Lodge.

Remaining personnel would mobilize the day after equipment is unloaded via commercial flight from Anchorage and charter flight from Dutch Harbor. It is assumed that camp setup and site setup would take 1 week.

Following completion of fieldwork, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors. No equipment or materials would be left onsite.

Assumptions:

1. Barging from Anchorage to Fort Glenn takes 6 days.
2. The field team would arrive once the barge is offloaded via commercial air to Dutch Harbor and charter flight to Fort Glenn.
3. All equipment and materials would be barged from Anchorage to Fort Glenn.
4. Weather contingency is not included.
5. The primary barge landing location near the Main Airfield is useable.
6. The Fort Glenn runway is in useable condition.

Fieldwork

After mobilization, site setup activities would begin. This would include setting up camp and equipment and supersack staging areas near the barge landing, as well as ensuring access to site features by grading access to washed out roads and laying tundra mats for features so low water crossings are possible. This is assumed to take 1 week.

After site setup, implementation of the NTCRA alternative would begin. There would be multiple excavation and backfill teams conducting the work simultaneously, depending on the volume of soil to be excavated. The intent is to have all the contaminated soil excavated and barged offsite for disposal within one season. Each team would perform the following activities with the following equipment:

- **Excavation Teams**: Drum removal and soil excavation of features identified in Section 2.5 for each estimate of soil volume (this team—personnel and equipment—would be replicated as many times as necessary to complete all excavation activities within one field season. Assume two teams are needed for the low soil volume estimate and three teams are needed for the medium and high soil volume estimates.)
  - Personnel
    - Operator
    - Truck driver
    - Archaeologist
    - Laborer
    - Scientist
  - Heavy equipment
    - Excavator
    - Rock truck
    - Marooka (as needed, one per two teams)
    - UTV

- **Backfill Teams**: Retrieve backfill material from a local borrow source and use to back fill and grade excavations (this team—personnel and equipment—would be replicated as many times as necessary to complete all excavation activities within one field season. Assume two teams are needed for the low soil volume estimate and three teams are needed for the medium and high soil volume estimates.)
  - Personnel
    - Operator
    - Truck driver
  - Heavy equipment
    - Rock truck
    - Marooka (as needed, one per two teams)
    - Bulldozer
- **Staging Area Team:** Receive loaded supersacks from Excavation Teams, and stage them at the barge landing area for offsite disposal
  - Personnel
    - Operator
  - Heavy equipment
    - Loader
- **Borrow Pit Team:** Excavate backfill material at the borrow pit location, and load into trucks for backfilling of excavations by the Backfill Teams
  - Personnel
    - Two operators
  - Heavy equipment
    - Excavator
    - Loader
- **Site Management Team**: Work oversight, camp operation, and maintenance activities
  - Personnel
    - Superintendent
    - Field team lead
    - Mechanic
    - Cook
    - Housekeeper
    - Camp manager
    - EMT
  - Heavy Equipment
    - UTV
    - Skid steer
    - Fuel truck
    - Loader
- **Survey Team**: Survey activities
  - Personnel

    - Surveyor
    - Assistant surveyor
  - Heavy equipment
    - UTV

The Excavation Teams would conduct drum removal and soil excavation of features identified in Section 2.5 for each estimate of soil volume. Prior to excavation at each feature, product found in any drums would be either pumped into isotanks or treated with a GAC filtration unit, depending on the product. Drums would then be crushed, placed in open-top containers, and finally staged near the barge landing for off-island transport. Drums with heavy oils would be put into overpacks for shipment for offsite disposal. An excavator would load contaminated material into 5-cy (7.5-ton) supersacks via a hopper. The supersacks would then be loaded onto a rock truck or a Marooka for transport to the staging area near the barge landing. A scientist would perform field screening to determine excavation extents (assumed to correspond with the estimates of soil volume) and resultant confirmation sampling. Analytical confirmation samples would be submitted to the laboratory for a quick turnaround so results can be received and reviewed prior to demobilization to allow for any additional removal necessary. The archaeologist would document all drum removal and monitor all intrusive activities.

The Backfill Teams would backfill open excavations with material from a local approved and tested source. Backfill operations would not begin at each excavation until confirmation soil sample results are received that indicate contaminants above the remedial goals have been removed. Backfill material would be loaded into a rock truck or Marooka for transport to the open excavation, with a bulldozer used to backfill the excavation. The disturbed areas would be backfilled with overburden from the excavation and clean fill and graded to neighboring contours. After the area is backfilled and graded, restored areas would be inspected and monitored consistent with best management practices.

The Site Management Team would perform work oversight, camp operation, and maintenance activities during the field effort. This would allow excavation and backfill activities to proceed without significant delays. This team would coordinate weekly charter flights from Anchorage to Fort Glenn, which would be used to bring out any needed supplies, for crew rotations, and to transport analytical samples to Anchorage for 24-hour turnaround analysis. For the middle and high soil volume estimates, a mobile camp consisting of extra facilities and an extra cook would mobilize to extend the main camp and support all site personnel.

The Survey Team would perform survey activities during the field effort and would mobilize to and from the site using the weekly resupply planes. During the low soil volume field effort, it is assumed that the survey team would be on the island for 2-week rotations, with 1 week off-island in between. During the execution of the middle and high soil volume activities, it is assumed that the survey team would be onsite for the duration of the field efforts, meaning that this team would only be onsite for half of the field duration after setup. They would survey all excavations prior to regrading, as well as all sample locations.

For every 15,000 tons of contaminated soil excavated, placed in 5-cy (7.5-ton) supersacks, and staged near the barge landing, it would be deck loaded onto a waste barge and transported to the final treatment, storage, and disposal facility. All profiling and manifesting would be completed in accordance with all applicable laws and regulations. It is assumed that all excavated soil would be non-hazardous and would not require hazardous material manifests; however, waste characterization samples would be collected and submitted for quick turnaround analysis to expedite prior to shipment off-island. Waste characterization samples would be collected at a minimum frequency of one sample per feature. If a single

feature results in more than 100 cy (150 tons) of excavated soil, waste characterization samples would be collected at a frequency of one sample per 100 cy (150 tons) of excavated material from that feature.

After backfill and site restoration activities are complete, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors. No equipment or materials would be left onsite once treatment and backfill activities are complete.

Assumptions:

1. Once drums are emptied of product or liquid, they can be disposed of as-is.
2. Drum contents can be consolidated and can be disposed of as non-hazardous waste. GAC material used to treat any liquid drum contents can also be disposed of as non-hazardous waste.
3. The rate of excavation is assumed to be 80 cy (120 tons) per day per excavation team. This average includes any logistical considerations.
4. All excavated material would be less than 2 inches in diameter with no screening of oversize material required.
5. No seeding would take place to avoid the introduction of non-native or invasive species.
6. Rock trucks would be used to access site features on or near roads; the Marooka would be used as needed for features away from established roads.
7. Field days are based on a 12-hour day, 7-day work week.
8. Temporary roads would not need to be constructed. Existing roads would be used to access the feature locations with tundra mats providing access for features away from roads and for stream/washout crossings.
9. Screening and confirmation sampling for excavations would be conducted per ADEC field sampling guidance.
10. Contingency is not included for equipment failure, weather delays, or archaeological discoveries that delay work.

Reporting

After the NTCRA alternative is complete, a report would be created in accordance with appropriate federal and state regulations, guidance, and manuals to summarize the implemented remedy. At the same time as the report, public interpretative materials would be prepared according to the approach described in Section 4.4.6.

Assumptions:

1. Preliminary Draft, Draft, and Final Report versions would be prepared.
2. Chemical data quality review activities are included in this task.

6.4.5.2 Effectiveness

The overall effectiveness of this alternative would be high, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

This alternative is presumed to be highly protective of human health and ecological receptors by removing POL-contaminated soil. This alternative could be applied to reduce contaminant concentrations exceeding the remedial goals through offsite disposal and move towards to satisfying cleanup complete without ICs requirements. This alternative would also employ ECs to protect human health while excavating contaminated materials. The associated disturbance to vegetation, however, introduces separate impacts to the environment. Excavated and disturbed areas would take years to fully revegetate.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

This alternative would meet the remedial goals through removal of contaminants.

Long-Term Effectiveness and Permanence

This alternative would have high long-term effectiveness, as it would permanently remove contaminated media from the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative would reduce the volume of contaminated material through removal and disposal offsite.

Short-Term Effectiveness

This alternative would have high short-term effectiveness by rapidly addressing the risk posed by soil contamination, as described below.

- Protection of the community: The community would be effectively protected in the short term due to the rapid nature of the excavation.
- Protection of the workers: Workers would be protected in the short term, as there are no hazardous byproducts from the excavation.
- Environmental impacts: Vegetation would be disturbed in the excavated areas, which would introduce short-term environmental degradation.
- Time until NTCRA objectives are achieved: Excavations rapidly remove contaminated material and, shortly thereafter, backfill would occur. Transporting excavation soil would take time, but there would be no exposure to the contamination during transit.

6.4.5.3 Implementability

Overall implementability of this alternative is low-medium, based on the criteria below.

Technical Feasibility

Technical feasibility of this alternative is low-medium; it consists of proven technologies (i.e., excavation), though implementation of this alternative would be complicated by site-specific concerns and large treatment volumes, as described below:

- Technology maturity: This alternative consists of proven technologies (i.e., excavation). Disposal for POL-contaminated soil is common and readily available.

- Prior use under similar conditions for similar wastes: This approach, typically called dig and haul, is common for contaminated soils. However, transporting the large volumes of soil excavated means that transportation offsite would be challenging, lowering the feasibility of dig and haul. Additionally, finding an onsite borrow pit for the large volume of backfill required may not be possible on Umnak Island, further lowering feasibility.
- Possible difficulty in operation once it is constructed: The alternative does not include construction. However, the large volumes of soil to be excavated and disposed of means that an equivalent volume of backfill would be required. Finding a borrow source on-island is assumed, and lowers feasibility significantly due to the large volumes of soil that would be removed.
- Environmental conditions with respect to both the operation phase of the alternative and the setup and construction phase: The site is in a very remote location, with a short 4-month window over which work can be conducted. Additionally, there is essentially no infrastructure available for site use (aside from a runway). The incredibly challenging logistics for mobilization, resupply, and demobilization to fully implement the remedy lowers the feasibility.
- Difficulty of potential future RAs: Because this EE/CA report is scoped for soils exceeding the remedial goals, future action to bring the site to a cleanup complete without ICs condition is likely for other media. Excavation extents would be discrete, and would allow for adequate determination of locations with the potential for other contaminated media, increasing feasibility.
- The ability to monitor the effectiveness of the alternative: Screening would guide excavations, which would be verified with confirmation sampling. Contaminated soils would be transported offsite for disposal, with no residual wastes. Therefore, monitoring of effectiveness is straightforward, increasing feasibility.

Administrative Feasibility

Administrative feasibility of this alternative is low-medium. While it is assumed that landowner concurrence would be granted, obtaining approval for an onsite borrow pit would be difficult and lowers feasibility. This approach is generally approved by regulators, but other stakeholders may introduce requirements for environmental concerns since the approach removes vegetation from source areas. Archaeological mitigation is included in the cost estimates.

Availability of Services and Materials

Availability of services and materials of this alternative is medium; while heavy equipment and personnel are readily available, barging and transportation services are limited, and availability of backfill onsite is concern, as described below:

- Personnel and technology: Excavation of soils uses readily available heavy equipment, including loaders, excavators, low boys, and skid steers; operators for this equipment are readily available for hire. Soil screening and confirmation sampling is routine and performed by environmental professionals that are readily available. Transportation services, including charter flights and barging, are available, but are limited.

- Offsite treatment, storage, and disposal: Disposal facilities for POL-contaminated soil are readily available, although it would be limited by the availability of barging services (with multiple barge loads required for the middle and high soil volume estimates).
- Services and materials: Contracted services include analytical laboratory services for chemical data, remote camp rental, barging, charter flights, and soil disposal. Analytical laboratory services are readily available. Remote camps to house personnel are readily available, although they require setup. Barging services are available, but limited due to high use during the summer months; the same is true for charter services, as only two companies currently fly to Umnak Island. As noted above, disposal facilities for POL-contaminated soil are readily available but limited by barging. Finding a borrow source onsite for backfill would be challenging.

State Acceptance

State acceptance is anticipated. The state has accepted soil excavation and offsite disposal as the implemented remedy for similar sites, since it typically moves a site much closer to cleanup complete without ICs condition.

Community Acceptance

Community acceptance is anticipated. Community expectations are generally to proceed with options that will result in cleanup complete without ICs land use scenarios; however, this alternative is invasive, which poses potential difficulties to implement due to required concurrence from the large number of stakeholders, each needing to represent the goals of their organizations.

6.4.5.4 Cost

Costs for each estimate of soil volume are presented below.

Low Soil Volume Estimate

For the low soil volume estimate, the present worth cost of the alternative is $11,980,629 (in base year 2021 dollars); the cost per cy is $1,224. Appendix C provides a detailed description of all associated costs.

Middle Soil Volume Estimate

For the middle soil volume estimate, the present worth cost of the alternative is $23,876,265 (in base year 2021 dollars); the cost per cy is $1,041. Appendix C provides a detailed description of all associated costs.

High Soil Volume Estimate

For the high soil volume estimate, the present worth cost of the alternative is $25,242,659 (in base year 2021 dollars); the cost per cy is $1,047. Appendix C provides a detailed description of all associated costs.

6.4.6 Alternative 5: Onsite Landfarming

The onsite landfarming alternative is described below.

6.4.6.1 Description

Alternative 5 consists of excavation and onsite landfarming of petroleum-contaminated soil. The aerobic microbial activity within the soil in the landfarm would be enhanced as the soil is brought to the surface and exposed to more oxygen. The addition of nutrients and moisture may also be necessary to increase microbial activity, but current soil conditions are not currently known. The accelerated microbial activity would result in degradation of absorbed petroleum products through microbial respiration, in addition to physical and chemical degradative processes.

Components of this NTCRA alternative include:

- Planning and planning documents, including a site visit
- Mobilization and demobilization
- Fieldwork
- Continued tilling for treatment
- A second mobilization and demobilization for backfilling
- Reporting

A project management team would oversee all activities to manage cost, schedule, and scope, and to ensure effective communications between stakeholders occurs. Implementation is expected to take 7 years, beginning in 2021, assuming that the soil treatment time is three seasons of tilling.

Planning and Planning Documents

Before implementation can begin, this alternative requires coordinating NTCRA activities with USACE, landowners, and other stakeholders associated with the site. Requirements include funding from USACE, approval from regulators, and access permissions from landowners.

Once coordination with stakeholders has occurred, a site visit would be conducted to confirm barge landings and road conditions, identify a landfarm location, and identify a surface water body where freshwater can be obtained. Two technical staff (one scientist and one archaeologist) would fly from Anchorage to Dutch Harbor commercially, staying the night in Dutch Harbor. A chartered aircraft would be taken from Dutch Harbor to Fort Glenn; the staff would stay at the Fort Glenn Lodge. Electric bikes would be mobilized to the site with the crew to provide transportation on Umnak Island. Demobilization would occur via chartered aircraft from Fort Glenn to Dutch Harbor and commercial flights from Dutch Harbor to Anchorage.

Once the site visit is complete, an Excavation and Landfarming Work Plan would be developed to summarize the activities to implement this alternative. Information from the site visit would be used to develop the Work Plan more fully. The Work Plan would include an outline of planned transportation and logistics; site preparation activities (e.g., staging and equipment storage areas, camp setup, and stormwater controls); the extent of soil removal; the sequence of excavation activities; treatment methodology; construction details of the landfarm; analytical sampling; maintenance and operations of the landfarm; methods for landfarm decommissioning; decontamination; backfill and site restoration activities; and segregation, transportation, and disposal of the waste generated during the effort. The health and safety methodology would be detailed in a site-specific health and safety plan. Lastly, the Work Plan would include archaeological methodology for mitigation of adverse impacts (as described in Section 4.4).

Assumptions:

1. Three total stakeholder meetings (4 hours each) would be held for planning purposes.
2. Preliminary Draft, Draft, and Final Work Plan versions would be prepared in 2021.
3. Land access is granted for the site visit, excavation, and planned treatment activities.
4. The site visit would include 3 full days onsite with 1 day to mobilize and 1 day to demobilize. Overnights would be spent in Dutch Harbor.
5. A site visit would take place in 2021 during Work Plan development.
6. The Fort Glenn runway is in useable condition.

Mobilization and Demobilization

Mobilization of equipment, supplies, materials, and personnel would be via air and water. Labor has been estimated for gathering and loading purchases and rentals, plus time to travel to Fort Glenn.

Mobilization would begin in late April from Anchorage for barging activities; it is assumed that the barge would land on Fort Glenn on 1 May and depart the next day. A preliminary management crew and operators would arrive in Dutch Harbor for transport to Fort Glenn via chartered aircraft. The following equipment would be mobilized via barge:

- UTVs
- 2,000-gallon portable ASTs for gasoline
- Eleven 20-foot shipping containers for equipment storage
  - Two for mechanical repair equipment and supplies
  - One for drum overpacks and isotanks for free product
  - One for water supply equipment
  - One for camp supply
  - One for PPE
  - One for analytical sampling equipment and supplies
  - One for miscellaneous tools and equipment
  - Two for transport of UTVs; secondarily to be used for staging equipment
  - One for GAC, decontamination, and pumping equipment
- Heavy equipment
- 500 feet of tundra mats
- 15 open-top shipping containers for drum disposal

Diesel fuel needed for heavy equipment would be supplied by separate barging in two 25,000-gallon ASTs staged near the barge landing area, with additional fuel stored in a 15,000-gallon AST located at the Fort Glenn Lodge.

Remaining personnel would mobilize the day after equipment is unloaded via commercial flight from Anchorage and charter flight from Dutch Harbor. It is assumed that camp setup and site setup would take 1 week.

Following completion of excavation fieldwork during the first year, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors.

The only equipment that would remain onsite is the equipment to be used for tilling operations during subsequent seasons (a bulldozer with tilling attachment).

Once landfarm treatment of the soil is complete, a second mobilization/demobilization event would occur to conduct backfilling and site restoration activities. It would be carried out in the same manner as the original mobilization/demobilization.

Assumptions:

1. Barging from Anchorage to Fort Glenn would take 6 days.
2. The field team would arrive once the barge is offloaded via commercial air to Dutch Harbor and charter flight to Fort Glenn.
3. All equipment and materials would be barged from Anchorage to Fort Glenn.
4. The primary barge landing location near the Main Airfield is useable. 25,000-gallon ASTs can be used and staged near this location.
5. The AST at the Fort Glenn Lodge is in useable condition.
6. Weather contingency is not included.
7. The Fort Glenn runway is in useable condition.

Excavation Fieldwork

After mobilization, site setup activities would begin. This would include baseline footprint sampling of the landfarm area and construction of the landfarm so it is ready to receive contaminated soils. Initial survey activities would be conducted, as well as ensuring access to site features by grading access to washed out roads and laying tundra mats for features so low water crossings are possible; this is assumed to take one week.

After site setup, implementation of the NTCRA alternative would begin. Multiple excavation teams would conduct the work simultaneously, depending on the volume of soil to be excavated. The intent is to have all the contaminated soil excavated and placed in the landfarm within one season. Each team would perform the following activities with the following equipment:

- **Excavation Team**: Drum removal and soil excavation of features identified in Section 2.5 for each estimate of soil volume (this team—personnel and equipment—would be replicated as many times as necessary to complete all excavation activities within one field season. Assume one team is needed for the low soil volume estimate and three teams are needed for the medium and high soil volume estimates.)
  - Personnel
    - Operator
    - Truck driver
    - Archaeologist
    - Laborer
    - Scientist
  - Heavy equipment
    - Excavator
    - Rock truck
    - Marooka (as needed, one per two teams)

        - UTV
- **Landfarm Team**: Receive and place all excavated soil in the landfarm at the desired depth
    - Personnel
        - Two operators
    - Heavy equipment
        - Excavator
        - Bulldozer
- **Site Management Team**: Work oversight, camp operation, and maintenance activities
    - Personnel
        - Field team lead
        - Superintendent
        - Mechanic
        - Cook
        - Housekeeper
        - Camp Manager
        - EMT
    - Heavy Equipment
        - UTVs
        - Skid steer
        - Fuel Truck
        - Loader
- **Survey Team**: Survey activities
    - Personnel
        - Surveyor
        - Assistant surveyor
    - Heavy equipment
        - UTV

The Excavation Teams would conduct drum removal, pre-screening sampling, and soil excavation of features identified in Section 2.5 for each estimate of soil volume. Prior to excavation at each feature, product found in any drums would be either pumped into isotanks or treated with a GAC filtration unit, depending on the product. Drums would then be crushed, placed in open-top containers, and finally staged near the barge landing for off-island transport. Drums with heavy oils would be put into overpacks for shipment for offsite disposal. Once the drums have been removed, pre-excavation analytical samples would be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples would be collected beneath each individual drum feature and composite samples would be collected from each drum area and drum dump feature. The samples would be analyzed for GRO, DRO/RRO, VOCs, PAH, RCRA metals, PCBs, and pesticides. If results indicate non-POL contaminants are comingled with POL contamination, the soil would either be addressed as part of this effort using methods appropriate to the contaminants present or potentially would not be excavated during this effort and would be addressed under a separate FUDS project at a later date. Once pre-screen sample results have been received for a feature, excavation activities would begin. An excavator would load contaminated material into a rock truck or Marooka for transport to the landfarm area, with the scientist performing field screening to determine excavation extents (assumed to correspond with the

estimates of soil volume) and resultant confirmation sampling. Analytical confirmation samples would be submitted to the laboratory for quick turnaround so results can be received and reviewed prior to demobilization to allow for any additional removal necessary. The archaeologist would document all drum removal and monitor all intrusive activities. Excavations would remain open but would be graded such that they do not pose a safety risk to animals or people at the site.

Landfarming would require relatively flat region of land large enough to accommodate spreading the contaminated soil to the desired depth. The location of the landfarm would need to be included in the assessment of effect, resolution of adverse effects, and part of archaeological monitoring to ensure that landfarm placement will not impact the cultural landscape or any other cultural resources. The landfarm would be unlined and would require berms around its perimeter to provide protection from sheet flow, wind, and other weather elements that may compromise the integrity of the landfarm or cause contaminated soil to be transported outside of the landfarm boundaries. Berm material would be acquired from an onsite borrow source.

The Landfarm Team would maintain the landfarm at a depth of no more than 2 feet to maximize degradation rates. A bulldozer with tilling attachment with the ability to till the entire depth of the landfarm would be purchased, mobilized to the site with the rest of the equipment, and left onsite for the duration of soil treatment. Baseline ISM samples would be collected from the footprint of the landfarming area prior to placing any soil. One ISM sample would be collected for each 0.5-acre area (corresponding to the EPA's definition of area for residential exposure).

It is assumed that it would take most of the first season to excavate soil and construct the landfarm. Once all of the soil has been placed in the landfarm, initial ISM samples would be collected from the petroleum-contaminated soil. One ISM sample would be collected from each 1,000-cy volume of the landfarm. In addition, field screening kits would be used to assess the nutrient levels and ratios from each ISM sample, as well as pH and moisture content in the soil to determine if amendments are necessary to optimize degradation. It is assumed that only a minimal amount of tilling could be completed before the end of season.

The Site Management Team would perform work oversight, camp operation, and maintenance activities during the active excavation and backfill/site restoration field efforts. This would allow excavation and backfill activities to proceed without significant delays. This team would coordinate weekly charter flights from Anchorage to Fort Glenn to bring out any needed supplies, for crew rotations, and to transport analytical samples to Anchorage for 24-hour turnaround analysis.

The Survey Team would perform survey activities. The survey team would mobilize every other resupply plane during the active excavation and backfill/site restoration field efforts, meaning that this team would only be onsite for half of the field duration after setup (more for middle and high estimates of soil volume). They would survey all excavations prior to regrading, as well as all sample locations.

Once excavation and site restoration activities are complete, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors. Only tilling equipment and supplies would remain onsite.

Assumptions:

1. Once drums are emptied of product or liquid, they can be disposed of as-is.
2. Drum contents can be consolidated and can be disposed of as non-hazardous waste. GAC material used to treat any liquid drum contents can also be disposed of as non-hazardous waste.

3. The rate of excavation is assumed to be 100 cy (150 tons) per day per excavation team. This average includes any logistical considerations.
4. Field days are based on a 12-hour day, 7-day work week.
5. Temporary roads would not need to be constructed. Existing roads would be used to access the feature locations, with tundra mats providing access for features away from roads and for stream/washout crossings.
6. Screening and confirmation sampling for excavations would be conducted per ADEC field sampling guidance.
7. Contingency is not included for equipment failure, weather delays, or archaeological discoveries that delay work.
8. No seeding would take place to avoid the introduction of non-native or invasive species.
9. A cover liner would not be used on the landfarm due to weather and logistical constraints.

Tilling Fieldwork

A two-person crew would return the next season via commercial air from Anchorage to Dutch Harbor and charter flight to Fort Glenn. This crew would continue tilling operations with the equipment that was left onsite. The crew would stay at the Fort Glenn Lodge for the duration of the season and till the landfarm continuously throughout the season (for the low volume soil estimate, the crew would only be onsite for half of the field duration). Field kits would be used monthly to measure nutrient levels and ratios, as well as moisture and pH, in the soil to determine if amendments are needed. At the end of the season, another round of ISM samples would be collected to determine the concentrations of contaminants in the soil.

This process would continue each season until analytical sample results indicate that landfarm treatment is complete and petroleum constituents are not present at levels above the remedial goals. Once treatment is complete, a field team would remobilize to the site with all the appropriate equipment to complete landfarm decommissioning, excavation backfill, and site restoration.

Assumptions:

1. Treatment of petroleum-contaminated soil through landfarming is estimated to take three seasons with tilling only.
2. All excavated soil can be fit into one landfarm cell without affecting surface water in the area.
3. Moisture, pH, and nutrient ratios in the excavated soils are assumed to be within acceptable ranges, and additional nutrients and/or water would not be necessary (moisture: 40 to 85%; pH between 6 and 8; C:N:P ratio between 100:1:0.5 and 100:10:1). Field test kits would be used to determine these levels.
4. Field days are based on a 12-hour day, 7-day work week. For the low estimate of soil volume, tilling would be required only half of the time. Tilling would be continuous for middle and high estimate of soil volume.
5. No seeding would take place to avoid the introduction of non-native or invasive species.

Backfilling Fieldwork

Once landfarm treatment is complete, mobilization and demobilization using the same methods described for the Excavation Fieldwork will take place so that the landfarm decommissioning, excavation backfill, and site restoration activities can be conducted. After mobilization, site setup activities would begin. This

would include ensuring access to site features by grading access to washed out roads and laying tundra mats for features so low water crossings are possible; this is assumed to take 1 week.

After site setup, backfilling operations would begin. Multiple Backfill Teams would conduct the work simultaneously, depending on the volume of soil to be backfilled. The intent is to have all the treated soil placed back in the excavations within one season. Each team would perform the following activities with the following equipment:

- **Landfarm Team**: Preparation of soil in the landfarm for backfilling, and loading treated soil into trucks to backfill excavations
  - Personnel
    - Two operators
  - Heavy equipment
    - Excavator
    - Bulldozer
- **Backfill Team**: Excavation backfill using treated soil (this team, including personnel and equipment, would be replicated as many times as necessary to complete all excavation activities within one field season. Assume one team is needed for the low soil volume estimate and three teams are needed for the medium and high soil volume estimates.)
  - Personnel
    - Operator
    - Truck driver
  - Heavy equipment
    - Rock truck
    - Marooka (as needed, one per two teams)
    - Bulldozer
    - UTV
- **Site Management Team**: Work oversight, camp operation, and maintenance activities
  - Personnel
    - Field team lead
    - Superintendent
    - Mechanic
    - Cook
    - Housekeeper
    - Camp Manager
    - EMT
  - Heavy Equipment
    - UTVs
    - Skid steer
    - Fuel truck
    - Loader
- **Survey Team**: Survey activities
  - Personnel

        - Surveyor
        - Assistant surveyor
    - Heavy equipment
        - UTV
- **Sample Team**: Sampling activities
    - Personnel
        - Scientist

The Backfill team would backfill open excavations with the treated material. An excavator would load treated material into a rock truck or Marooka for transport to the open excavation, where a bulldozer would be used to backfill the excavation. The disturbed areas would be backfilled with overburden from the excavation and graded to match neighboring contours. After the area is backfilled and graded, restored areas would be inspected and monitored consistent with best management practices.

Once all treated soil has been removed from the landfarm, it would be decommissioned and the site restored. Post-treatment ISM samples would be collected from the footprint of the landfarm (from the same decision unit locations as the baseline footprint samples) to confirm that contaminants from the petroleum-contaminated soil were not left in place. Post-treatment sample results would be compared to pre-treatment sample results.

The Site Management Team would perform work oversight, camp operation, and maintenance activities during the active excavation and backfill/site restoration field efforts. This would allow excavation and backfill activities to proceed without significant delays. This team would coordinate weekly charter flights from Anchorage to Fort Glenn to bring out any needed supplies, for crew rotations, and to transport analytical samples to Anchorage for 24-hour turnaround analysis.

The Survey Team would perform survey activities. The survey team would mobilize with the second to last resupply plane for 1 week, and demobilize on the last resupply plane. They would survey any features, as well as all sample locations. A scientist would mobilize with the Survey Team to complete post-treatment ISM sampling.

Once backfill and site restoration activities are complete, equipment and materials would be demobilized using the same transportation methods as for mobilization. These activities include packaging and shipping remaining supplies, travel back to Anchorage, and returning supplies and rentals to vendors. No equipment or materials would be left onsite once treatment and backfill activities are complete.

Assumptions:

1. The rate of backfill is assumed to be 100 cy (150 tons) per day per backfill team. This average includes any logistical considerations.
2. Rock trucks would be used to access site features on or near roads; the Morooka would be used as needed for features away from established roads.
3. Field days are based on a 12-hour day, 7-day work week.
4. Temporary roads would not need to be constructed. Existing roads would be used to access the feature locations, with tundra mats providing access for features away from roads and for stream/washout crossings.
5. Screening and confirmation sampling for excavations would be conducted per ADEC field sampling guidance.

6. Contingency is not included for equipment failure, weather delays, or archaeological discoveries that delay work.
7. No seeding would take place to avoid the introduction of non-native or invasive species.

Reporting

Until the NTCRA alternative is complete, an annual technical memorandum would be prepared to summarize the work completed each year. After the NTCRA alternative is complete, a report would be created in accordance with appropriate federal and state regulations, guidance, and manuals to summarize the implemented remedy. At the same time as the report, public interpretative materials would be prepared according to the approach described in Section 4.4.6.

Assumptions:

1. Preliminary Draft, Draft, and Final Report versions would be prepared.
2. Chemical data quality review activities are included in this task.

6.4.6.2 Effectiveness

The overall effectiveness of this alternative would be medium, using the evaluation criteria below.

Overall Protection of Public Health and the Environment

This alternative is presumed to be adequately protective of human health and ecological receptors by treating POL-contaminated soil. This alternative could be applied to reduce contaminant concentrations exceeding the remedial goals through treatment, and move towards to satisfying cleanup complete without ICs requirements. This alternative would also employ ICs to protect human health while treatment is underway. During treatment, ecological receptors could be exposed to contaminated material; but the exposure would be limited, since contaminated material would be consolidated in one treatment location. The associated disturbance to vegetation, however, introduces separate impacts to the environment. Excavated and disturbed areas would take years to fully revegetate.

Compliance with ARARs and Other Criteria, Advisories, and Guidance

This alternative would likely meet the remedial goals through treatment of contaminants. However, since current analytical data are limited, the maximum concentration of contaminants is unknown; landfarming can effectively treat POL contamination in soil, reducing concentrations up to 95%, as long as contamination concentrations are not initially too high. If maximum concentrations are initially too high, this technology is less effective; that being said, the soil with the highest concentrations would be mixed with soil that has lower concentrations, and based on available evidence the overall resultant concentration is likely amenable for complete treatment by landfarming. For this reason, since the low estimate of soil volume would include the most contaminated material, this alternative would be more effective for the middle and high estimates.

For any material remaining with high concentrations, it would be consolidated for treatment or disposal using other approaches to bring the site closer to a cleanup complete without ICs condition as part of a future action.

Long-Term Effectiveness and Permanence

This alternative would have high long-term effectiveness, as it would permanently reduce contaminant concentrations without hazardous waste or byproducts. Essentially, this method would accelerate the natural degradation of POL contaminants that is already occurring in situ at the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative would reduce the volume of contaminated material through treatment. Since current analytical data are limited, it is unknown how effective the treatment would be, which presents a significant data gap and causes high uncertainty of the treatment time. In general, landfarming can effectively treat POL contamination in soil, reducing concentrations up to 95% but is less effective if maximum concentrations are too high.

Short-Term Effectiveness

This alternative would have low short-term effectiveness since treatment of the soil would take years, as described below.

- Protection of the community: Although contaminant concentrations would be reduced over the course of multiple years, the community would be partially protected in the short term due to the rapid nature of the excavation and consolidation of contaminated material into one treatment area.
- Protection of the workers: Workers would be protected in the short term, as there are no hazardous byproducts from the excavation or treatment (tilling and adding amendments).
- Environmental impacts: Vegetation would be disturbed in the excavated areas that would be left open for years, which would increase potential erosion over this time. Additionally, the treatment area would be fairly large, and could not be re-vegetated until treatment is complete.
- Time until NTCRA objectives are achieved: While the excavations would remove contaminated material rapidly, treatment of the soil would take years after excavation is complete.

6.4.6.3 Implementability

Overall implementability of this alternative is low-medium, based on the criteria below.

Technical Feasibility

Technical feasibility of this alternative is low-medium; it consists of proven technologies (i.e., excavation and landfarming), though implementation of this alternative would be complicated by site-specific concerns and large treatment volumes, as described below:

- Technology maturity: This alternative consists of proven technologies (i.e., excavation and landfarming). Landfarming for POL-contaminated soil is common, with proven approaches for implementation within the State of Alaska and specifically on the Aleutian Islands.
- Prior use under similar conditions for similar wastes: This approach has been used for POL-contaminated soils in Alaska. More than 13,000 tons of POL-contaminated soil was treated through landfarming at the FUDS Nome Tank Site “E” in Nome, Alaska, which has similar environmental conditions. The success of the project was contingent on active engagement of

the soil including routine monitoring of nutrients, moisture levels, and pH; as well as routine sampling of the landfarm for contaminant concentrations. The landfarm was tilled weekly in varying directions. The estimated 3 years of treatment are based on the results of this site (USACE 2018b). The large volume of soil to be treated at Fort Glenn means that a large area would be required for treatment, lowering the feasibility. Although bioremediation rates can be reduced by Alaska's cool and wet temperatures (especially in the Aleutians), volatilization, photodegradation, and oxidation remain quite effective, particularly on sunny, breezy days with freshly tilled soil.

- Possible difficulty in operation once it is constructed: Once constructed, operation of the remedy is straightforward, which involves tilling and adding amendments (if necessary). Tilling would be performed using heavy equipment, which would limit impacts due to adverse weather. Tilling with heavy equipment would also prevent clumping, although this is not anticipated due to the soil type (poorly graded gravels and sands with silt). The limited analytical data results in an inability to determine the amount and types of amendments that may be necessary to increase microbial activity, and the large volume of soil to be treated means that a large amount of amendments would need to be transported to the site, as well as heavy equipment and labor for tilling operations. Therefore, the logistics of the remote site location lower feasibility.
- Environmental conditions only with respect to both the operation phase of the alternative and the setup and construction phase: The site is in a very remote location, with a short 4-month window over which work can be conducted each year. Additionally, there is essentially no infrastructure available for site use (aside from a runway). The challenging logistics for mobilization, resupply, and demobilization over the course of multiple years to fully implement the remedy lowers the feasibility.
- Difficulty of potential future RAs: Because this EE/CA report is scoped for soils exceeding the remedial goals, future action to bring the site to a cleanup complete without ICs condition is likely for other media. Excavation extents would be discrete and would allow for adequate determination of locations with the potential for other contaminated media, increasing feasibility.
- The ability to monitor the effectiveness of the alternative: Screening would guide excavations, which would be verified with confirmation sampling. Contaminated soils would be treated onsite, with no residual wastes. Therefore, monitoring of effectiveness is straightforward, increasing feasibility.

Administrative Feasibility

Administrative feasibility of this alternative is low-medium. While it is assumed that landowner concurrence would be granted, obtaining approval for an onsite treatment area for the large volume of soil would be difficult and lowers feasibility. This approach is generally approved by regulators, but other stakeholders may introduce requirements for environmental concerns since the approach removes vegetation from source areas; archaeological mitigation is included in the cost estimates.

Availability of Services and Materials

Availability of services and materials of this alternative is medium; while heavy equipment and personnel are readily available, barging and transportation services are limited, as described below:

- Personnel and technology: Excavation of soils uses readily available heavy equipment, including loaders, excavators, low boys, and skid steers; operators for this equipment are readily available for hire. Soil screening and confirmation sampling are routine and performed by environmental professionals that are readily available. Tillers are also readily available, with amendment application, if necessary, using the same heavy equipment described above. Transportation services, including charter flights and barging, are available, but are limited.
- Offsite treatment, storage, and disposal: Treatment for soil would be conducted on-island. While Umnak Island is largely uninhabited, finding an area for treatment would be difficult due to the large volume of soil.
- Services and materials: Contracted services would include analytical laboratory services for chemical data, remote camp rental, barging, and charter flights. Analytical laboratory services are readily available. Lodging to house personnel is available, although it is limited. Barging services are available, but limited due to high use during the summer months; the same is true for charter services, as only two companies currently fly to Umnak Island.

State Acceptance

State acceptance is anticipated. The state has accepted landfarming as the implemented remedy for similar sites (USACE 2018b), since it typically moves a site closer to a cleanup complete without ICs condition. However, leaving excavations open for the long treatment time would lower acceptance.

Community Acceptance

Community acceptance is anticipated, but will require dissemination of information that proves effectiveness. Community expectations are generally to proceed with options that would result in cleanup complete without ICs land use scenarios. However, this alternative is invasive and therefore poses potential difficulties to implement due to required concurrence from the large number of stakeholders, each needing to represent the goals of their organizations. Additionally, the treatment time for this alternative would take years, with excavations left open until they can be backfilled with treated material; this would lower community acceptance.

6.4.6.4 Cost

Costs for each estimate of soil volume are presented below.

Low Soil Volume Estimate

For the low soil volume estimate, the present worth cost of the alternative is $12,521,986 (in base year 2021 dollars); the cost per cy is $1,279. Appendix C provides a detailed description of all associated costs.

Middle Soil Volume Estimate

For the middle soil volume estimate, the present worth cost of the alternative is $16,123,892 (in base year 2021 dollars); the cost per cy is $703. Appendix C provides a detailed description of all associated costs.

High Soil Volume Estimate

For the high soil volume estimate, the present worth cost of the alternative is $16,960,069 (in base year 2021 dollars); the cost per cy is $704. Appendix C provides a detailed description of all associated costs.

7.0 COMPARATIVE ANALYSIS OF NTCRA ALTERNATIVES

For the five alternatives previously identified and individually evaluated, a comparative analysis is shown below for each estimate of soil volume to determine the relative performance of each alternative in relation to effectiveness, implementability, and cost. The results of the individual analyses are summarized in Table 7-1. The purpose of the comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another for each estimate of soil volume, so that key tradeoffs that affect the remedy selection can be identified.

Table 7-1 Summary of Comparative Analysis of Alternatives

NTCRA ALTERNATIVE	EFFECTIVENESS	IMPLEMENTABILITY	COST		
			ESTIMATE OF SOIL VOLUME	TOTAL COST	COST PER CY
Alternative 1: No Action	Low	Low	Low	$0	NA
			Middle	$0	NA
			High	$0	NA
Alternative 2: Institutional Controls	Low	Medium	Low	$938,905	NA
			Middle	$1,099,086	NA
			High	$1,345,704	NA
Alternative 3: Onsite Ex Situ Incineration	High	Medium	Low	$9,428,600	$963
			Middle	$23,064,664	$1,005
			High	$23,909,110	$992
Alternative 4: Excavation and Offsite Disposal	High	Low-Medium	Low	$11,980,629	$1,224
			Middle	$23,876,265	$1,041
			High	$25,242,659	$1,047
Alternative 5: Onsite Landfarming	Medium	Low-Medium	Low	$12,521,986	$1,279
			Middle	$16,123,892	$703
			High	$16,960,069	$704

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
Effectiveness and implementability are ranked from low to medium to high.

7.1 Low Soil Volume Estimate

The comparative analysis for the low soil volume estimate is shown below.

7.1.1 Effectiveness

No Action would provide no protection to human health or the environment. ICs would provide adequate protection to human health because they would prohibit contact with contaminated material. ICs would not be protective of the environment. Neither of these alternatives would address free product contained in drums present onsite.

Onsite Ex Situ Incineration and Excavation and Offsite Disposal would be the most effective for protection of human health and the environment by eliminating the contaminated material within 1 year. Onsite

Landfarming would also be protective of human health and the environment, but effectiveness would be highly dependent on the maximum levels of contaminants present. Since the low soil volume estimate would contain the material that likely will have the highest concentrations of contaminants, it is uncertain if it would be fully effective; the other two treatment alternatives are highly effective regardless of concentrations.

7.1.2 Implementability

No Action is currently implemented. ICs would be potentially difficult to implement due to management into perpetuity via periodic reviews and the need for landowner concurrence.

The treatment alternatives each have site-specific concerns on implementability. For the low soil volume estimate, both Onsite Ex Situ Incineration and Excavation and Offsite Disposal have the most implementability. The primary challenge for Onsite Ex Situ Incineration is mobilizing the large volumes of diesel required to excavate the soil and incinerate it; if the estimated burn rate for treatment is higher than expected, large volumes of diesel would be required, which is challenging for a remote location like Umnak Island. It is uncertain how much fuel can be delivered by the vendor in one season.

The primary challenge for Excavation and Offsite Disposal is finding a borrow pit on-island for the large volume of soil being backfilled; while there are borrow pits known for use, it is uncertain if almost 10,000 cy (15,000 tons) of backfill material is available onsite. Additionally, the logistics for removing thousands of supersacks and disposing of them are challenging.

Landfarming has the lowest implementability of the treatment alternatives for the low soil volume estimate. This is because a large treatment area would have to be maintained for multiple years for this alternative. Since the other two alternatives can be completed in one field season, that lowers the implementability for the landfarming alternative in comparison.

7.1.3 Cost

No Action has no associated costs. For the low soil volume estimate, overall costs for the other NTCRA alternatives are: ICs with 30 years of periodic reviews and management ($938,905); Onsite Ex Situ Incineration ($9,428,600); Excavation and Offsite Disposal ($11,980,629); and Onsite Landfarming ($12,521,986).

It should be noted that there is uncertainty in the treatment rate for Onsite Ex Situ Incineration; costs would increase substantially if 140 tons per day could not be achieved as an additional season would be required to treat the required soil volume. The other costs have less uncertainty, although overall treatment time for Onsite Landfarming is estimated and could change based on contaminant concentrations and the possible need for nutrient amendments (which would increase costs).

7.2 Middle Soil Volume Estimate

The comparative analysis for the middle soil volume estimate is shown below.

7.2.1 Effectiveness

No Action would provide no protection to human health or the environment. ICs would provide adequate protection to human health as it would prohibit contact with contaminated material; it would not be protective of the environment. Neither of these alternatives would address free product contained in drums present onsite.

Onsite Ex Situ Incineration and Excavation and Offsite Disposal would be the most effective for protection of human health and the environment by eliminating the contaminated material. Onsite Landfarming would also be protective of human health and the environment, but effectiveness would be highly dependent on the maximum levels of contaminants present. Since the middle soil volume estimate would likely contain both highly contaminated material and moderately contaminated material, it is uncertain if it would be fully effective but would likely be as the overall concentrations would be lower than for just the low soil volume estimate material by itself.

7.2.2 Implementability

No Action is currently implemented. ICs would be potentially difficult to implement due to management into perpetuity via periodic reviews and the need for landowner concurrence.

The treatment alternatives each have site-specific concerns on implementability. For the middle soil volume estimate, Onsite Landfarming has the most implementability, as both Onsite Ex Situ Incineration and Excavation and Offsite Disposal are less feasible due to constraints on availability of required supplies and materials. The primary challenge for Onsite Landfarming is finding a large treatment area that could be maintained for multiple years, along with onsite storage for the tilling equipment. Additionally, this assumes the landfarm is implemented without a liner or cover, which may have pushback from stakeholders.

The primary challenge for Onsite Ex Situ Incineration is mobilizing the large volumes of diesel required to excavate the soil and incinerate it; if the estimated burn rate for treatment is higher than expected, larger volumes of diesel would be required, and it is uncertain how much fuel can be delivered by the vendor in one season (and would necessitate refueling over the course of the seasons). Additionally, treatment activities would occur over multiple years. The higher the soil volume estimate, the lower the comparative feasibility for Onsite Ex Situ Incineration.

The primary challenge for Excavation and Offsite Disposal is finding a borrow pit on-island for the large volume of soil being backfilled; while there are borrow pits known for use, it is unlikely over 20,000 cy (30,000 tons) of backfill material is readily available onsite. Additionally, the logistics for removing many thousands of supersacks and disposing of them are challenging and would require multiple barges for transport. The higher the soil volume estimate, the lower the comparative feasibility for Excavation and Offsite Disposal.

7.2.3 Cost

No Action has no associated costs. For the middle soil volume estimate, overall costs for the other NTCRA alternatives are: ICs with 30 years of periodic reviews and management ($1,085,086); Onsite Landfarming ($16,123,892); Onsite Ex Situ Incineration ($23,064,664); and Excavation and Offsite Disposal ($23,876,265).

It should be noted that there is uncertainty in the treatment rate for Onsite Ex Situ Incineration; however, if treatment was slower than 140 tons per day, the price would not increase substantially because the duration could be extended without causing the need for more seasons of treatment (as long as 140 tons per day could be achieved). The other costs have less uncertainty, although overall treatment time for Onsite Landfarming is estimated and could change based on contaminant concentrations and the possible need for nutrient amendments (which would increase costs).

7.3 High Soil Volume Estimate

The comparative analysis for the high soil volume estimate is shown below.

7.3.1 Effectiveness

No Action would provide no protection to human health or the environment. ICs would provide adequate protection to human health as it would prohibit contact with contaminated material; it would not be protective of the environment. Neither of these alternatives would address free product contained in drums present onsite.

Onsite Ex Situ Incineration and Excavation and Offsite Disposal would be the most effective for protection of human health and the environment by eliminating the contaminated material. Onsite Landfarming would also be protective of human health and the environment, but effectiveness would be highly dependent on the maximum levels of contaminants present.

7.3.2 Implementability

No Action is currently implemented. ICs would be potentially difficult to implement due to management into perpetuity via periodic reviews and the need for landowner concurrence.

The treatment alternatives each have site-specific concerns on implementability. For the high soil volume estimate, Onsite Landfarming has the most implementability, as both Onsite Ex Situ Incineration and Excavation and Offsite Disposal are less feasible due to constraints on availability of required supplies and materials. The primary challenge for Onsite Landfarming is finding a large treatment area that could be maintained for multiple years, along with onsite storage for the tilling equipment. Additionally, this assumes the landfarm is implemented without a liner or cover, which may have pushback from stakeholders.

The primary challenge for Onsite Ex Situ Incineration is mobilizing the large volumes of diesel required to excavate the soil and incinerate it; if the estimated burn rate for treatment is higher than expected, larger volumes of diesel would be required, and it is uncertain how much fuel can be delivered by the vendor in one season (and would necessitate refueling over the course of the seasons). Additionally, treatment activities would occur over multiple years. The higher the soil volume estimate, the lower the comparative feasibility for Onsite Ex Situ Incineration.

The primary challenge for Excavation and Offsite Disposal is finding a borrow pit on-island for the large volume of soil being backfilled; while there are borrow pits known for use, it is unlikely over 20,000 cy (30,000 tons) of backfill material is readily available onsite. Additionally, the logistics for removing many thousands of supersacks and disposing of them are challenging and would require multiple barges for transport. The higher the soil volume estimate, the lower the comparative feasibility for Excavation and Offsite Disposal.

7.3.3 Cost

No Action has no associated costs. For the high soil volume estimate, overall costs for the other NTCRA alternatives are: ICs with 30 years of periodic reviews and management ($1,331,704); Onsite Landfarming ($16,960,069); Onsite Ex Situ Incineration ($23,909,110); and Excavation and Offsite Disposal ($25,242,659).

It should be noted that there is uncertainty in the treatment rate for Onsite Ex Situ Incineration; however, if treatment was slower than 140 tons per day, the price would increase substantially because the duration would need to be extended another season of treatment (if 140 tons per day could not be achieved). The other costs have less uncertainty, although overall treatment time for Onsite Landfarming is estimated and could change based on contaminant concentrations and the possible need for nutrient amendments (which would increase costs).

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8.0 RECOMMENDED NTCRA ALTERNATIVE

Based on the comparative analysis in the previous section, the recommended NTCRA alternative that best satisfies the evaluation criteria for each estimate of soil volume is identified below.

The NTCRA described in this EE/CA report is part of a holistic strategy for remediation at the FUDS Fort Glenn site. No additional investigation will occur prior to the NTCRA; therefore, the low soil volume estimate will be carried forward as it reflects known source soils. The middle and high estimates could contain RBSL exceedances that would feed into a cumulative risk calculation for the site, and therefore can be used to reflect possible volumes for complete remediation of the site that addresses residual soil contamination and contamination that may be present in media other than soil.

The No Action alternative is not recommended for any estimate of soil volume, as it would not prevent exposure to contaminated material and is not acceptable to stakeholders. ICs are not recommended for any estimate of soil volume due to the anticipated lack of acceptance from stakeholders, as well as the presence of gross contamination and/or free product contained in drums that has been observed at multiple features that necessitate the need for action.

8.1 Low Soil Volume Estimate

Alternative 3: Onsite Ex Situ Incineration is the recommended alternative for the low soil volume estimate. This alternative is the most cost effective for the volume of soil requiring treatment, and would be effective no matter the concentrations of contaminants. However, there are two uncertainties that should be noted with this recommendation:

- First, the treatment rate was estimated at 100 to 150 tons per day. For the cost estimate, 140 tons per day was used, since it is assumed that the bulk of the material to be incinerated is sand (based on boring logs from around the drum features). If 140 tons per day cannot be achieved, then the schedule would need to extend to a second season, or a second treatment unit would have to be mobilized—both resulting in substantial increases in costs, which would make this comparable to the costs for Excavation and Offsite Disposal.
- Second, large volumes of fuel are required for incineration. It is currently estimated at 6.15 gallons of diesel per ton of treated soil (92,200 gallons per 15,000 tons), but could be higher depending on site conditions. While there are vendors that supply fuel to the area, barging is never certain in the Aleutian islands, meaning that large storage capacity would need to be mobilized. If more fuel than estimated is required, then the schedule would likely extend as noted above.

Alternative 4: Excavation and Offsite Disposal has more certainty in cost, but has uncertainty in availability of backfill material on-island. Additionally, CERCLA has a preference for treatment. While landfarming is another alternative, there is uncertainty in contaminant concentrations present which could lower effectiveness (increasing treatment time) and further increase the high cost per cy. Therefore, Onsite Ex Situ Incineration was chosen as the recommended alternative.

8.2 Middle Soil Volume Estimate

Alternative 5: Onsite Landfarming is the recommended alternative for the middle soil volume estimate. This alternative is the most cost effective for the large volume of soil requiring treatment, and would be effective for the likely overall concentrations of contaminants.

Both Onsite Ex Situ Incineration and Excavation and Offsite Disposal are resource-heavy approaches, which result in a higher cost per cy than Onsite Landfarming, as well as logistical issues that significantly reduce feasibility. Onsite Ex Situ Incineration requires very large amounts of fuel to treat contaminated material, and it is uncertain that the volumes of fuel required could be delivered to the site (especially if treatment requires more fuel than is currently estimated). Excavation and Offsite Disposal requires over 23,000 cy (34,500 tons) of backfill material; it is unlikely that this volume of material is readily available on Umnak Island.

8.3 High Soil Volume Estimate

Alternative 5: Onsite Landfarming is the recommended alternative for the high soil volume estimate. This alternative is the most cost effective for the large volume of soil requiring treatment, and would be effective for the likely overall concentrations of contaminants.

Both Onsite Ex Situ Incineration and Excavation and Offsite Disposal are resource-heavy approaches, which result in a higher cost per cy than Onsite Landfarming as well as logistical issues that significantly reduce feasibility. Onsite Ex Situ Incineration requires very large amounts of fuel to treat contaminated material, and it is uncertain that the volumes of fuel required could be delivered to the site (especially if treatment requires more fuel than is currently estimated). Excavation and Offsite Disposal requires over 26,000 cy (39,000 tons) of backfill material; it is unlikely that this volume of material is readily available on Umnak Island.

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FIGURES

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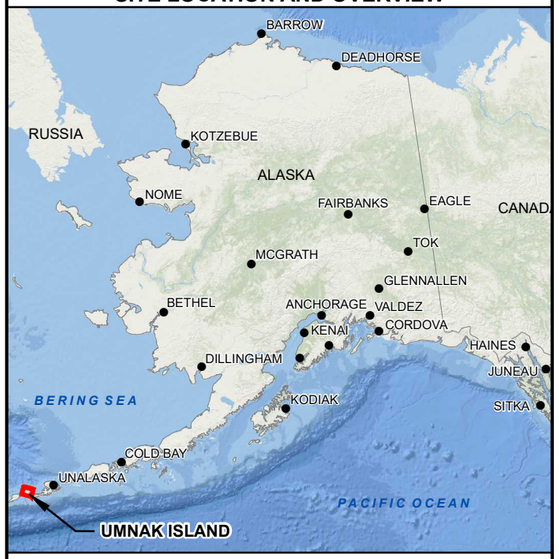
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

SITE LOCATION AND OVERVIEW



Legend

- Road Obstructions
- Barge Landing Site
- NGS Survey Monument
- Surveyed Roads (2017)
- Other Roads Observed
- State of Alaska Property Boundary
- St George Property Boundary
- TDX Sections

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
NGS	National Geodetic Survey
TDX	Tanadgusix Corporation
USFW	U.S. Fish and Wildlife Service

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery from Maxar (composite imagery collected 2014-2018, 50-centimeter resolution).
2. Historical information derived from Figure 8 Pacifier Airfield Area Features, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska*. June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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PROJECT No.:	DATE:	FIGURE:
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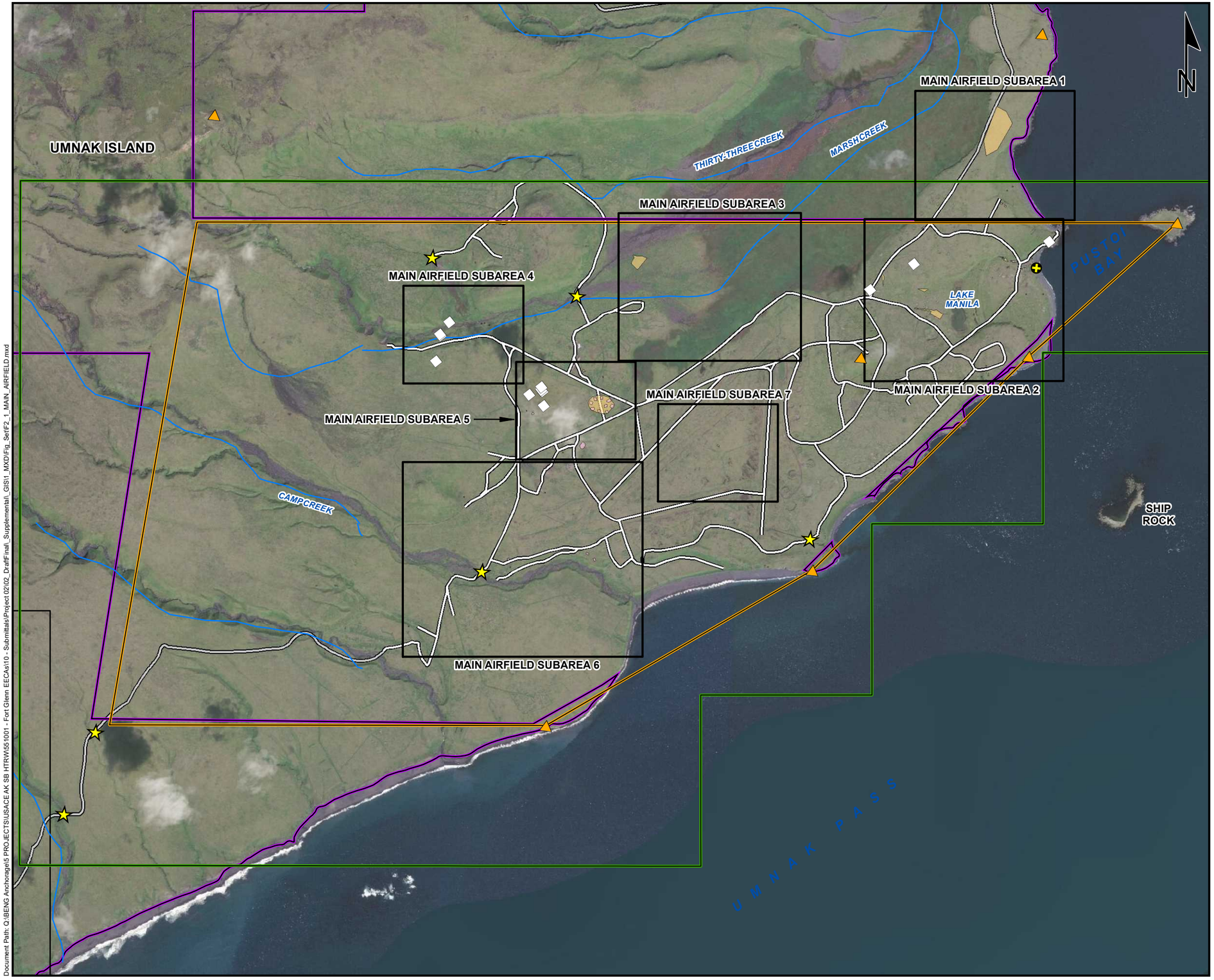
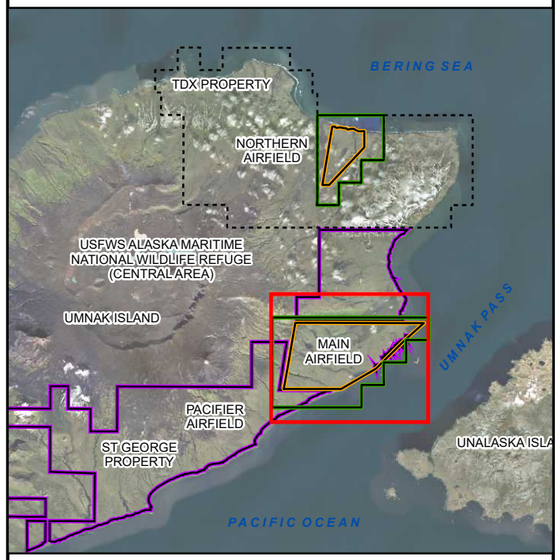
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD AREA FEATURES AND SUBAREA OVERVIEW





Legend

- Barge Landing Site
- Road Obstructions
- NGS Survey Monument
- Drum
- River/Stream
- Surveyed Roads (2017)
- Other Roads Observed
- Drum Area
- Drum Dump
- State of Alaska Property Boundary
- St George Property Boundary
- State of Alaska Sections
- TDX Sections

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
NGS	National Geodetic Survey
TDX	Tanadgusix Corporation
USFWS	U.S. Fish and Wildlife Service

Notes

1. For conceptual purposes only. All locations are approximate.
2. The River/Stream locations should be utilized for conceptual purposed only due to location inaccuracies. The River/Stream layer is the most accurate available for Umnak Island and was sourced from Alaska Department of Natural Resources.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, And Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

3,000 1,500 0 3,000 6,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-1
P.M.: E.D.	DRAWN: K.T.	

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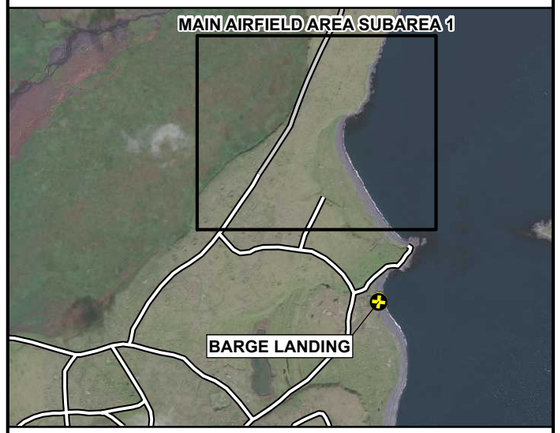
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD AREA SUBAREA 1 FEATURES



Legend

- Barge Landing Site
- Surveyed Roads (2017)
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Area

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

400 200 0 400 800 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-2
P.M.: E.D.	DRAWN: K.T.	

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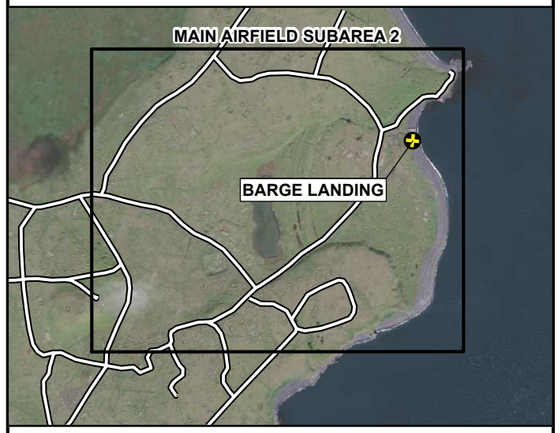
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 2 FEATURES



Legend

- Barge Landing Site
- NGS Survey Monument
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Dump
- Drum Area

Historical Sample Locations

- Soil Boring Field Screening/Analytical Sample Location
- Sediment Analytical Sample Location
- Surface Water Analytical Sample Location
- Surface Soil Field Screening Sample Location
- Surface Soil Analytical Sample Location

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
NGS	National Geodetic System
RBSL	Risk-Based Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

500 250 0 500 1,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-3
P.M.: E.D.	DRAWN: K.T.	

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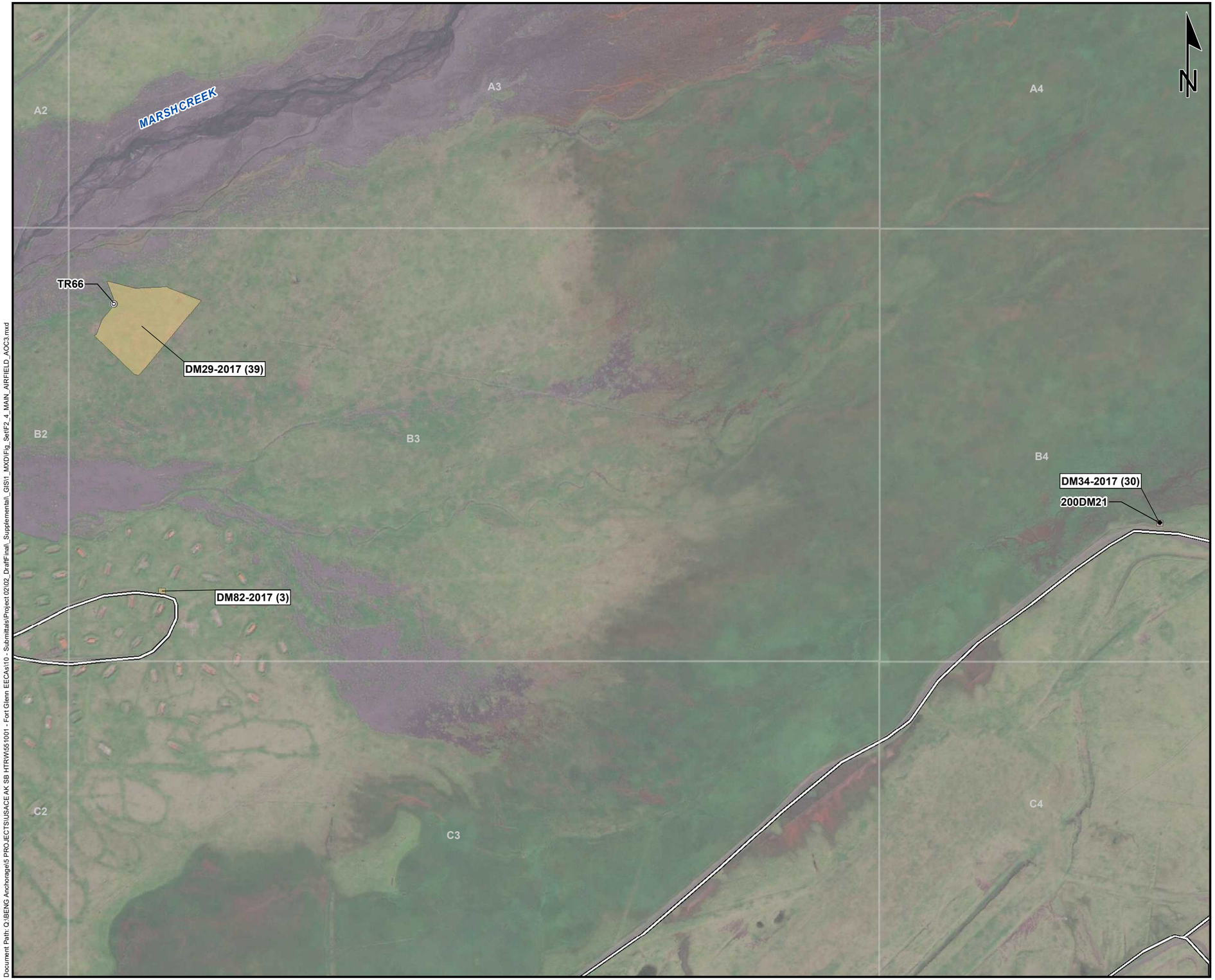
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 3 FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Dump
- Drum Area

Historical Sample Locations

- Surface Soil Field Screening Sample Location
- Surface Soil Analytical/Field Screening Sample Location

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

5,000 2,500 0 5,000 10,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-4
P.M.: E.D.	DRAWN: K.T.	

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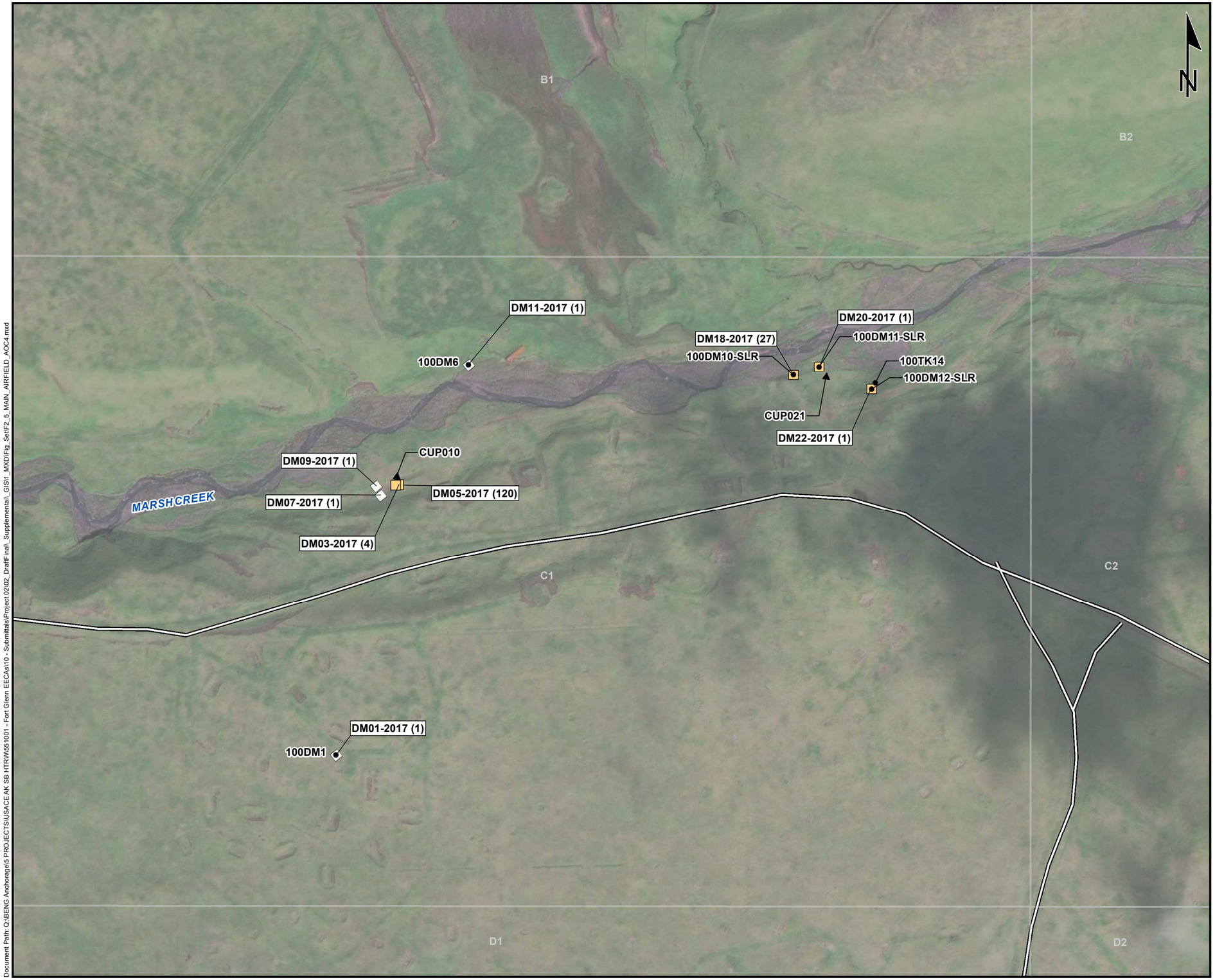
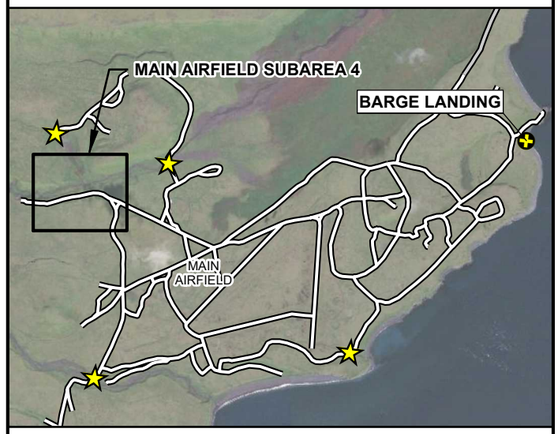
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 4 FEATURES





Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area

Historical Sample Locations

- Soil Boring Field Screening Sample Location
- Surface Soil Field Screening Sample Location

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/22/2021	2-5
P.M.: E.D.	DRAWN: K.T.	

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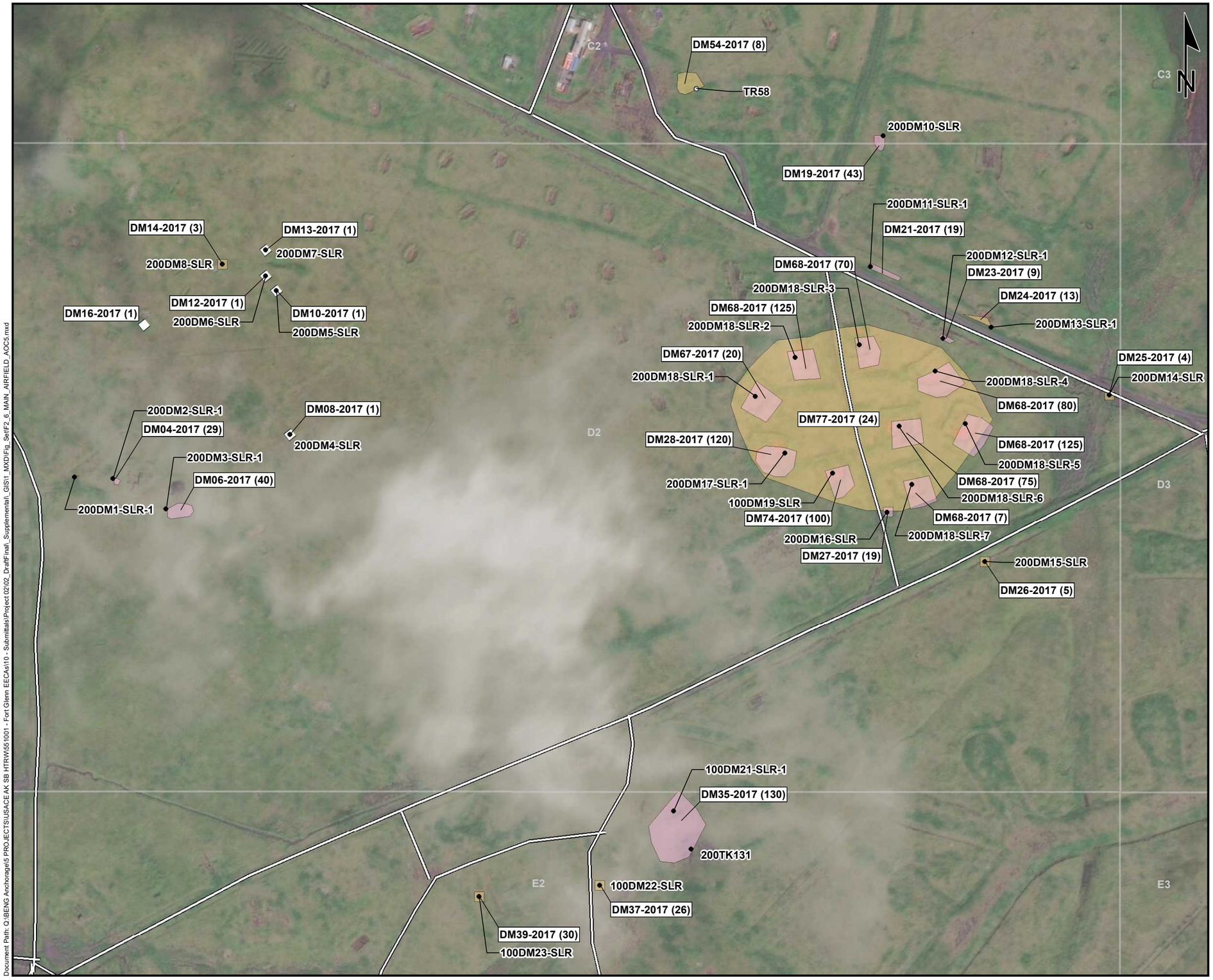
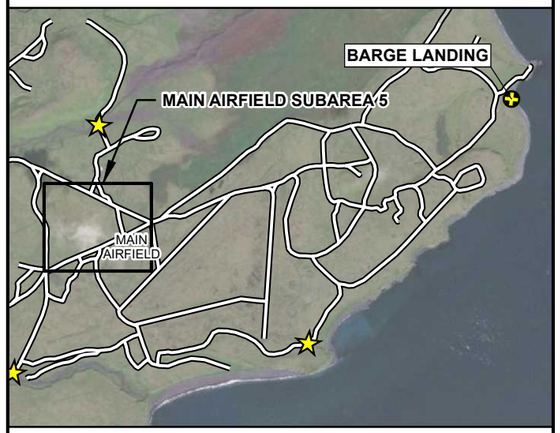
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 5 FEATURES





Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Dump
- Drum Area

Historical Sample Locations

- Surface Soil Field Screening Sample Location
- Surface Soil Analytical Sample Location

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-6
P.M.: E.D.	DRAWN: K.T.	

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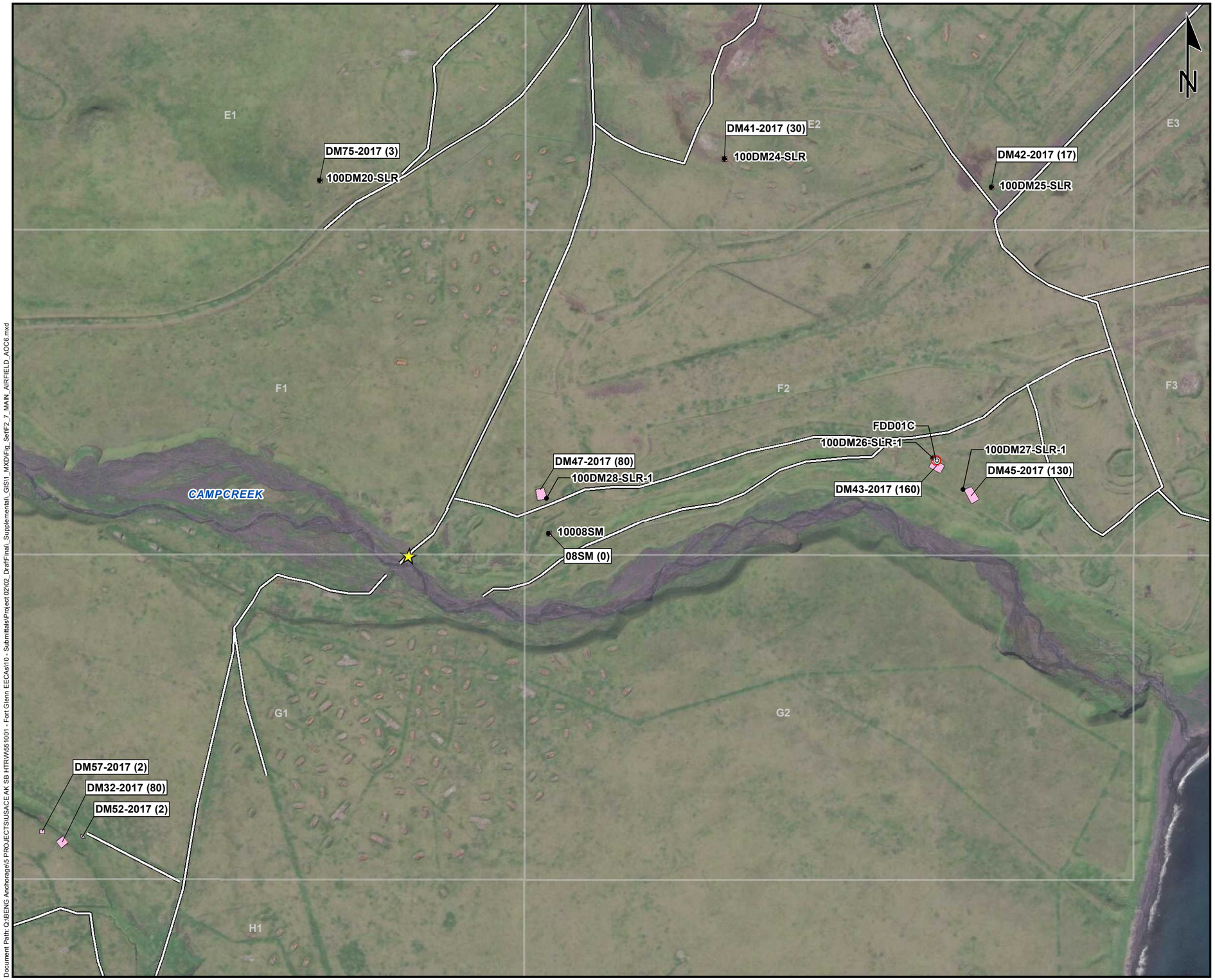
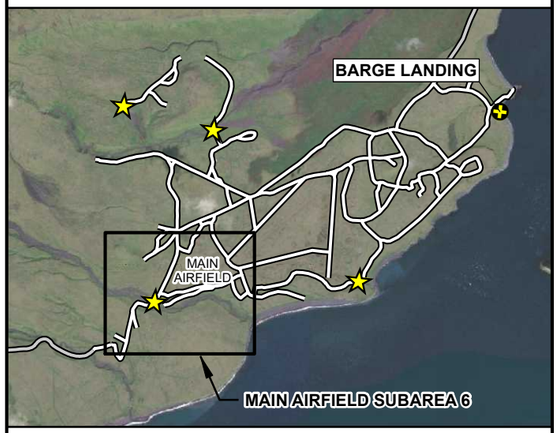


EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 6 FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum Dump DM32
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Dump
- Drum Area

Historical Sample Locations

- Surface Soil Field Screening Sample Location
- Surface Soil Analytical/Field Screening Sample Location

Historical Samples Exceeding RBSL/Field Screening Criteria

- Sediment/Surface Soil/Surface Water Exceeding RBSL/Field Screening Criteria

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
RBSL	Risk-Based Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

600 300 0 600 1,200 Feet

PROJECT No.: 551001	DATE: 3/15/2021	FIGURE:
P.M.: E.D.	DRAWN: K.T.	2-7

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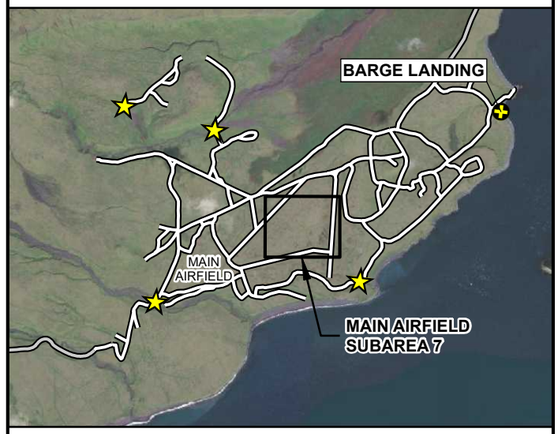
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASK02A

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 7 FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-8
P.M.: E.D.	DRAWN: K.T.	

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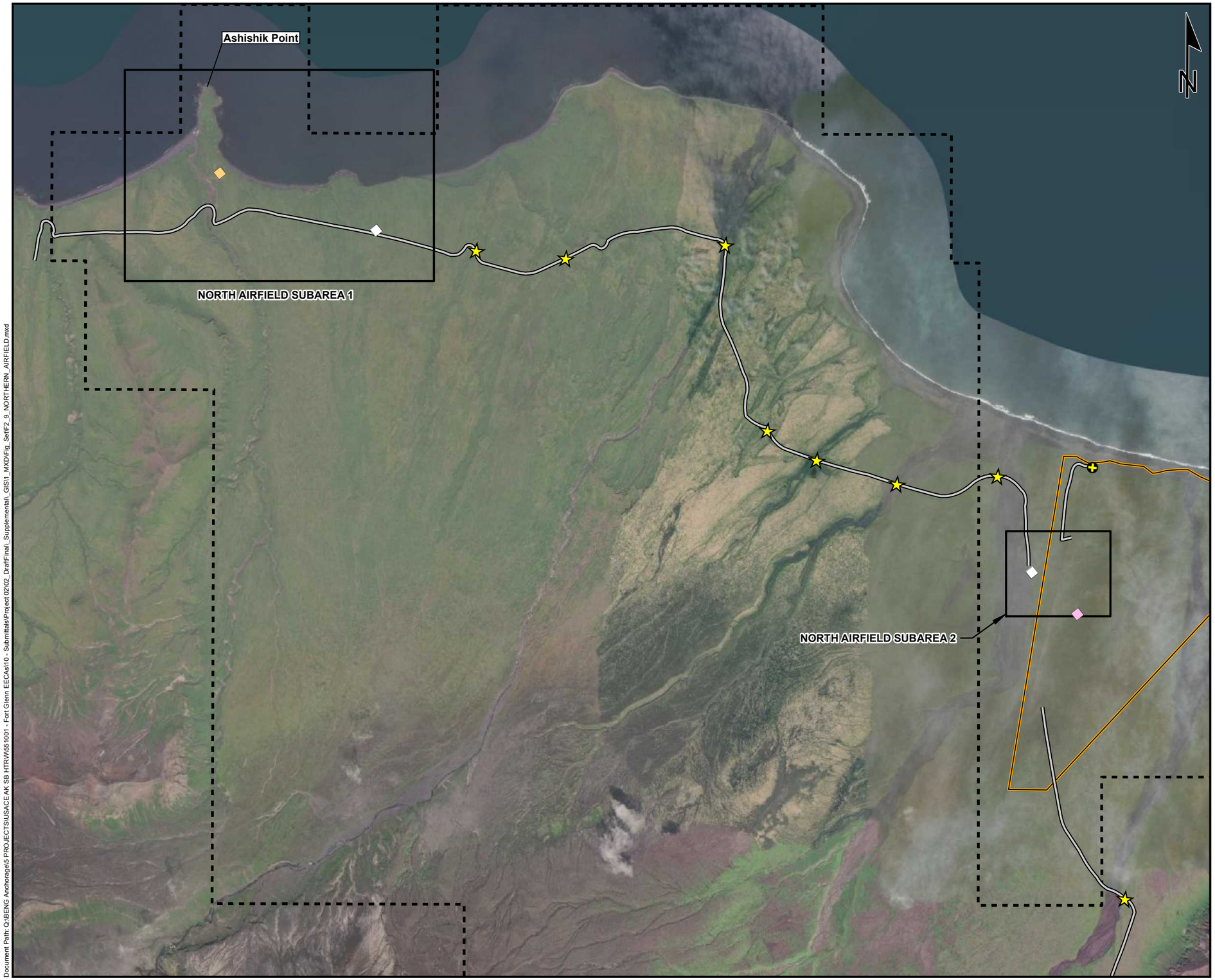
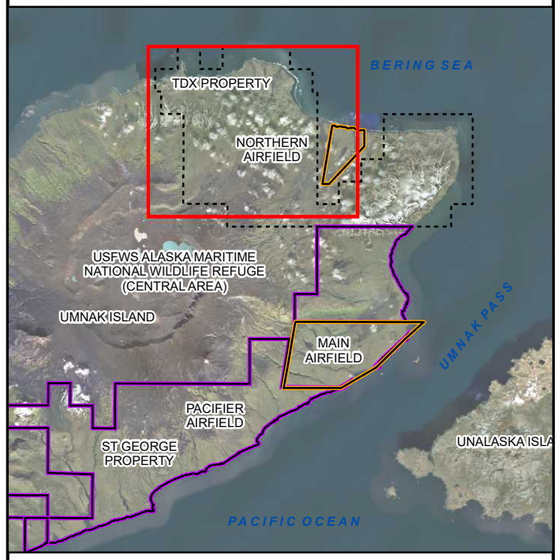
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, NORTHERN AIRFIELD SUBAREA OVERVIEW AND SITE FEATURES





Legend
- Barge Landing Site
- Road Obstructions
- Drum
- Drum Area
- Drum Dump
- Other Roads Observed
- Drum Area
- Drum Dump
- State of Alaska Property Boundary
- St George Propery Boundary
- TDX Sections

Abbreviations
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
TDX	Tanadgusix Corporation
USFWS	U.S. Fish and Wildlife Service

Notes
1. For conceptual purposes only. All locations are approximate.

References
1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska*. June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

4,000 2,000 0 4,000 8,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/15/2021	2-9
P.M.: E.D.	DRAWN: K.T.	

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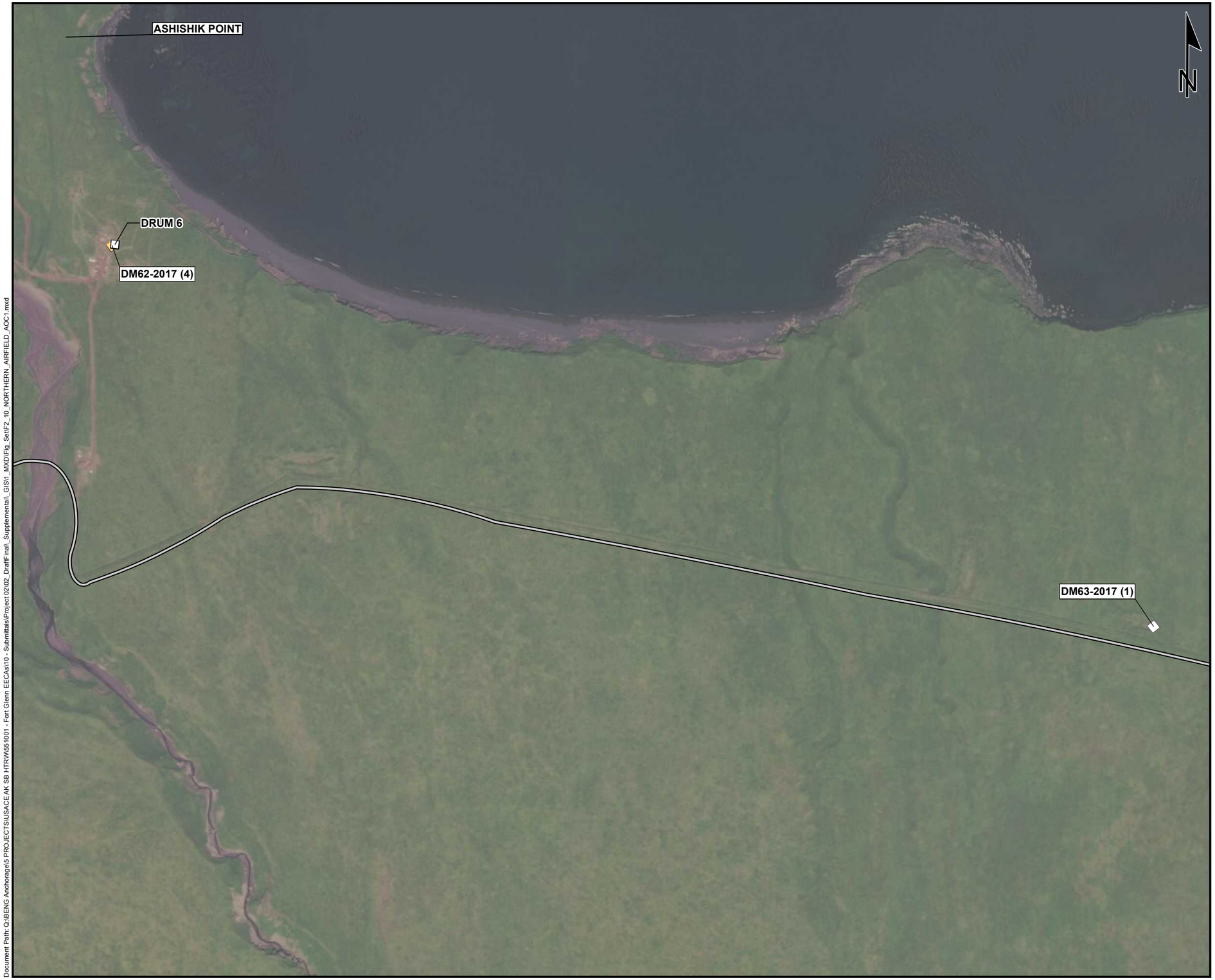
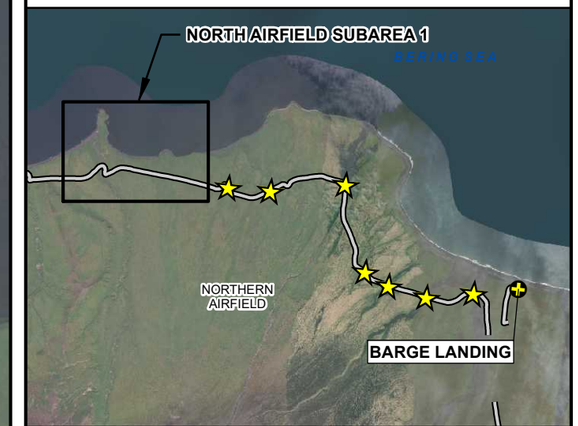


EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, NORTHERN AIRFIELD SUBAREA 1 FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum Area
- Drum
- Other Roads Observed

Historical Sample Locations

- Drum Location Surface Soil Screening Sample Location (Brice 2020)

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

600 300 0 600 1,200 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-10
P.M.: E.D.	DRAWN: K.T.	

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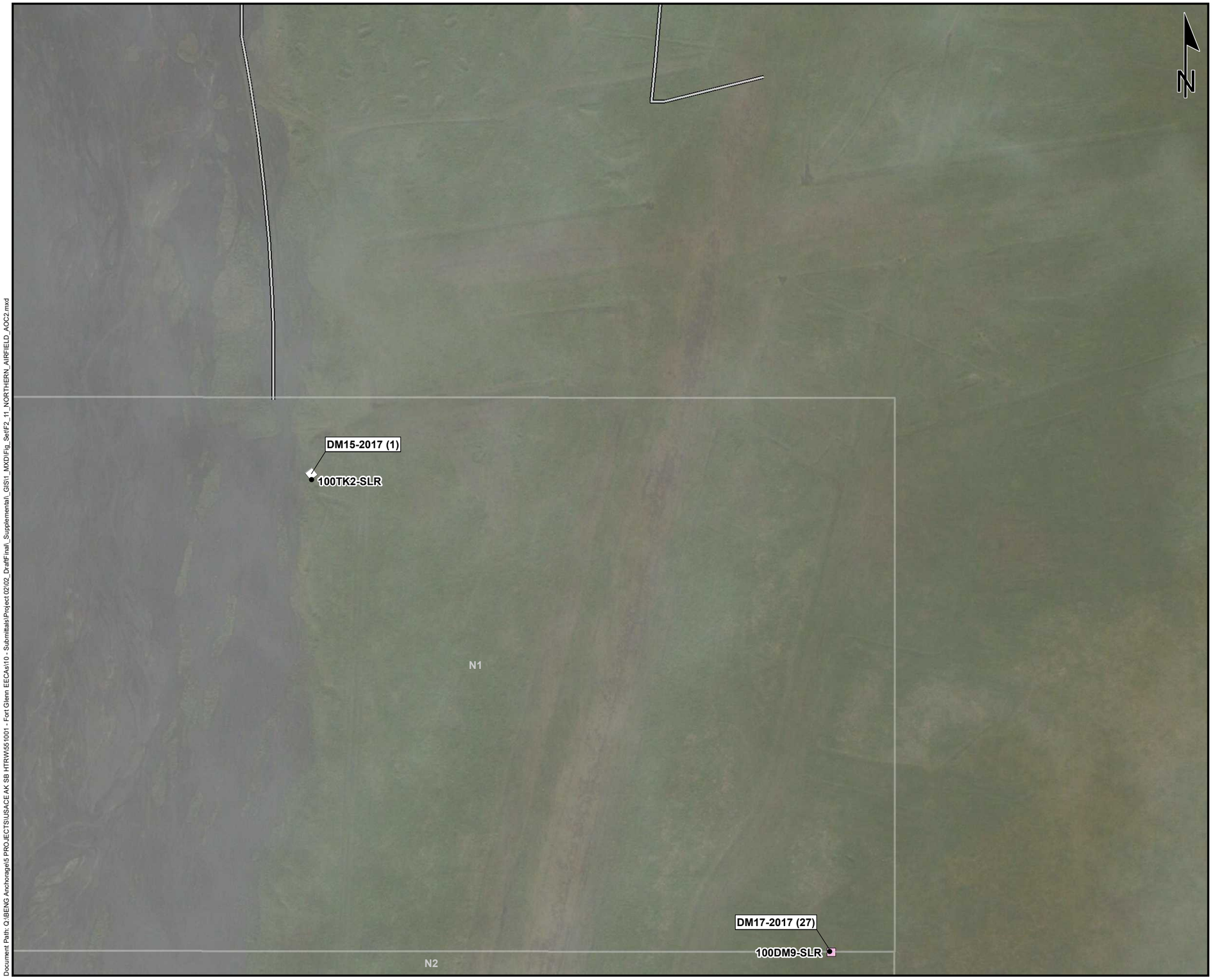
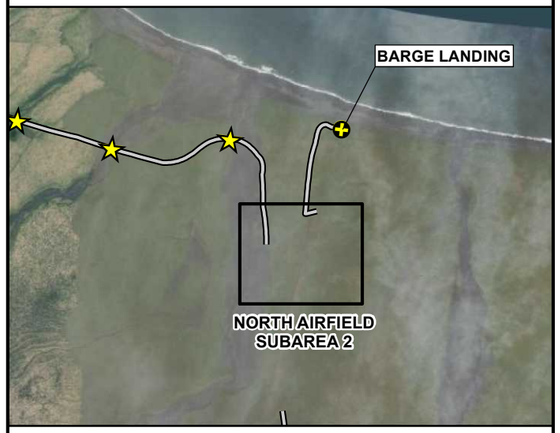
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, NORTHERN AIRFIELD SUBAREA 2 FEATURES





Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Dump

Historical Sample Locations

- Surface Soil Field Screening Sample Location

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

350 175 0 350 700 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-11
P.M.: E.D.	DRAWN: K.T.	

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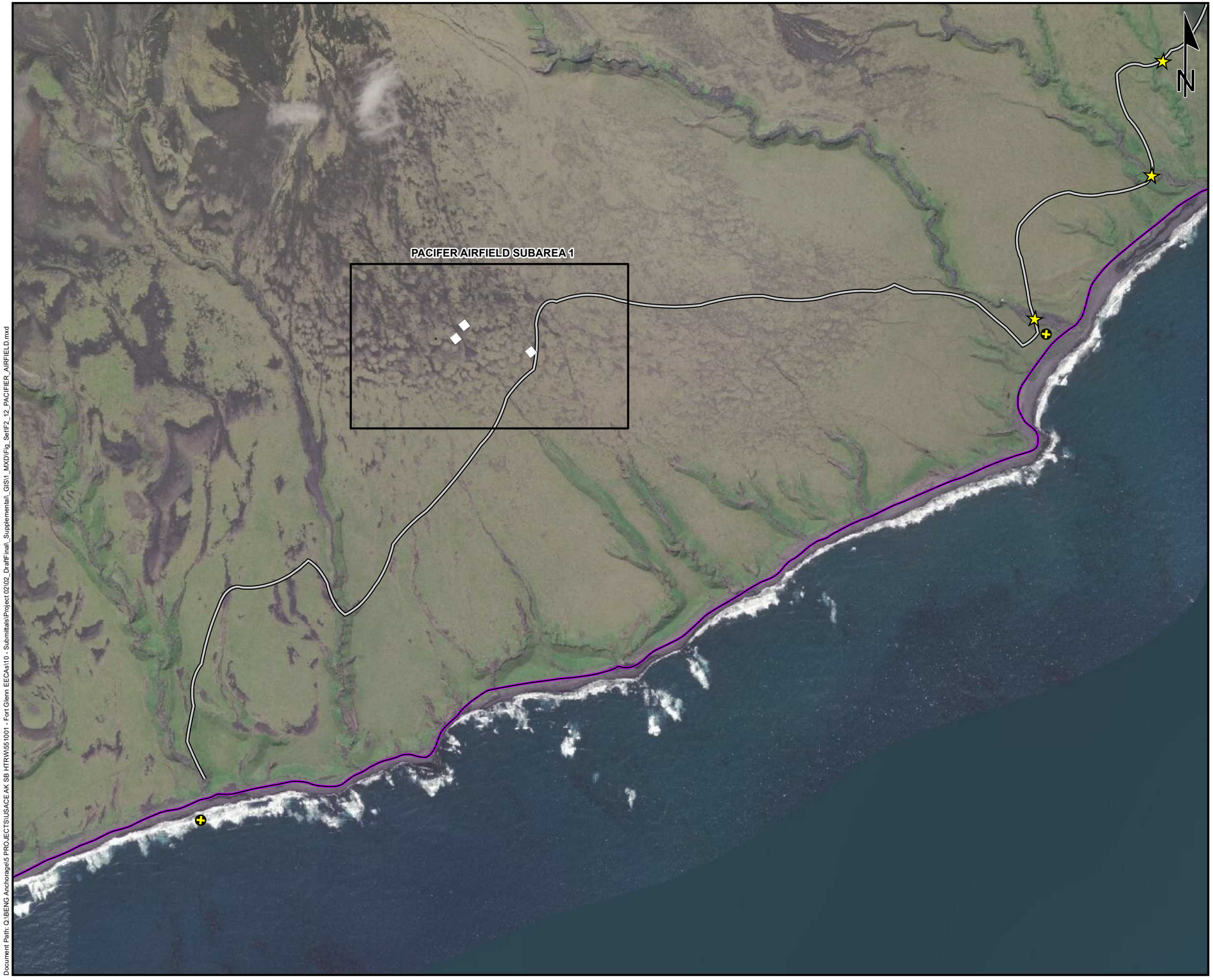
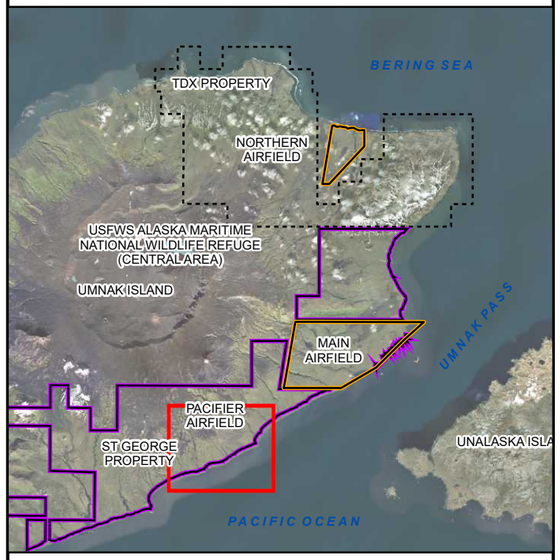
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, PACIFIER AIRFIELD SUBAREA OVERVIEW AND SITE FEATURES





Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Other Roads Observed
- Drum Area
- State of Alaska Property Boundary
- St George Property Boundary
- TDX Sections

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
TDX	Tanadgusix Corporation
USFWS	U.S. Fish and Wildlife Service

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

2,000 1,000 0 2,000 4,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-12
P.M.: E.D.	DRAWN: K.T.	

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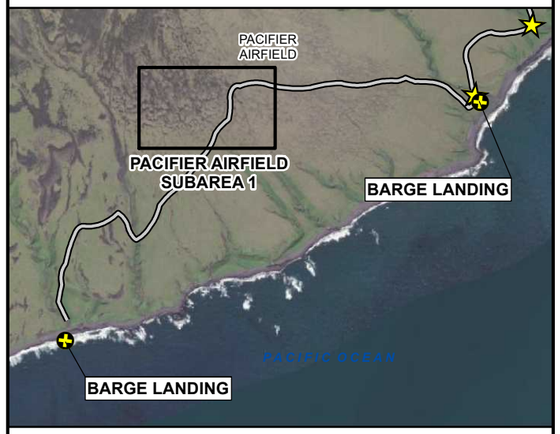
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, PACIFIER AIRFIELD SUBAREA 1 FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Area

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of 55-gallon drums found in parentheses of label for Drums, Drum Area, and Drum Dump.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

250 125 0 250 500 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	2-13
P.M.: E.D.	DRAWN: K.T.	

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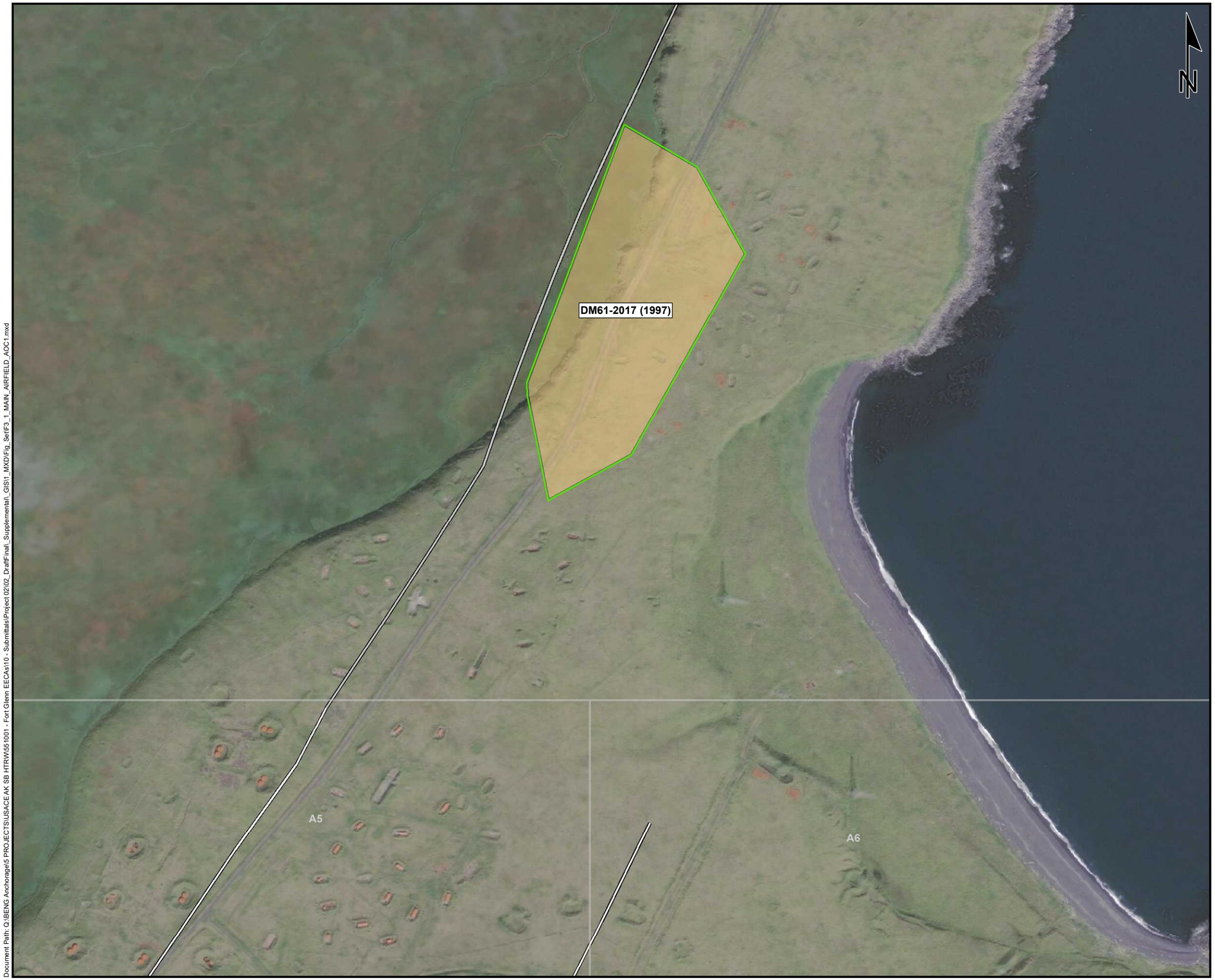
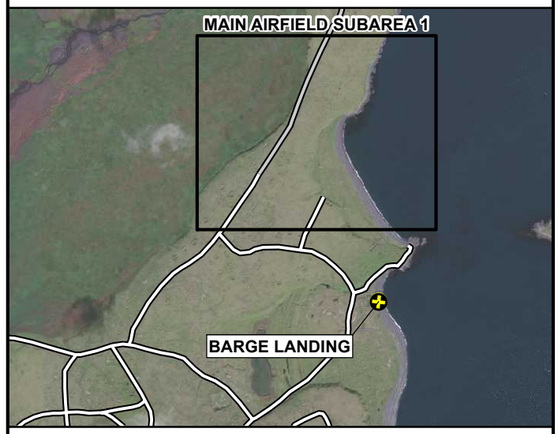


EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 1 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Surveyed Roads (2017)
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Area

Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
3. Low estimate of contaminated soil volume includes features with evidence of gross contamination. This includes qualitative and screening evidence of contamination, as well as sample results greater than applicable RBSLs present. The low estimate for removal scope purposes is the low estimate of contaminated soil volume.
4. Middle estimate of contaminated soil volume is the low volume estimate plus additional features with screening above background, and all drum dumps not included in the low volume estimate. The middle estimate for removal scope purposes is the combined quantity of low and middle estimates of contaminated soil volume.
5. High estimate of contaminated soil volume assumes that all locations with previously documented Project 02 features will require remediation of contaminated soil. The high estimate for removal scope purposes is the combined quantity of low, middle, and high estimates of contaminated soil volume.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

400 200 0 400 800 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/15/2021	3-1
P.M.: E.D.	DRAWN: K.T.	

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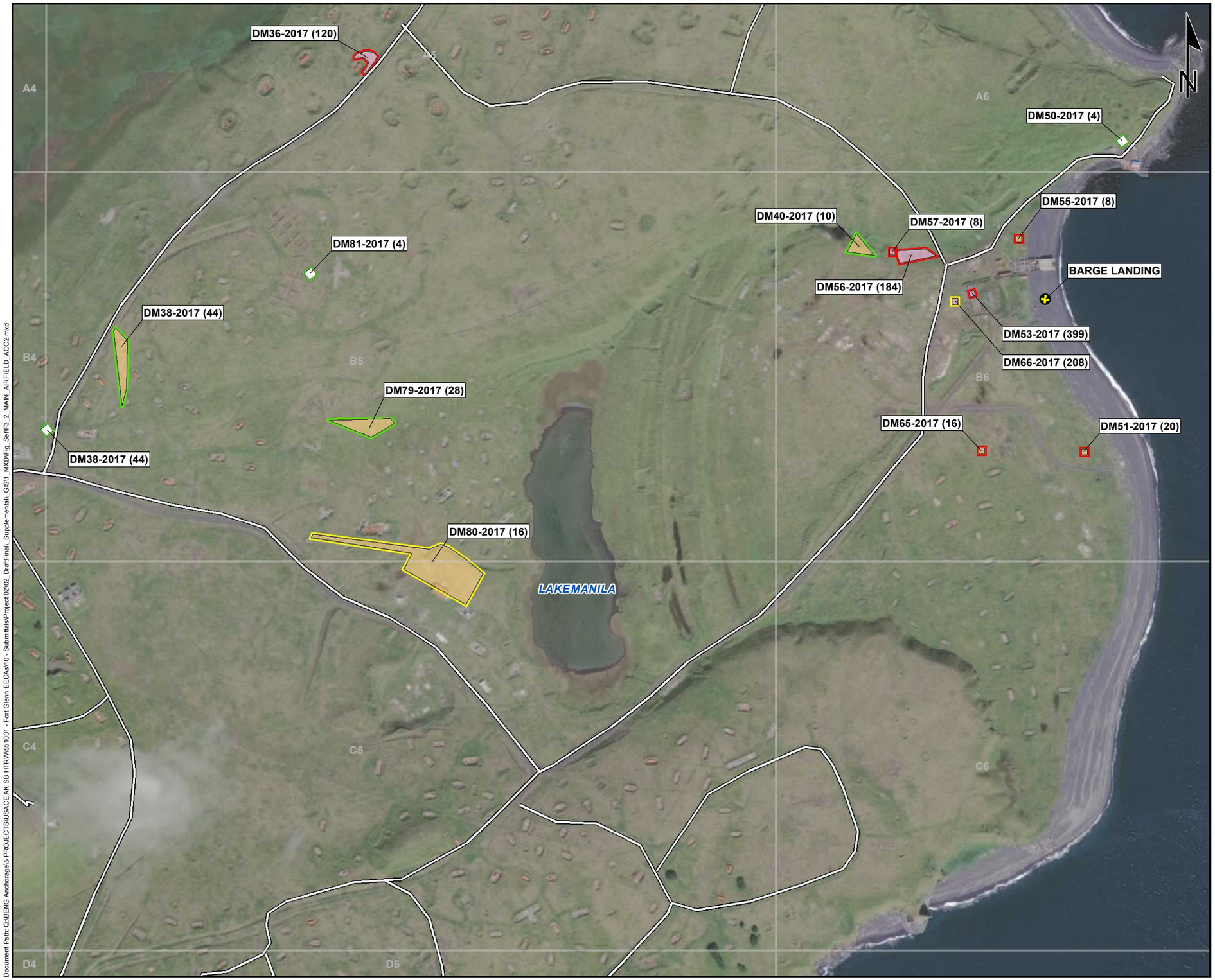
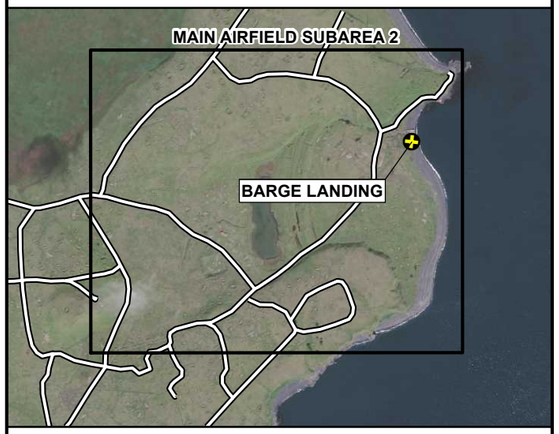


EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 2 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area
- Drum Dump

Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
3. Low estimate of contaminated soil volume includes features with evidence of gross contamination. This includes qualitative and screening evidence of contamination, as well as sample results greater than applicable EPA RSLs present. The low estimate for removal scope purposes is the low estimate of contaminated soil volume.
4. Middle estimate of contaminated soil volume is the low volume estimate plus additional features with screening above background, and all drum dumps not included in the low volume estimate. The middle estimate for removal scope purposes is the combined quantity of low and middle estimates of contaminated soil volume.
5. High estimate of contaminated soil volume assumes that all locations with previously documented Project 02 features will require remediation of contaminated soil. The high estimate for removal scope purposes is the combined quantity of low, middle, and high estimates of contaminated soil volume.

References

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2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

500 250 0 500 1,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-2
P.M.: E.D.	DRAWN: K.T.	

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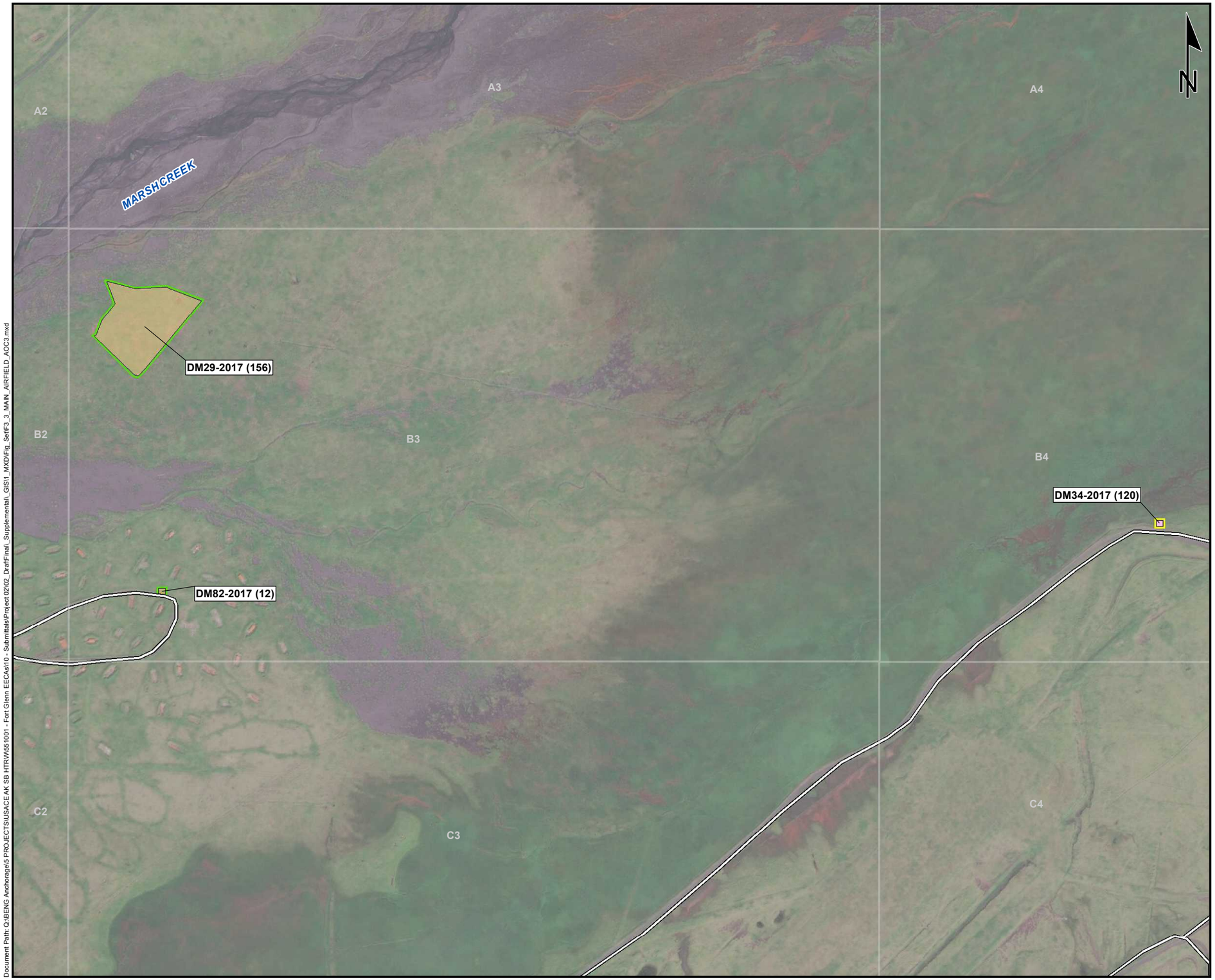

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 3 SOIL VOLUME ESTIMATE FEATURES

Legend
- Barge Landing Site
- Road Obstructions
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area
- Drum Dump

Estimate of Contaminated Soil Volume to be Excavated
- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes
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2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

450 225 0 450 900 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-3
P.M.: E.D.	DRAWN: K.T.	

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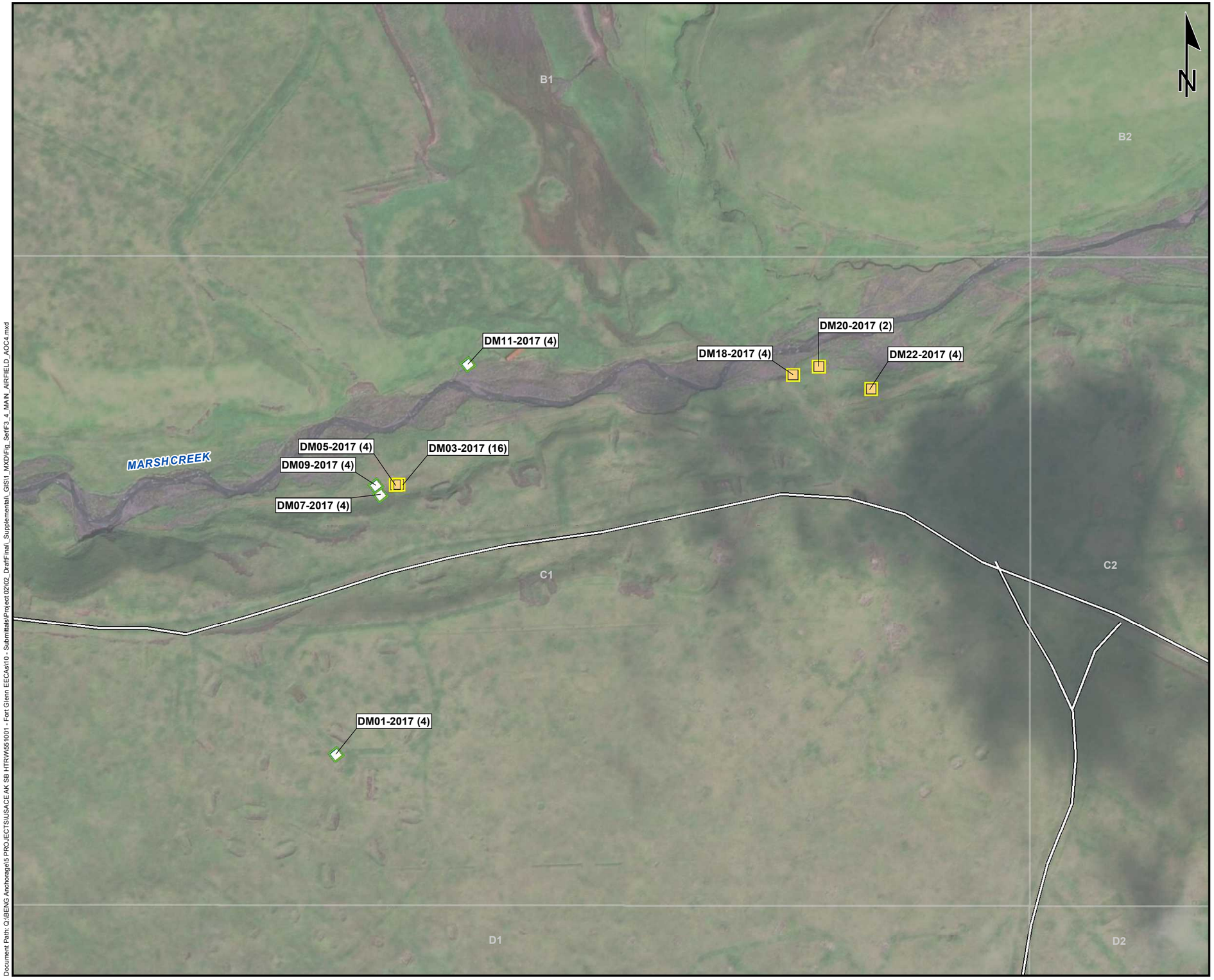
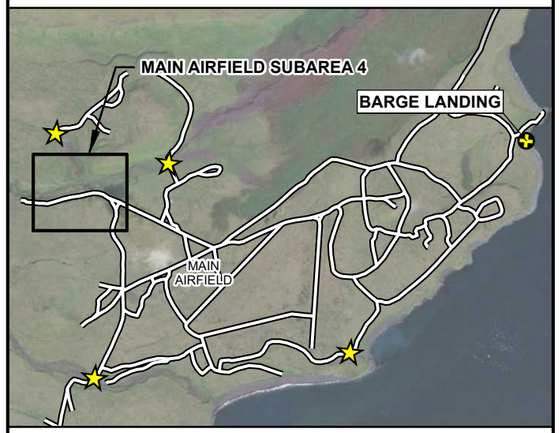
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 4 SOIL VOLUME ESTIMATE FEATURES





Legend
- Barge Landing Site
- Road Obstructions
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area

Estimate of Contaminated Soil Volume to be Excavated
- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes
1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
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ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-4
P.M.: E.D.	DRAWN: K.T.	

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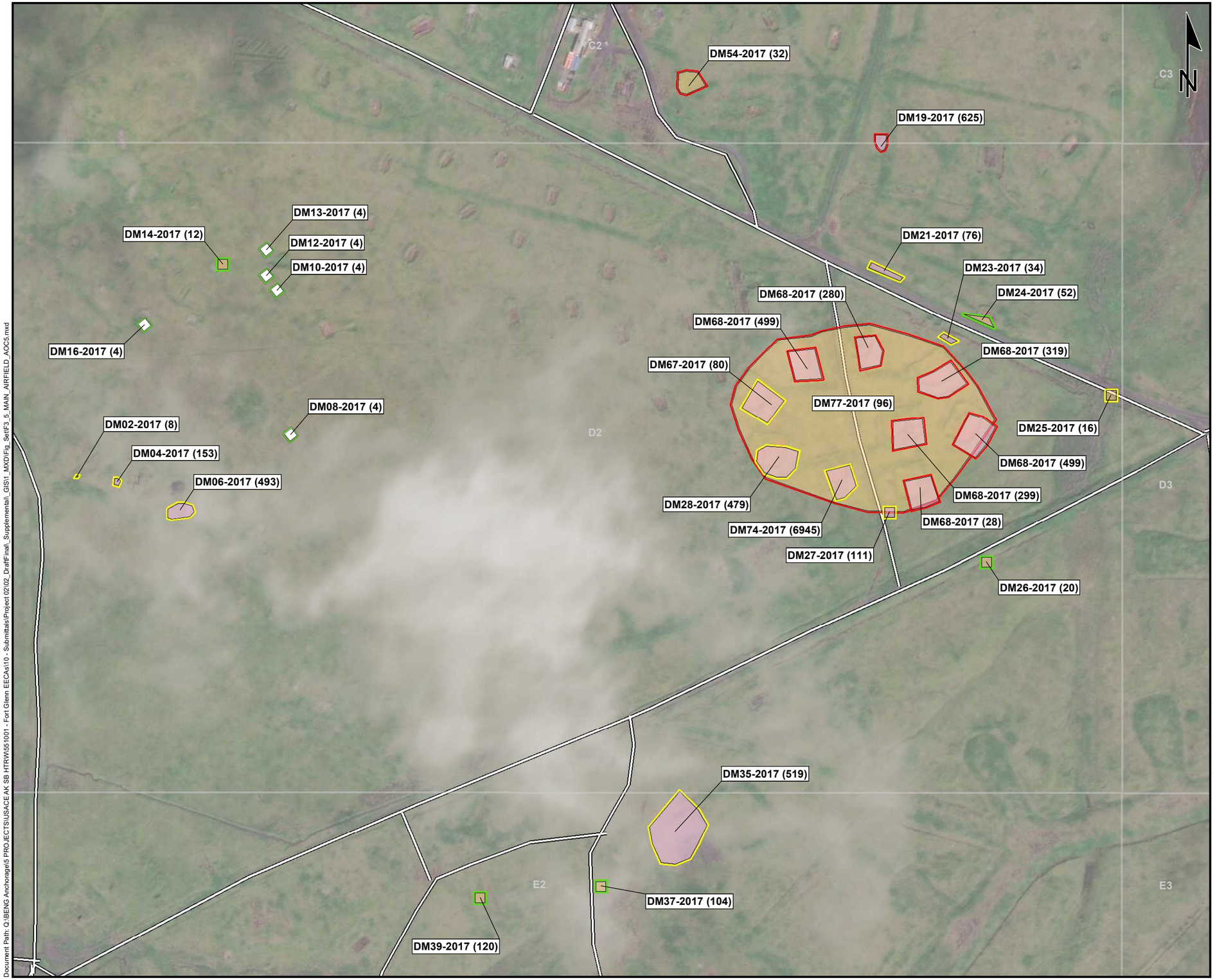
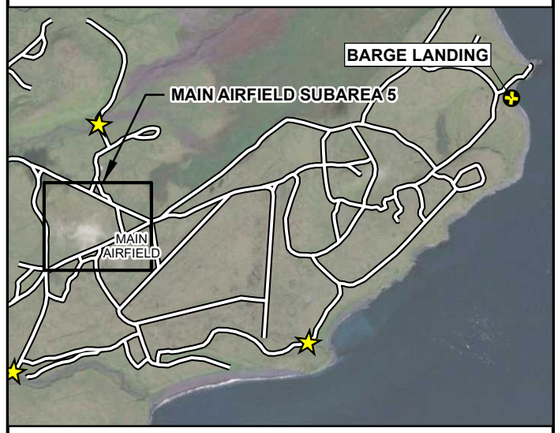
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 5 SOIL VOLUME ESTIMATE FEATURES





Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area
- Drum Dump

Estimate of Contaminated Soil Volume to be Excavated

- Low Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- High Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

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References

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2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-5
P.M.: E.D.	DRAWN: K.T.	

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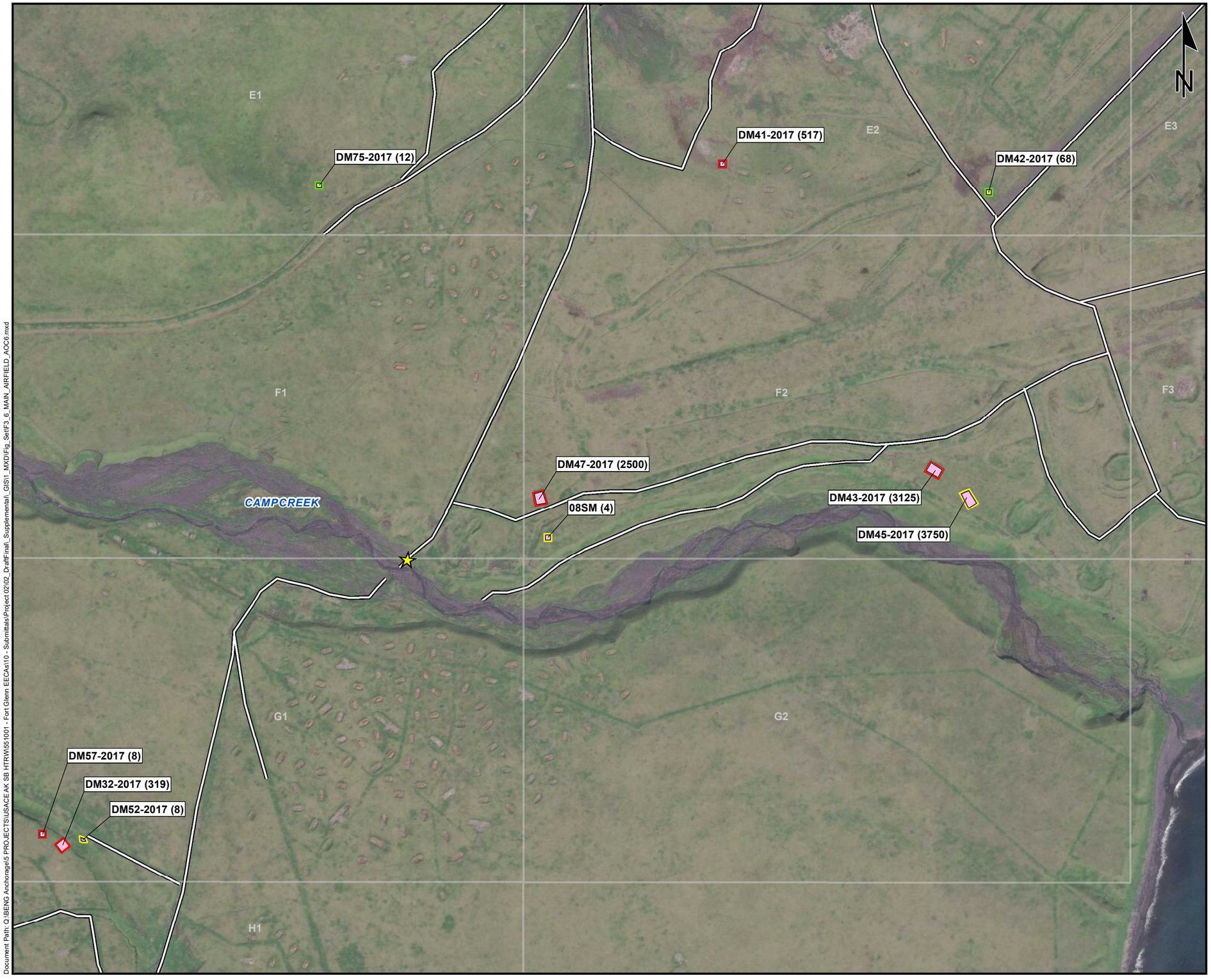

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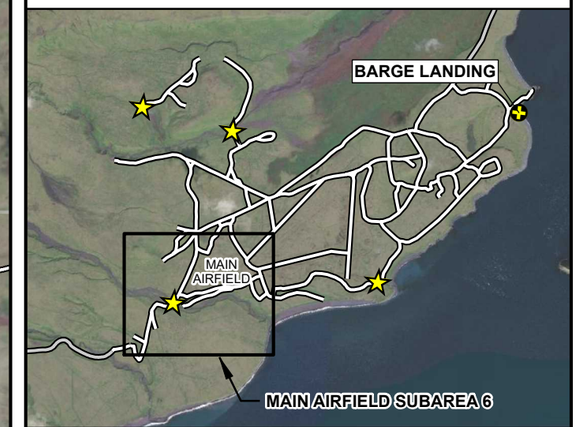
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 6 SOIL VOLUME ESTIMATE FEATURES



Legend
- Barge Landing Site
- Road Obstructions
- Drum Dump DM32
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area
- Drum Dump

Estimate of Contaminated Soil Volume to be Excavated
- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes
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2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

600 300 0 600 1,200 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/15/2021	3-6
P.M.: E.D.	DRAWN: K.T.	

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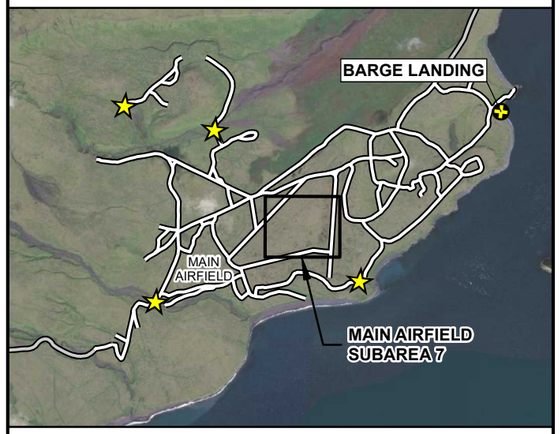
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, MAIN AIRFIELD SUBAREA 7 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Surveyed Roads (2017)
- Subarea Map Index (USACE 2018)
- Drum Area

Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

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ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

300 150 0 300 600 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/15/2021	3-7
P.M.: E.D.	DRAWN: K.T.	

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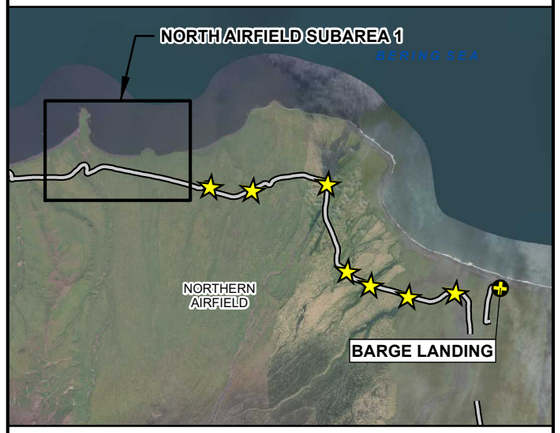
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, NORTHERN AIRFIELD SUBAREA 1 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum Area
- Drum
- Other Roads Observed

Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
3. Low estimate of contaminated soil volume includes features with evidence of gross contamination. This includes qualitative and screening evidence of contamination, as well as sample results greater than applicable EPA RSLs present. The low estimate for removal scope purposes is the low estimate of contaminated soil volume.
4. Middle estimate of contaminated soil volume is the low volume estimate plus additional features with screening above background, and all drum dumps not included in the low volume estimate. The middle estimate for removal scope purposes is the combined quantity of low and middle estimates of contaminated soil volume.
5. High estimate of contaminated soil volume assumes that all locations with previously documented Project 02 features will require remediation of contaminated soil. The high estimate for removal scope purposes is the combined quantity of low, middle, and high estimates of contaminated soil volume.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

600 300 0 600 1,200 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/15/2021	3-8
P.M.: E.D.	DRAWN: K.T.	

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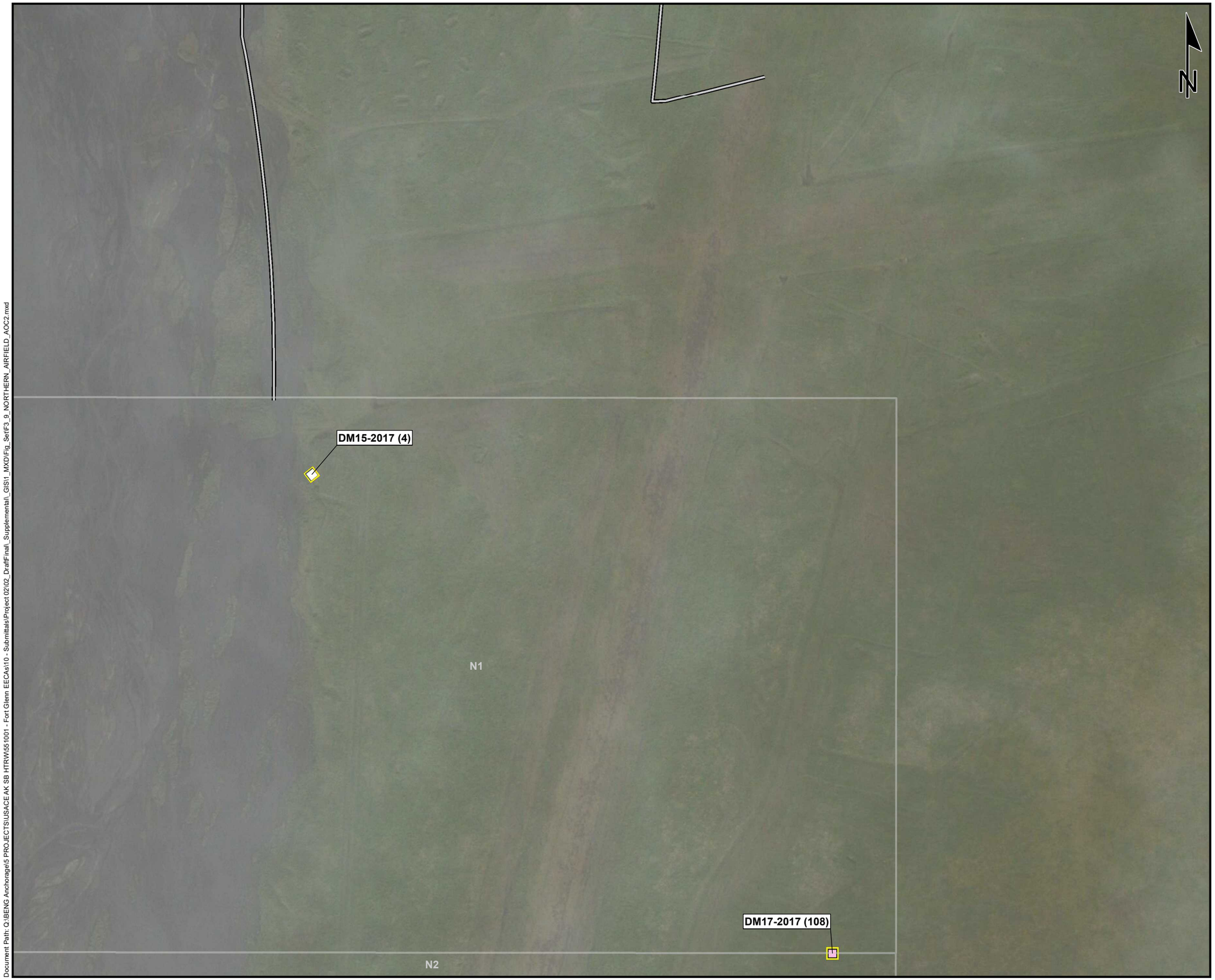
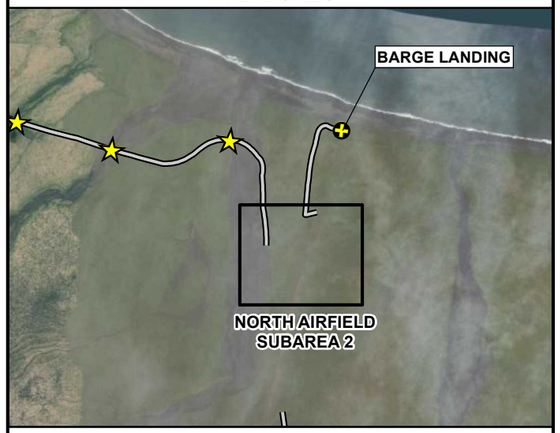
1 INCH



EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/CON/HTRW PROJECT 02, NORTHERN AIRFIELD SUBAREA 2 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Dump

Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
3. Low estimate of contaminated soil volume includes features with evidence of gross contamination. This includes qualitative and screening evidence of contamination, as well as sample results greater than applicable EPA RSLs present. The low estimate for removal scope purposes is the low estimate of contaminated soil volume.
4. Middle estimate of contaminated soil volume is the low volume estimate plus additional features with screening above background, and all drum dumps not included in the low volume estimate. The middle estimate for removal scope purposes is the combined quantity of low and middle estimates of contaminated soil volume.
5. High estimate of contaminated soil volume assumes that all locations with previously documented Project 02 features will require remediation of contaminated soil. The high estimate for removal scope purposes is the combined quantity of low, middle, and high estimates of contaminated soil volume.

References

1. Imagery from Maxar (composite imagery collected 8/29/2018, 50-centimeter Resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

350 175 0 350 700 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-9
P.M.: E.D.	DRAWN: K.T.	

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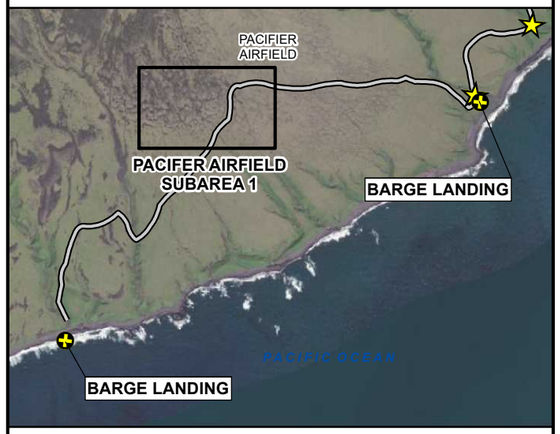
EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

CON/HTRW PROJECT 02, PACIFIER AIRFIELD SUBAREA 1 SOIL VOLUME ESTIMATE FEATURES



Legend

- Barge Landing Site
- Road Obstructions
- Drum
- Other Roads Observed
- Subarea Map Index (USACE 2018)
- Drum Area

High Estimate of Contaminated Soil Volume to be Excavated

- High Soil Volume Estimate Features
- Middle Soil Volume Estimate Features
- Low Soil Volume Estimate Features

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
EPA RSL	U.S. Environmental Protection Agency Regional Screening Level

Notes

1. For conceptual purposes only. All locations are approximate.
2. Quantity of material in cubic yards proposed to be removed found in parentheses of label for Drums, Drum Area, and Drum Dump.
3. Low estimate of contaminated soil volume includes features with evidence of gross contamination. This includes qualitative and screening evidence of contamination, as well as sample results greater than applicable EPA RSLs present. The low estimate for removal scope purposes is the low estimate of contaminated soil volume.
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5. High estimate of contaminated soil volume assumes that all locations with previously documented Project 02 features will require remediation of contaminated soil. The high estimate for removal scope purposes is the combined quantity of low, middle, and high estimates of contaminated soil volume.

References

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2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

250 125 0 250 500 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	3-10
P.M.: E.D.	DRAWN: K.T.	

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1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

AHRS SITES OF THE MAIN AND PACIFIER AIRFIELDS

Legend

- Prehistoric Archaeological
- Drum
- Drum Area
- Surveyed Roads (2017)
- Other Roads Observed
- Drum Dump
- Drum Area
- Ft. Glenn National Historic Landmark

Abbreviations

AHRS	Alaska Heritage Resources Survey
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery from Maxar (composite imagery collected 2014-2018, 50-centimeter resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.
3. AHRS locations provided by Alaska Department of Natural Resources - Office of History and Archaeology.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

4,000 2,000 0 4,000 8,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	4-1
P.M.: E.D.	DRAWN: K.T.	

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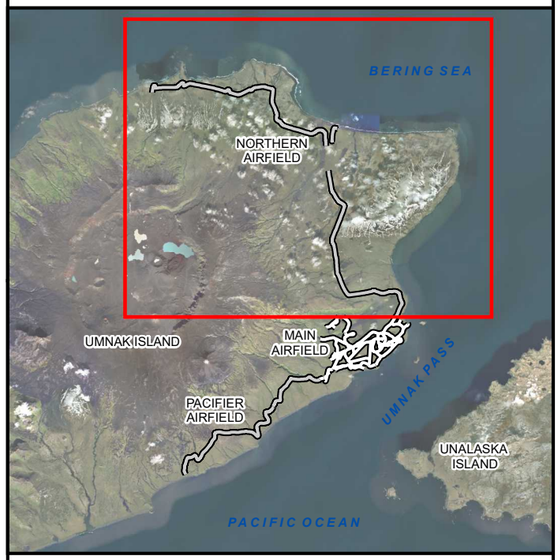
1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

AHRS SITES OF THE NORTHERN AIRFIELD



Legend

- Prehistoric Archaeological Site
- Drum
- Drum Area
- Surveyed Roads (2017)
- Other Roads Observed
- Drum Area
- Drum Dump

Abbreviations

AHRS	Alaska Heritage Resources Survey
CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery from Maxar (composite imagery collected 2014-2018, 50-centimeter resolution).
2. Historical information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, and Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.
3. AHRS locations provided by Alaska Department of Natural Resources - Office of History and Archaeology.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

7,000 3,500 0 7,000 14,000 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	4-2
P.M.: E.D.	DRAWN: K.T.	

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1 INCH

EE/CA REPORT
FORT GLENN FUDS - F10AK029802
UMNAK ISLAND, ALASKA

UNL-00145 SITE MAP

Legend

- Barge Landing Site
- WWII-era Surface Depression
- WWII-era Fuel Tank Bunkers
- Midden Deposit Exposure
- Unangan Surface Depression
- Unangan Surface Depression with exposed Whalebone
- Drum
- WWII era Road
- Drum Area
- Drum Dump
- Archaeological Site Boundary UNL-00145

Abbreviations

CON/HTRW	Containerized/Hazardous, Toxic, and Radioactive Waste
FUDS	Formerly Used Defense Site
TDX	Tanadgusix Corporation
WWII	World War II

Notes

1. For conceptual purposes only. All locations are approximate.
2. Surface features and the WWII-era road locations are based on aerial imagery and Stephen R. Braund & Associate's 2017 cursory surface investigation and should not be interpreted as an exhaustive survey of the site.
3. Archaeological Site Boundary estimated based on Stephen R. Braund & Associate's 2017 pedestrian survey, surface artifacts, terrain, and observable surface features. No subsurface site delineation was undertaken.

References

1. Imagery from Maxar (composite imagery collected 9/8/2018, 50-centimeter resolution).
2. Historical information georeferenced from Appendix B - SRB&A Site Forms UNL-00145 Site Map. Cultural Resource Survey Report of 2017 Fort Glenn CON/HTRW Site Reconnaissance Formerly Used Defense Site – F10AK0298- *Umnak Island, Alaska.* June 12, 2018.
3. Historical drum information derived from Figure 3 Main Airfield Area Drum Storage Locations and 2A Site-Wide Road Survey, Helicopter Routes, And Barge Landings, *Site Reconnaissance Fort Glenn CON/HTRW (Multiple Projects) Formerly Used Defense Sites - F10AK0298 - Umnak Island, Alaska.* June 2018.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

180 90 0 180 360 Feet

PROJECT No.:	DATE:	FIGURE:
551001	3/24/2021	4-3
P.M.: E.D.	DRAWN: K.T.	

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APPENDIX A
PROJECT 02 ANALYTICAL DATA

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APPENDIX A SAMPLE SUMMARY TABLE
Fort Glenn - Historical Samples within 25' of Drum Features

									Analyses	AK101	AK102	AK102/103	AK103	D808	E160.3M	E200.8	SM2540G	SW1020A	SW6010B	SW6020A	SW7471A	SW7471B	SW8021B	SW8081A	SW8082	SW8082A	SW8260B	SW8270CSIM	SW8270DSIM
Sample ID	**Location**	**Collect Date**	**Matrix**	**QC Type**	**Start Depth**	**End Depth**	**Unit**	**SDG**	**Lab**																				
JE01FDC02AWS-01	FDC02A	7/23/01 9:50 AM	Surface Water	Primary	--	--	--	1014722	CTE Anchorage, AK		X		X														X	X	
JE01FDC02BSE-01	FDC02B	7/23/01 10:10 AM	Sediment	Primary	--	--	--	K2105349	CAS, Kelso, WA		X		X		X								X					X	
JE01DAT54A-10.0-12SO-01	DAT54A	7/31/01 12:20 PM	Soil	Primary	10	12	feet	K2105557	CAS, Kelso, WA	X	X		X		X	X					X		X					X	
JE01DAT54A-15.0-17SO-01	DAT54A	7/31/01 12:35 PM	Soil	Primary	15	17	feet	K2105557	CAS, Kelso, WA	X	X		X		X	X					X								
JE01DAT59A-11.0-13SO-01	DAT59A	7/31/01 10:35 AM	Soil	Primary	11	13	feet	K2105557	CAS, Kelso, WA	X	X		X		X	X					X								
JE01DAT59A-8.0-10.0SO-01	DAT59A	7/31/01 10:20 AM	Soil	Primary	8	10	feet	K2105557	CAS, Kelso, WA	X	X		X		X	X					X								
JE01FDD01A0-0.5SO-01	FDD01A	8/4/01 9:20 AM	Soil	Primary	0.5	0.5	feet	K2105607	CAS, Kelso, WA	X	X		X		X	X					X			X	X		X	X	
JE01FDD01B0-0.5SO-01	FDD01B	8/4/01 9:45 AM	Soil	Primary	0.5	0.5	feet	K2105607	CAS, Kelso, WA	X	X		X		X	X					X			X	X		X	X	
JE01FDD01C0-0.5MH-01	FDD01C	8/4/01 10:00 AM	Product*	Primary	0.5	0.5	feet	1015167	CTE Anchorage, AK					X				X	X						X				
JE01FDD01C0-0.5SO-01	FDD01C	8/4/01 10:20 AM	Soil	Primary	0.5	0.5	feet	K2105607	CAS, Kelso, WA	X	X		X		X	X					X			X	X		X	X	
17FG-HT03	TR66	8/14/17 10:40 AM	Soil	Primary	0.5	0.5	feet	1176012	SGS Anchorage, AK								X									X			
17FG-HT97	TR66	8/14/17 1:00 PM	Soil	Primary	0.5	0.5	feet	1176012	SGS Anchorage, AK								X									X			
17FG-HT07	TR18	8/18/17 3:14 PM	Soil	Primary	0.5	0.5	feet	1176012	SGS Anchorage, AK								X									X			
17FG-T22	TR103-2017	8/21/17 4:48 PM	Soil	Primary	0.5	0.5	feet	1176012	SGS Anchorage, AK								X									X			
17FG-T24	TR58	8/22/17 11:33 AM	Soil	Primary	0.5	0.5	feet	1176012	SGS Anchorage, AK								X									X			

Notes:

ID - Identification

*Field notes describe this sample as being spilled product along with saturated surface soil.

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	17FG-HT03	17FG-HT97
				Location	TR66	TR66
				Lab ID	1176012003	1176012007
				Collection Date	8/14/2017 10:40:00 AM	8/14/2017 1:00:00 PM
				Matrix	Soil	Soil
				QC Type	Primary	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**		
SW8082A	Aroclor 1016	0.41	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SW8082A	Aroclor 1221	0.2	0.1	mg/kg	***ND [0.116]***	***ND [0.116]***
SW8082A	Aroclor 1232	0.17	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SW8082A	Aroclor 1242	0.23	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SW8082A	Aroclor 1248	0.23	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SW8082A	Aroclor 1254	0.12	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SW8082A	Aroclor 1260	0.24	0.1	mg/kg	ND [0.0290]	ND [0.0291]
SM2540G	Solids	NS	NS	%	84.6	84.6

Notes:

Gray/Bold indicates the LOD for a non-detect results exceeds the ADEC CUL.

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

LOD shown in brackets [ ].

ID - Identification

mg/kg - milligrams per kilogram

ND - not detected

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	JE01DAT54A-10.0-12SO-01	JE01DAT54A-15.0-17SO-01	JE01DAT59A-8.0-10.0SO-01	JE01DAT59A-11.0-13SO-01
				Location	DAT54A	DAT54A	DAT59A	DAT59A
				Lab ID	K210555705	K210555706	K210555703	K210555704
				Collection Date	7/31/2001 12:20:00 PM	7/31/2001 12:35:00 PM	7/31/2001 10:20:00 AM	7/31/2001 10:35:00 AM
				Matrix	Soil	Soil	Soil	Soil
				QC Type	Primary	Primary	Primary	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**				
AK101	Gasoline Range Organics	NS	1400	mg/kg	ND [4.1]	ND [7.6]	ND [4.3]	ND [3.7]
AK102	Diesel Range Organics	NS	8250	mg/kg	2.8 [14] UBRL	12 [18]	10 [12] UBRL	2.8 [12] UBRL
AK103	Residual Range Organics	NS	8300	mg/kg	ND [140]	120 [180]	50 [120]	ND [120]
E200.8	Arsenic	0.68	0.72	mg/kg	**2.4 [0.6]**	**5.3 [2.4]**	**0.9 [0.6]**	**0.9 [0.6]**
E200.8	Barium	1500	1700	mg/kg	65.6 [0.06]	71 [0.24]	44.1 [0.06]	31 [0.06]
E200.8	Cadmium	7.1	7.6	mg/kg	0.05 [0.06]	0.13 [0.24]	0.03 [0.06]	0.02 [0.06]
E200.8	Chromium	NS	10000	mg/kg	2.3 [0.2]	5.2 [0.9]	1.2 [0.2]	1.3 [0.2]
E200.8	Lead	400	40	mg/kg	3.1 [0.06]	5.11 [0.05]	1.69 [0.06]	1.41 [0.06]
E200.8	Selenium	39	41	mg/kg	0.2 [1.1]	0.5 [4.7]	0.1 [1.2]	ND [1.2]
E200.8	Silver	39	41	mg/kg	0.161 [0.023]	0.283 [0.019]	0.157 [0.024]	0.107 [0.023]
SW7471A	Mercury	1.1	0.31	mg/kg	0.07 [0.02]	0.09 [0.02]	ND [0.02]	ND [0.02]
SW8021B	Benzene	1.2	0.81	mg/kg	ND [0.024]	--	--	--
SW8021B	Ethylbenzene	5.8	3.5	mg/kg	ND [0.078]	--	--	--
SW8021B	m,p-Xylene	NS	5.7	mg/kg	ND [0.078]	--	--	--
SW8021B	o-Xylene	65	5.7	mg/kg	ND [0.078]	--	--	--
SW8021B	Toluene	490	20	mg/kg	ND [0.078]	--	--	--
SW8270CSIM	2-Methylnaphthalene	24	25	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Acenaphthene	360	380	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Acenaphthylene	NS	190	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Anthracene	1800	1900	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Benzo(a)anthracene	1.1	1.2	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Benzo(a)pyrene	0.11	0.12	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Benzo(b)fluoranthene	1.1	1.2	mg/kg	0.002 [0.0069]	--	--	--
SW8270CSIM	Benzo(g,h,i)perylene	NS	190	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Benzo(k)fluoranthene	11	12	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Chrysene	110	120	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Dibenzo(a,h)anthracene	0.11	0.12	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Dibenzofuran	7.3	7.7	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Fluoranthene	240	250	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Fluorene	240	250	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Indeno(1,2,3-cd)pyrene	1.1	1.2	mg/kg	0.0022 [0.0069] UBRL	--	--	--
SW8270CSIM	Naphthalene	2	2	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Phenanthrene	NS	190	mg/kg	ND [0.0069]	--	--	--
SW8270CSIM	Pyrene	180	190	mg/kg	ND [0.0069]	--	--	--
E160.3M	Solids	NS	NS	%	73.3	58.7	84.1	86

Notes:

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

Bold/red - indicates that a detected result exceeds the RSL.

LOD shown in brackets [ ].

ID - Identification

J – the result is an estimated value greater than or equal to the DL and below the LOQ.

mg/kg - milligrams per kilogram

ND - not detected

NS - not specified

UBRL - although the analyte was detected, the result should be considered nondetect at the reporting limit or reported value, whichever is higher, due to potential laboratory contamination or trip contamination

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	17FG-T22
				Location	TR103-2017
				Lab ID	1176012029
				Collection Date	8/21/2017 4:48:00 PM
				Matrix	Soil
				QC Type	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**	
SW8082A	Aroclor 1016	0.41	0.1	mg/kg	ND [0.0470]
SW8082A	Aroclor 1221	0.2	0.1	mg/kg	***ND [0.188]***
SW8082A	Aroclor 1232	0.17	0.1	mg/kg	ND [0.0470]
SW8082A	Aroclor 1242	0.23	0.1	mg/kg	ND [0.0470]
SW8082A	Aroclor 1248	0.23	0.1	mg/kg	ND [0.0470]
SW8082A	Aroclor 1254	0.12	0.1	mg/kg	ND [0.0470]
SW8082A	Aroclor 1260	0.24	0.1	mg/kg	ND [0.0470]
SM2540G	Solids	NS	NS	%	52.4

Notes:

Gray/Bold indicates the LOD for a non-detect results exceeds the ADEC CUL.

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

LOD shown in brackets [ ].

ID - Identification

mg/kg - milligrams per kilogram

ND - not detected

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	JE01FDD01A0-0.5SO-01	JE01FDD01B0-0.5SO-01	JE01FDD01C0-0.5SO-01
				Location	FDD01A	FDD01B	FDD01C
				Lab ID	K210560711	K210560712	K210560713
				Collection Date	8/4/2001 9:20:00 AM	8/4/2001 9:45:00 AM	8/4/2001 10:20:00 AM
				Matrix	Soil	Soil	Soil
				QC Type	Primary	Primary	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**			
AK101	Gasoline Range Organics	NS	1400	mg/kg	ND [5.4]	ND [5.8] UJ-S	ND [9.5] J-S
AK102	Diesel Range Organics	NS	8250	mg/kg	2400 [53]	6300 [65]	12 [14]
AK103	Residual Range Organics	NS	8300	mg/kg	19000 [530]	54000 [6500]	98 [140]
E200.8	Arsenic	0.68	0.72	mg/kg	**1.2 [0.5]**	**1.4 [0.5]**	**1.2 [0.6]**
E200.8	Barium	1500	1700	mg/kg	33.4 [0.05]	51.5 [0.05]	42.8 [0.06]
E200.8	Cadmium	7.1	7.6	mg/kg	0.04 [0.05]	0.04 [0.05]	0.04 [0.06]
E200.8	Chromium	NS	10000	mg/kg	1.5 [0.2]	1.5 [0.2]	2 [0.2]
E200.8	Lead	400	40	mg/kg	1.26 [0.05]	1.84 [0.05]	2.3 [0.06]
E200.8	Selenium	39	41	mg/kg	0.2 [1.1]	0.4 [1.1]	0.3 [1.2]
E200.8	Silver	39	41	mg/kg	0.062 [0.022]	0.037 [0.022]	0.054 [0.023]
SW7471A	Mercury	1.1	0.31	mg/kg	ND [0.02]	0.04 [0.02]	0.02 [0.02]
SW8081A	4,4'-DDD	0.19	0.2	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	4,4'-DDE	2	2	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	4,4'-DDT	1.9	2	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Aldrin	0.039	0.04	mg/kg	ND [0.037]	***ND [0.043]***	ND [0.0047]
SW8081A	alpha-BHC	0.086	0.091	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	alpha-Chlordane	1.7	1.7	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Beta-BHC	0.3	0.32	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	delta-BHC	NS	NS	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Dieldrin	0.034	0.04	mg/kg	***ND [0.037]***	***ND [0.043]***	ND [0.0047]
SW8081A	Endosulfan I	NS	50	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Endosulfan II	NS	50	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Endosulfan sulfate	38	50	mg/kg	ND [0.037] UJ-M	ND [0.043]	ND [0.0047]
SW8081A	Endrin	1.9	2	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Endrin aldehyde	NS	NS	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Endrin ketone	NS	NS	mg/kg	ND [0.037]	0.043 [0.043]	ND [0.0047]
SW8081A	gamma-BHC	0.57	0.6	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	gamma-Chlordane	1.7	1.7	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Heptachlor	0.13	0.13	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Heptachlor epoxide	0.07	0.07	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Methoxychlor	32	34	mg/kg	ND [0.037]	ND [0.043]	ND [0.0047]
SW8081A	Toxaphene	0.49	0.52	mg/kg	***ND [1.9]***	***ND [2.2]***	ND [0.24]
SW8082	Aroclor 1016	0.41	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8082	Aroclor 1221	0.2	0.1	mg/kg	***ND [0.15] UJ-S***	***ND [0.18] UJ-S***	***ND [0.19]***
SW8082	Aroclor 1232	0.17	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8082	Aroclor 1242	0.23	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8082	Aroclor 1248	0.23	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8082	Aroclor 1254	0.12	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8082	Aroclor 1260	0.24	0.1	mg/kg	ND [0.073] UJ-S	ND [0.086] UJ-S	ND [0.093]
SW8260B	1,1,1,2-Tetrachloroethane	2	1.5	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1,1-Trichloroethane	810	36	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1,2,2-Tetrachloroethane	0.6	0.44	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1,2-Trichloroethane	0.15	0.11	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1-Dichloroethane	3.6	3.3	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1-Dichloroethene	23	24	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,1-Dichloropropene	NS	NS	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,2,3-Trichlorobenzene	6.3	6.6	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]

APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	JE01FDD01A0-0.5SO-01	JE01FDD01B0-0.5SO-01	JE01FDD01C0-0.5SO-01
				Location	FDD01A	FDD01B	FDD01C
				Lab ID	K210560711	K210560712	K210560713
				Collection Date	8/4/2001 9:20:00 AM	8/4/2001 9:45:00 AM	8/4/2001 10:20:00 AM
				Matrix	Soil	Soil	Soil
				QC Type	Primary	Primary	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**			
SW8260B	1,2,3-Trichloropropane	0.0051	0.1	mg/kg	***ND [0.056]***	***ND [0.07]***	***ND [0.092]***
SW8260B	1,2,4-Trichlorobenzene	5.8	3.2	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	1,2,4-Trimethylbenzene	30	4.3	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	1,2-Dibromo-3-chloropropane	0.0053	NS	mg/kg	***ND [0.23]***	***ND [0.28]***	***ND [0.37]***
SW8260B	1,2-Dibromoethane	0.036	0.031	mg/kg	***ND [0.23]***	***ND [0.28]***	***ND [0.37]***
SW8260B	1,2-Dichlorobenzene	180	7.8	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,2-Dichloroethane	0.46	0.39	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,2-Dichloropropane	1.6	1.2	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,3,5-Trimethylbenzene	27	3.7	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	1,3-Dichlorobenzene	NS	6.2	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,3-Dichloropropane	160	NS	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	1,4-Dichlorobenzene	2.6	1.5	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	2,2-Dichloropropane	NS	NS	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	2-Butanone	2700	2300	mg/kg	ND [2.3]	ND [2.8]	ND [3.7]
SW8260B	2-Chlorotoluene	160	NS	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	2-Hexanone	20	2.1	mg/kg	***ND [2.3]***	***ND [2.8]***	***ND [3.7]***
SW8260B	4-Chlorotoluene	160	NS	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	4-Isopropyltoluene	NS	NS	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	4-Methyl-2-pentanone	3300	220	mg/kg	ND [2.3]	ND [2.8]	ND [3.7]
SW8260B	Acetone	6100	6500	mg/kg	0.5 [2.3] UBRL	0.87 [2.8] UBRL	0.62 [3.7] UBRL
SW8260B	Benzene	1.2	0.81	mg/kg	ND [0.023]	ND [0.028]	ND [0.037]
SW8260B	Bromobenzene	29	16	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	Bromochloromethane	15	NS	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Bromodichloromethane	0.29	0.26	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Bromoform	19	17	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Bromomethane	0.68	0.74	mg/kg	ND [0.056] UJ-L	ND [0.07] UJ-L	ND [0.092] UJ-L
SW8260B	Carbon disulfide	77	50	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Carbon tetrachloride	0.65	0.66	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Chlorobenzene	28	18	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Chloroethane	1400	140	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Chloroform	0.32	0.29	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Chloromethane	11	12	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	cis-1,2-Dichloroethene	16	17	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	cis-1,3-Dichloropropene	NS	1.5	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Dibromochloromethane	8.3	8.8	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Dibromomethane	2.4	2.2	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Dichlorodifluoromethane	8.7	11	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Ethylbenzene	5.8	3.5	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Hexachlorobutadiene	1.2	0.33	mg/kg	ND [0.23]	ND [0.28]	***ND [0.37]***
SW8260B	Isopropylbenzene	190	5.4	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	m,p-Xylene	NS	5.7	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Methylene chloride	35	36	mg/kg	0.04 [0.12] UBRL	0.057 [0.14] UBRL	0.069 [0.19] UBRL
SW8260B	Naphthalene	2	2	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	n-Butylbenzene	390	2	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	n-Propylbenzene	380	5.2	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	o-Xylene	65	5.7	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	sec-Butylbenzene	780	2.8	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]

APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	JE01FDD01A0-0.5SO-01	JE01FDD01B0-0.5SO-01	JE01FDD01C0-0.5SO-01
				Location	FDD01A	FDD01B	FDD01C
				Lab ID	K210560711	K210560712	K210560713
				Collection Date	8/4/2001 9:20:00 AM	8/4/2001 9:45:00 AM	8/4/2001 10:20:00 AM
				Matrix	Soil	Soil	Soil
				QC Type	Primary	Primary	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**			
SW8260B	Styrene	600	18	mg/kg	0.012 [0.056] UBRL	0.015 [0.07] UBRL	0.022 [0.092]
SW8260B	tert-Butylbenzene	780	3.6	mg/kg	ND [0.23]	ND [0.28]	ND [0.37]
SW8260B	Tetrachloroethene	8.1	6.8	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Toluene	490	20	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	trans-1,2-Dichloroethene	160	96	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	trans-1,3-Dichloropropene	NS	1.5	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Trichloroethene	0.41	0.35	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Trichlorofluoromethane	2300	98	mg/kg	ND [0.056]	ND [0.07]	ND [0.092]
SW8260B	Vinyl chloride	0.059	0.06	mg/kg	ND [0.056]	***ND [0.07]***	***ND [0.092]***
SW8270CSIM	2-Methylnaphthalene	24	25	mg/kg	0.0031 [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Acenaphthene	360	380	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Acenaphthylene	NS	190	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Anthracene	1800	1900	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Benzo(a)anthracene	1.1	1.2	mg/kg	0.052 [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Benzo(a)pyrene	0.11	0.12	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Benzo(b)fluoranthene	1.1	1.2	mg/kg	0.045 [0.0055]	0.042 [0.0065]	ND [0.0071]
SW8270CSIM	Benzo(g,h,i)perylene	NS	190	mg/kg	0.026 [0.0055]	0.029 [0.0065]	ND [0.0071]
SW8270CSIM	Benzo(k)fluoranthene	11	12	mg/kg	0.034 [0.0055]	0.024 [0.0065]	ND [0.0071]
SW8270CSIM	Chrysene	110	120	mg/kg	0.36 [0.0055]	1.3 [0.033]	ND [0.0071]
SW8270CSIM	Dibenzo(a,h)anthracene	0.11	0.12	mg/kg	0.014 [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Dibenzofuran	7.3	7.7	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Fluoranthene	240	250	mg/kg	0.0088 [0.0055]	0.005 [0.0065]	ND [0.0071]
SW8270CSIM	Fluorene	240	250	mg/kg	ND [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Indeno(1,2,3-cd)pyrene	1.1	1.2	mg/kg	0.01 [0.0055]	ND [0.0065]	ND [0.0071]
SW8270CSIM	Naphthalene	2	2	mg/kg	0.0042 [0.0055]	0.0028 [0.0065]	ND [0.0071]
SW8270CSIM	Phenanthrene	NS	190	mg/kg	0.026 [0.0055]	0.0045 [0.0065] UBRL	ND [0.0071]
SW8270CSIM	Pyrene	180	190	mg/kg	0.055 [0.0055]	0.077 [0.0065]	ND [0.0071]
E160.3M	Solids	NS	NS	%	91.1	76.7	71.2

Notes:

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

Bold/red indicates that a detected result exceeds the EPA RSL.

Bold/Blue indicates that a detected result exceeds the ADEC CUL.

Yellow/Bold indicates the LOD for a non-detect results exceeds the EPA RSL.

Gray/Bold indicates the LOD for a non-detect results exceeds the ADEC CUL.

LOD shown in brackets [ ].

ID - Identification

J-S – Result is considered estimated due to surrogate recovery.

mg/kg - milligrams per kilogram

ND - not detected

NS - not specified

UBRL - although the analyte was detected, the result should be considered non-detect at the reporting limit or reported value, whichever is higher, due to potential laboratory contamination or trip contamination

UJ-M - The reporting limit is considered estimated due to matrix spike and/or spike duplicate.

UJ-S - The reporting limit is considered estimated due to surrogate recovery.

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

		Sample ID	JE01FDD01C0-0.5MH-01
		Location	FDD01C
		Lab ID	1015167001
		Collection Date	8/4/2001 10:00:00 AM
		Matrix	Product*
		QC Type	Primary
Method	**Analyte**	**Units**	
D808	Total Halogens	ppm	ND [131]
SW1020A	Ignitability	deg F	200 [70]
SW6010B	Arsenic	mg/kg	1.44 [2.5]
SW6010B	Cadmium	mg/kg	ND [0.3]
SW6010B	Chromium	mg/kg	ND [1]
SW6010B	Lead	mg/kg	3.94 [2.5]
SW8082	Total PCBs	ppm	ND [0.96]

Notes:

*Field notes describe this sample as being spilled product along with saturated surface soil.

LOD shown in brackets [ ].

deg F - degrees Fahrenheit

ID - Identification

mg/kg - milligrams per kilogram

ND - not detected

ppm - parts per million

ug/kg - micrograms per kilogram

APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	17FG-T24
				Location	TR58
				Lab ID	1176012031
				Collection Date	8/22/2017 11:33:00 AM
				Matrix	Soil
				QC Type	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**	
SW8082A	Aroclor 1016	0.41	0.1	mg/kg	ND [0.0286]
SW8082A	Aroclor 1221	0.2	0.1	mg/kg	***ND [0.115]***
SW8082A	Aroclor 1232	0.17	0.1	mg/kg	ND [0.0286]
SW8082A	Aroclor 1242	0.23	0.1	mg/kg	ND [0.0286]
SW8082A	Aroclor 1248	0.23	0.1	mg/kg	ND [0.0286]
SW8082A	Aroclor 1254	0.12	0.1	mg/kg	ND [0.0286]
SW8082A	Aroclor 1260	0.24	0.1	mg/kg	ND [0.0286]
SM2540G	Solids	NS	NS	%	86.3

Notes:

Gray/Bold indicates the LOD for a non-detect results exceeds the ADEC CUL.

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

LOD shown in brackets [ ].

ID - Identification

mg/kg - milligrams per kilogram

ND - not detected

APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	JE01FDC02BSE-01
				Location	FDC02B
				Lab ID	K210534904
				Collection Date	7/23/2001 10:10:00 AM
				Matrix	Sediment
				QC Type	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**	
AK102	Diesel Range Organics	NS	8250	mg/kg	860 [68]
AK103	Residual Range Organics	NS	8300	mg/kg	2900 [680]
SW8021B	Benzene	1.2	0.81	mg/kg	ND [0.14] UJ-S
SW8021B	Ethylbenzene	5.8	3.5	mg/kg	ND [0.45] UJ-S
SW8021B	m,p-Xylene	NS	5.7	mg/kg	ND [0.45] UJ-S
SW8021B	o-Xylene	65	5.7	mg/kg	ND [0.45] UJ-S
SW8021B	Toluene	490	20	mg/kg	0.042 [0.45] J-S
SW8270CSIM	2-Methylnaphthalene	24	25	mg/kg	0.036 [0.018]
SW8270CSIM	Acenaphthene	360	380	mg/kg	ND [0.018]
SW8270CSIM	Acenaphthylene	NS	190	mg/kg	ND [0.018]
SW8270CSIM	Anthracene	1800	1900	mg/kg	0.021 [0.018]
SW8270CSIM	Benzo(a)anthracene	1.1	1.2	mg/kg	0.022 [0.018]
SW8270CSIM	Benzo(a)pyrene	0.11	0.12	mg/kg	0.026 [0.018]
SW8270CSIM	Benzo(b)fluoranthene	1.1	1.2	mg/kg	0.065 [0.018]
SW8270CSIM	Benzo(g,h,i)perylene	NS	190	mg/kg	0.029 [0.018]
SW8270CSIM	Benzo(k)fluoranthene	11	12	mg/kg	0.03 [0.018]
SW8270CSIM	Chrysene	110	120	mg/kg	0.098 [0.018]
SW8270CSIM	Dibenzo(a,h)anthracene	0.11	0.12	mg/kg	ND [0.018]
SW8270CSIM	Dibenzofuran	7.3	7.7	mg/kg	0.014 [0.018]
SW8270CSIM	Fluoranthene	240	250	mg/kg	0.15 [0.018]
SW8270CSIM	Fluorene	240	250	mg/kg	0.015 [0.018]
SW8270CSIM	Indeno(1,2,3-cd)pyrene	1.1	1.2	mg/kg	ND [0.018]
SW8270CSIM	Naphthalene	2	2	mg/kg	0.017 [0.018]
SW8270CSIM	Phenanthrene	NS	190	mg/kg	0.11 [0.018]
SW8270CSIM	Pyrene	180	190	mg/kg	0.098 [0.018]
E160.3M	Solids	NS	NS	%	28

Notes:

LOD shown in brackets [ ].

ID - Identification

J-S – Result is considered estimated due to surrogate recovery.

mg/kg - milligrams per kilogram

ND - not detected

NS - not specified

UJ-S - The reporting limit is considered estimated due to surrogate recovery.

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APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

		Sample ID	JE01FDC02AWS-01
		Location	FDC02A
		Lab ID	1014722019
		Collection Date	7/23/2001 9:50:00 AM
		Matrix	Surface Water
		QC Type	Primary
Method	**Analyte**	**Units**	
AK102	Diesel Range Organics	mg/L	1.37 [0.495]
AK103	Residual Range Organics	mg/L	0.522 [0.99]
SW8260B	Benzene	mg/L	ND [0.0005]
SW8260B	Ethylbenzene	mg/L	ND [0.001]
SW8260B	m,p-Xylene	mg/L	ND [0.002]
SW8260B	o-Xylene	mg/L	ND [0.001]
SW8260B	Toluene	mg/L	ND [0.001]
SW8270CSIM	Acenaphthene	mg/L	ND [0.000109]
SW8270CSIM	Acenaphthylene	mg/L	ND [0.000109]
SW8270CSIM	Anthracene	mg/L	ND [0.000109]
SW8270CSIM	Benzo(a)anthracene	mg/L	ND [0.000141]
SW8270CSIM	Benzo(a)pyrene	mg/L	ND [0.000163]
SW8270CSIM	Benzo(b)fluoranthene	mg/L	0.0000946 [0.000109]
SW8270CSIM	Benzo(g,h,i)perylene	mg/L	ND [0.000109]
SW8270CSIM	Benzo(k)fluoranthene	mg/L	ND [0.000109]
SW8270CSIM	Chrysene	mg/L	ND [0.000109]
SW8270CSIM	Dibenzo(a,h)anthracene	mg/L	ND [0.000109]
SW8270CSIM	Fluoranthene	mg/L	0.0000635 [0.000109]
SW8270CSIM	Fluorene	mg/L	0.0000707 [0.000109]
SW8270CSIM	Indeno(1,2,3-cd)pyrene	mg/L	ND [0.000109]
SW8270CSIM	Naphthalene	mg/L	0.0000675 [0.000109]
SW8270CSIM	Phenanthrene	mg/L	0.0000407 [0.000109]
SW8270CSIM	Pyrene	mg/L	0.0000543 [0.000109]

Notes:

LOD shown in brackets [ ].

ID - identification

mg/L - milligrams per liter

ND - not detected

APPENDIX A DATA SUMMARY TABLE
Fort Glenn - DM29-2017 - Historical Analytical Results for Soil

				Sample ID	17FG-HT07
				Location	TR18
				Lab ID	1176012008
				Collection Date	8/18/2017 3:14:00 PM
				Matrix	Soil
				QC Type	Primary
Method	**Analyte**	**EPA RSL[1]**	**ADEC CUL[2]**	**Units**	
SW8082A	Aroclor 1016	0.41	0.1	mg/kg	ND [0.0382]
SW8082A	Aroclor 1221	0.2	0.1	mg/kg	***ND [0.153]***
SW8082A	Aroclor 1232	0.17	0.1	mg/kg	ND [0.0382]
SW8082A	Aroclor 1242	0.23	0.1	mg/kg	ND [0.0382]
SW8082A	Aroclor 1248	0.23	0.1	mg/kg	ND [0.0382]
SW8082A	Aroclor 1254	0.12	0.1	mg/kg	ND [0.0382]
SW8082A	Aroclor 1260	0.24	0.1	mg/kg	ND [0.0382]
SM2540G	Solids	NS	NS	%	65.4

Notes:

Gray/Bold indicates the LOD for a non-detect results exceeds the ADEC CUL.

[1]EPA RSLs are defined as the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential soil, with a hazard quotient (HQ) of 0.1 and total cancer risk of 1×10^{-6} (EPA 2019).

[2]ADEC CULs are defined as 1/10 the 18 AAC 75.341 Table B1 and the 18 AAC 75.341 Table B2 human health criteria for the over 40" zone.

LOD shown in brackets [ ].

ID - identification

mg/kg - milligrams per kilogram

ND - not detected

APPENDIX A FIELD SCREENING SUMMARY
Fort Glenn - Historical Field Screening Results

						Parameter	PID	IR	XRF
						Screening Criteria[1]	20	35	200
						Units	ppm	ppm	ppm
Sample ID	Location	Matrix	Depth			Collect Date			
			Start	End	Units				
CUP010-SURFACE	CUP010	Subsurface Soil	0	0	feet	7/26/2001	--	22	--
CUP010-3	CUP010	Subsurface Soil	3	3	feet	7/26/2001	--	12	--
CUP010-6	CUP010	Subsurface Soil	6	6	feet	7/26/2001	--	8	--
CUP021-SURFACE	CUP021	Subsurface Soil	0	0	feet	7/28/2001	--	8	--
CUP021-3	CUP021	Subsurface Soil	3	3	feet	7/28/2001	--	4	--
CUP021-9	CUP021	Subsurface Soil	9	9	feet	7/28/2001	--	8	--
DAT54A-2-4	DAT54A	Subsurface Soil	2	4	feet	7/31/2001	1.3	0	--
DAT54A-10-12	DAT54A	Subsurface Soil	10	12	feet	7/31/2001	1.1	--	--
DAT54A-10-20	DAT54A	Subsurface Soil	10	20	feet	7/31/2001	--	0	--
DAT54A-15-17	DAT54A	Subsurface Soil	15	17	feet	7/31/2001	1.1	20	--
DAT54A-19.5-20.5	DAT54A	Subsurface Soil	19.5	20.5	feet	7/31/2001	--	0	--
DAT54A-19.5-21.5	DAT54A	Subsurface Soil	19.5	21.5	feet	7/31/2001	1.1	--	--
DAT59A-2-4	DAT59A	Subsurface Soil	2	4	feet	7/31/2001	1.1	**66**	--
DAT59A-8-10	DAT59A	Subsurface Soil	8	10	feet	7/31/2001	1	10	--
DAT59A-11-13	DAT59A	Subsurface Soil	11	13	feet	7/31/2001	1.1	10	--
DAT59A-30-30.5	DAT59A	Subsurface Soil	30	30.5	feet	7/31/2001	1.1	--	--
DAT59A-30-32	DAT59A	Subsurface Soil	30	32	feet	7/31/2001	--	0	--
FDD01C-0-0.5	FDD01C	Surface Soil	0	0.5	feet	8/4/2001	--	**90**	--
10008SM	10008SM	Surface Soil	0.5	1.0	feet	8/15/2017	0	--	--
100DM1	100DM1	Surface Soil	0.5	1.0	feet	8/9/2017	0	--	--
100DM10-SLR	100DM10-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	0.9	--	--
100DM11-SLR	100DM11-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	1.4	--	--
100DM12-SLR	100DM12-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	6.2	--	--
100DM19-SLR	100DM19-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
100DM20-SLR	100DM20-SLR	Surface Soil	0.5	1.0	feet	8/13/2017	0	--	--
100DM21-SLR-1	100DM21-SLR-1	Surface Soil	0.5	1.0	feet	8/13/2017	0	--	--
100DM22-SLR	100DM22-SLR	Surface Soil	0.5	1.0	feet	8/14/2017	0	--	--
100DM23-SLR	100DM23-SLR	Surface Soil	0.5	1.0	feet	8/14/2017	0	--	--
100DM24-SLR	100DM24-SLR	Surface Soil	0.5	1.0	feet	8/14/2017	0	--	--
100DM25-SLR	100DM25-SLR	Surface Soil	0.5	1.0	feet	8/14/2017	0	--	--
100DM26-SLR-1	100DM26-SLR-1	Surface Soil	0.5	1.0	feet	8/15/2017	0	--	--
100DM27-SLR-1	100DM27-SLR-1	Surface Soil	0.5	1.0	feet	8/15/2017	0	--	--
100DM28-SLR-1	100DM28-SLR-1	Surface Soil	0.5	1.0	feet	8/17/2017	0	--	--
100DM30-SLR	100DM30-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM31-SLR	100DM31-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM32-SLR	100DM32-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM33-SLR	100DM33-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM34-SLR	100DM34-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0.1	--	--
100DM35-SLR	100DM35-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM36-SLR	100DM36-SLR	Surface Soil	0.5	1.0	feet	8/21/2017	0	--	--
100DM6	100DM6	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
100DM9-SLR	100DM9-SLR	Surface Soil	0.5	1.0	feet	8/11/2017	0	--	--
100TK14	100TK14	Surface Soil	0.5	1.0	feet	8/12/2017	1	--	--
100TK2-SLR	100TK2-SLR	Surface Soil	0.5	1.0	feet	8/11/2017	0.3	--	--
200DM10-SLR	200DM10-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM11-SLR-1	200DM11-SLR-1	Surface Soil	0.5	1.0	feet	8/12/2017	8.1	--	--
200DM12-SLR-1	200DM12-SLR-1	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM13-SLR-1	200DM13-SLR-1	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM14-SLR	200DM14-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	1.7	--	--
200DM15-SLR	200DM15-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM16-SLR	200DM16-SLR	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM17-SLR-1	200DM17-SLR-1	Surface Soil	0.5	1.0	feet	8/12/2017	0.6	--	--
200DM18-SLR-1	200DM18-SLR-1	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM18-SLR-2	200DM18-SLR-2	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM18-SLR-3	200DM18-SLR-3	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM18-SLR-4	200DM18-SLR-4	Surface Soil	0.5	1.0	feet	8/12/2017	0.6	--	--
200DM18-SLR-5	200DM18-SLR-5	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM18-SLR-6	200DM18-SLR-6	Surface Soil	0.5	1.0	feet	8/12/2017	0	--	--
200DM18-SLR-7	200DM18-SLR-7	Surface Soil	0.5	1.0	feet	8/12/2017	0.1	--	--
200DM1-SLR-1	200DM1-SLR-1	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM21	200DM21	Surface Soil	0.5	1.0	feet	8/15/2017	0	--	--
200DM22-1	200DM22-1	Surface Soil	0.5	1.0	feet	8/16/2017	0	--	--
200DM2-SLR-1	200DM2-SLR-1	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM30-1	200DM30-1	Surface Soil	0.5	1.0	feet	8/20/2017	0	--	--
200DM3-SLR-1	200DM3-SLR-1	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM4-SLR	200DM4-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM5-SLR	200DM5-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM6-SLR	200DM6-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM7-SLR	200DM7-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200DM8-SLR	200DM8-SLR	Surface Soil	0.5	1.0	feet	8/10/2017	0	--	--
200QRTK14	200QRTK14	Surface Soil	0.5	1.0	feet	8/16/2017	6.4	--	--
200TK131	200TK131	Surface Soil	0.5	1.0	feet	8/21/2017	0.3	--	--
200TK7-SLR	200TK7-SLR	Surface Soil	0.5	1.0	feet	8/18/2017	0.3	--	--
200TK8-SLR	200TK8-SLR	Surface Soil	0.5	1.0	feet	8/16/2017	0.3	--	--
200TK9-SLR	200TK9-SLR	Surface Soil	0.5	1.0	feet	8/16/2017	0.3	--	--
TR66	TR66	Surface Soil	0.5	1.0	feet	8/19/2017	0	--	--

Notes:

[1]Field screening criteria are based on historical report correlation data, where available, or standard field practices.

red,bold - exceeds screening criteria

-- no data available

ID - Identification

IR - infrared spectrometer

PID - photoionization detector

ppm - parts per million

XRF - x-ray fluorescence

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APPENDIX B
CSM GRAPHIC AND SCOPING FORMS

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Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Fort Glenn CON/HTRW Project 02, FUDS Property F10AK029802, Umnak Island, Drum Piles

File Number: 2550.38.001

Completed by: Brice Engineering, LLC

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☒ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Drum piles

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☐ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☒ Other: Ranchers

* bgs - below ground surface

2. **Exposure Pathways:** *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Many drums that were visually inspected at the site were noted to be perforated, corroded, and empty; additionally, soil staining, odors, stressed vegetation, open drums, and fluid/product were observed in some drum dumps and drum areas. Due to these observations, the compounds of potential concern (COPCs) that may be present in surface soil include petroleum hydrocarbons (GRO, DRO, RRO) and petroleum-related constituents (BTEX and PAH).

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

COPCs are potentially present in surface soil due to the presence of POL substances in some drum dumps and drum areas. According to the EPA RSL tables and calculator (EPA 2020a), PAH permeate the skin; thus, this pathway is complete.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

COPCs could potentially migrate from soil to groundwater. Although drinking water at the site is currently sourced from Thirty-Three Creek, groundwater could potentially be used as a drinking water source in the future; thus, this a potentially complete pathway .

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Thirty-Three Creek is currently used for human consumption and the intake is upstream of potential sources of contamination. Surface water samples collected near the intake were clean. However, some drum dumps are located either in or near marsh areas of streams; thus, this pathway is potentially complete.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

The site can potentially be used for hunting, fishing, or harvesting of wild or farmed foods. PAH are bioaccumulative according to Appendix C of the CSM guidance (ADEC 2017); thus, this pathway is complete.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

BTEX and PAH are volatile in soil, according to the EPA RSL tables and calculator (EPA 2020a) and product has been observed at some of the drum dumps and drum areas; thus, this pathway is complete.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

There are currently no occupied buildings within the project area and therefore, indoor air exposure is considered an incomplete pathway for current site conditions. Although future development of these areas is not anticipated, this pathway is considered potentially complete for future receptors to be protective of the potential for future development and residential use.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Although bedrock tends to be higher than groundwater in certain areas of Fort Glenn, the potential for exposure to groundwater during construction exists. Additionally, surface water is used as potable water at Fort Glenn and is intended to be used the same way in the future; thus, this pathway is complete. However, the climate on Umnak Island is not favorable for recreational water use as protective clothing would be necessary for prolonged exposure to the water and the site remoteness limits access to the nearby waters for recreational use of swimming.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

BTEX and many PAH are volatile, as listed in the EPA RSL tables and calculator (EPA 2020a); however, the project site on Umnak Island is currently uninhabited, contaminated water is not currently used for household purposes, and the potential for future residents using surface water or groundwater for household purposes is unlikely because of the remote nature of the site; however, this pathway is potentially complete in the future for potential residential use.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

The COPCs at this site are volatile compounds and the site area is covered by grasses, because the land is used for cattle grazing, limiting the formation of dust; thus, this pathway is incomplete.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Some PAHs were detected above RBSLs in one sediment sample collected in 2001 near a drum dump, indicating that the drum piles near surface water bodies may potentially impact sediment. Additionally, although the climate is not conducive to recreational activities around sediment and the site remoteness limits accessibility, this pathway is retained as potentially complete.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

The drum piles and drum areas found on Fort Glenn may have once contained POL-related contents. Other potential contents or comingled sources of contaminants are not considered for this CSM.

The Project 02 area is currently used for cattle grazing, uninhabited, considered an NHL, and not expected to change in the foreseeable future. Exposure pathways for current site visitors, trespassers, and recreational users are considered potentially complete but insignificant due to current land use and site remoteness. Exposure pathways for future receptors are considered potentially complete to be protective of future development and residential use.

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Fort Glenn CON/HTRW Project 02, FUDS Property F10AK029802
Umnak Island, Alaska, Drum Piles

Completed By: Brice Engineering, LLC
Date Completed: 3/22/2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media / Transport Mechanisms

Media	Transport Mechanisms	
☑ Surface Soil (0-2 ft bgs)	Direct release to surface soil	check soil
	☑ Migration to subsurface	check soil
	☑ Migration to groundwater	check groundwater
	☑ Volatilization	check air
	☑ Runoff or erosion	check surface water
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil	check soil
	☑ Migration to groundwater	check groundwater
	☑ Volatilization	check air
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Ground-water	Direct release to groundwater	check groundwater
	☐ Volatilization	check air
	☐ Flow to surface water body	check surface water
	☐ Flow to sediment	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Surface Water	Direct release to surface water	check surface water
	☑ Volatilization	check air
	☑ Sedimentation	check sediment
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Sediment	Direct release to sediment	check sediment
	☐ Resuspension, runoff, or erosion	check surface water
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Exposure Media / Exposure Pathway/Route / Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion	C/F		F	F	C/F	C/F	C/F
	☑ Dermal Absorption of Contaminants from Soil	C/F		F	F	C/F	C/F	C/F
	☐ Inhalation of Fugitive Dust							
☑ groundwater	☑ Ingestion of Groundwater	F		F	F	F	F	F
	☑ Dermal Absorption of Contaminants in Groundwater	F		F	F	F	F	F
	☑ Inhalation of Volatile Compounds in Tap Water	F		F	F	F	F	F
☑ air	☑ Inhalation of Outdoor Air	C/F		F	F	C/F	C/F	C/F
	☑ Inhalation of Indoor Air	F		F	F	F	F	F
	☐ Inhalation of Fugitive Dust							
☑ surface water	☑ Ingestion of Surface Water	C/F		F	F	C/F	C/F	C/F
	☑ Dermal Absorption of Contaminants in Surface Water	C/F		F	F	C/F	C/F	C/F
	☑ Inhalation of Volatile Compounds in Tap Water	C/F		F	F	C/F	C/F	C/F
☑ sediment	☑ Direct Contact with Sediment	C/F		F	F	C/F	C/F	C/F
☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F		F	F	C/F	C/F	C/F

Revised, 10/01/2010

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Fort Glenn CON/HTRW Project 02, FUDS Property F10AK029802, Umnak Island, Individual Drums

File Number: 2550.38.001

Completed by: Brice Engineering, LLC

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☒ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Individual, isolated drums on Umnak Island

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☐ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☒ Other: Ranchers

* bgs - below ground surface

2. **Exposure Pathways:** *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Most individual drums that were visually inspected at the site were noted to be perforated, corroded, empty, and/or open; no soil staining, odors, stressed vegetation, or fluid/product were observed for the lone drums. Due to these observations, the compounds of potential concern (COPCs) that may be present in surface soil include petroleum hydrocarbons (GRO, DRO, RRO) and petroleum-related constituents (BTEX and PAH).

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

COPCs are potentially present in surface soils due to the drums once containing POL-related contents. According to the EPA RSL tables and calculator (EPA 2020a), PAH are able to permeate the skin; thus, this pathway is complete.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

COPCs are potentially present in soil. Although there were no visual signs of contamination and field screening results indicated no environmental impacts at multiple lone drum locations, additional information is necessary and this pathway will be maintained as potentially complete for future receptors to be protective of human health and environment.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Field screening results for the individual drums at the site indicated no environmental impacts and no visual signs of staining or odor were observed. Additionally, there are no surface waters located near the locations of the individual, isolated drums; thus, this pathway is incomplete.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

Potentially complete pathway because some drums are partially buried and are in areas that could be used for hunting or harvesting of wild foods. However, this pathway is likely to be insignificant since a household is unlikely to obtain all their subsistence resources from that location (due to remote location, logistical challenges, accessibility, probability of infrequent visits, etc.) for a chronic lifetime exposure in their diet (RAPM 2018) and previous investigations indicated no observations of stressed vegetation, visual staining, or odors.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Complete but insignificant due to site remoteness. COPCs are potentially present in surface soils and PAH are volatile contaminants, according to the EPA RSL tables and calculator (EPA 2020a).

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

There are no occupied building where the individual drums are located and therefore, an incomplete pathway for current site conditions. However, although future development of these areas is not anticipated, lthis pathway is to be protective of the potential for future development and residential use; thus this pathway is potentially complete for future receptors.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

There are no contaminant transport pathways to surface water at the isolated, individual drum locations; thus, this pathway is incomplete. However, groundwater impacts may be present. Dermal exposure to groundwater will be maintained as a potentially complete pathway to be protective of human health and the environment until additional information indicates otherwise.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

BTEX and many PAH are volatile, as listed in the EPA RSL tables and calculator (EPA 2020a). Although the surface water pathway is not impacted, the groundwater pathway for future receptors may potentially be impacted; thus, this pathway is potentially complete.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

The COPCs at this site are volatile compounds and the site area is covered by grasses, as the land is used for cattle grazing, limiting the formation of dust; thus, this pathway is incomplete.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

The release of contaminated material would not directly affect a media leading to sediment contamination. Additionally, there are no sediments present within the locations of the individual, isolated drums; thus this pathway is incomplete.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

The individual, isolated drums found on Fort Glenn may have once contained POL-related contents. Other potential contents or comingled sources of contaminants are not considered for this CSM.

The Project 02 area is currently used for cattle grazing, is uninhabited, is considered a national historic landmark, and is not expected to change in the foreseeable future. Inhalation of outdoor air exposure pathway is considered complete but insignificant due to the site remoteness and contaminants limited in volume and extent (no stressed vegetation or signs of staining or odor). Exposure pathways for current site visitors, trespassers, and recreational users are considered potentially complete but insignificant due to current land use and site remoteness. Exposure pathways for future receptors are considered potentially complete to be protective of future development and residential use.

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Fort Glenn CON/HTRW Project 02, FUDS Property F10AK029802
Umnak Island, Alaska, Individual Drums

Completed By: Brice Engineering, LLC
Date Completed: 3/19/2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media / Transport Mechanisms

Media	Transport Mechanisms	
☑ Surface Soil (0-2 ft bgs)	Direct release to surface soil	check soil
	☑ Migration to subsurface	check soil
	☑ Migration to groundwater	check groundwater
	☑ Volatilization	check air
	☐ Runoff or erosion	check surface water
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil	check soil
	☑ Migration to groundwater	check groundwater
	☑ Volatilization	check air
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Ground-water	Direct release to groundwater	check groundwater
	☐ Volatilization	check air
	☐ Flow to surface water body	check surface water
	☐ Flow to sediment	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Surface Water	Direct release to surface water	check surface water
	☐ Volatilization	check air
	☐ Sedimentation	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Sediment	Direct release to sediment	check sediment
	☐ Resuspension, runoff, or erosion	check surface water
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Exposure Media / Exposure Pathway/Route / Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion	C/F		F	F	C/F	C/F	C/F
	☑ Dermal Absorption of Contaminants from Soil	C/F		F	F	C/F	C/F	C/F
	☐ Inhalation of Fugitive Dust							
☑ groundwater	☑ Ingestion of Groundwater	F		F	F	F	F	F
	☑ Dermal Absorption of Contaminants in Groundwater	F		F	F	F	F	F
	☑ Inhalation of Volatile Compounds in Tap Water	F		F	F	F	F	F
☑ air	☑ Inhalation of Outdoor Air	I		I	I	I	I	I
	☑ Inhalation of Indoor Air	F		F	F	F	F	F
	☐ Inhalation of Fugitive Dust							
☐ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ sediment	☐ Direct Contact with Sediment							
☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F		F	C/F	C/F	C/F	C/F

Revised, 10/01/2010

APPENDIX C
DETAILED COST ESTIMATES

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ALTERNATIVE 2
PROJECT 02 DRUMS INSTITUTIONAL CONTROLS – LOW ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
BASE TASKS							
Task 1	Project Management	1	Job	$ 25,392	$ 25,392	2021	$ 25,392
Task 2	Planning Documents	1	Job	$ 29,972	$ 29,972	2021	$ 29,972
Task 3	Field Activities	1	Job	$ 43,823	$ 43,823	2021	$ 43,823
Task 4	Reporting	1	Job	$ 35,921	$ 35,921	2022	$ 34,943
30 YEARS OF PERIODIC REVIEWS							
1st Review	Periodic Review Inspection	1	Job	$ 113,873	$ 113,873	2026	$ 99,187
1st Review	Periodic Review Report	1	Job	$ 41,240	$ 41,240	2027	$ 34,943
2nd Review	Periodic Review Inspection	1	Job	$ 130,733	$ 130,733	2031	$ 99,187
2nd Review	Periodic Review Report	1	Job	$ 47,346	$ 47,346	2032	$ 34,943
3rd Review	Periodic Review Inspection	1	Job	$ 150,089	$ 150,089	2036	$ 99,187
3rd Review	Periodic Review Report	1	Job	$ 54,356	$ 54,356	2037	$ 34,943
4th Review	Periodic Review Inspection	1	Job	$ 172,312	$ 172,312	2041	$ 99,187
4th Review	Periodic Review Report	1	Job	$ 62,404	$ 62,404	2042	$ 34,943
5th Review	Periodic Review Inspection	1	Job	$ 197,825	$ 197,825	2046	$ 99,187
5th Review	Periodic Review Report	1	Job	$ 71,643	$ 71,643	2047	$ 34,943
6th Review	Periodic Review Inspection	1	Job	$ 227,116	$ 227,116	2051	$ 99,187
6th Review	Periodic Review Report	1	Job	$ 82,251	$ 82,251	2052	$ 34,943
				TOTAL COST	**$1,486,294**	**TOTAL NET PRESENT WORTH COST**	**$ 938,905**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	Unit
Professional Labor							
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
Craft Labor							
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$215.88	hour	6	$ 1,295.28	6	$ 1,295.28	0	$ -	12	$ 2,590.56
Project Manager	$174.76	hour	32	$ 5,592.32	12	$ 2,097.12	6	$ 1,048.56	50	$ 8,738.00
Contract Manager	$143.92	hour		$ -	12	$ 1,727.04		$ -	12	$ 1,727.04
Project Controls	$195.32	hour		$ -	24	$ 4,687.68	6	$ 1,171.92	30	$ 5,859.60
Administrative Assistant	$92.52	hour		$ -	12	$ 1,110.24	6	$ 555.12	18	$ 1,665.36
Engineer	$133.64	hour	36	$ 4,811.04		$ -		$ -	36	$ 4,811.04
Professional Labor Subtotal			**74**	**$ 11,698.64**	**66**	**$ 10,917.36**	**18**	**$ 2,775.60**	**158**	**$ 25,391.60**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractor(s)/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 11,698.64		$ 10,917.36		$ 2,775.60	$ 25,391.60	$ 25,391.60
Running Total by Task				$ 11,698.64		$ 22,616.00		$ 25,391.60	**GRAND TOTAL**	**$ 25,391.60**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; 8 hours for PM and 24 hours for Eng Mid for Quality Management Plan preparation
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 2 reports total
4 PoP = 12 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Work Plan (Pre-Draft RTCs)		Work Plan (Draft)		Work Plan (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$174.76	hour	4	$ 699.04	10	$ 1,747.60	2	$ 349.52	3	$ 524.28	2	$ 349.52	2	$ 349.52	23	$ 4,019.48
Project Controls	$195.32	hour	4	$ 781.28		$ -		$ -		$ -		$ -		$ -	4	$ 781.28
Geospatial Specialist	$102.80	hour		$ -	15	$ 1,542.00	3	$ 308.40	4	$ 411.20	2	$ 205.60	2	$ 205.60	26	$ 2,672.80
Engineer	$133.64	hour		$ -	40	$ 5,345.60	8	$ 1,069.12	10	$ 1,336.40	5	$ 668.20	5	$ 668.20	68	$ 9,087.52
Scientist	$133.64	hour		$ -	20	$ 2,672.80	4	$ 534.56	5	$ 668.20	3	$ 400.92	3	$ 400.92	35	$ 4,677.40
Tech Editor	$143.92	hour		$ -	4	$ 575.68		$ -	4	$ 575.68		$ -	4	$ 575.68	12	$ 1,727.04
Archaeologist	$215.88	hour		$ -	15	$ 3,238.20	3	$ 647.64	4	$ 863.52	2	$ 431.76	2	$ 431.76	26	$ 5,612.88
Safety Officer	$154.20	hour		$ -	4	$ 616.80	1	$ 154.20	1	$ 154.20	1	$ 154.20	1	$ 154.20	8	$ 1,233.60
Professional Labor Subtotal			**8**	**$ 1,480.32**	**108**	**$ 15,738.68**	**21**	**$ 3,063.44**	**31**	**$ 4,533.48**	**15**	**$ 2,210.20**	**19**	**$ 2,785.88**	**202**	**$ 29,812.00**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractor(s)/Vendors																
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 1,480.32		$ 15,778.68		$ 3,063.44		$ 4,593.48		$ 2,210.20		$ 2,845.88	$ 29,972.00	$ 29,972.00
Running Total by Task				$ 1,480.32		$ 17,259.00		$ 20,322.44		$ 24,915.92		$ 27,126.12		$ 29,972.00	**GRAND TOTAL**	**$ 29,972.00**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.

TASK 3 - Field Activities			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor														
Project Manager	$174.76	hour	5	$ 873.80	2	$ 349.52	2	$ 349.52	2	$ 349.52	4	$ 699.04	15	$ 2,621.40
Engineer	$133.64	hour	15	$ 2,004.60	12	$ 1,603.68	12	$ 1,603.68	12	$ 1,603.68	10	$ 1,336.40	61	$ 8,152.04
Scientist	$133.64	hour	15	$ 2,004.60	12	$ 1,603.68	12	$ 1,603.68	12	$ 1,603.68	10	$ 1,336.40	61	$ 8,152.04
Safety Officer	$154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**37**	**$ 5,191.40**	**26**	**$ 3,556.88**	**26**	**$ 3,556.88**	**26**	**$ 3,556.88**	**24**	**$ 3,371.84**	**139**	**$ 19,233.88**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**			**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**			**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -		$ -	1	$ 200.00		$ -			1	$ 200.00
EPL	$ 346.22	LS		$ -		$ -	1	$ 346.22		$ -			1	$ 346.22
PPE	$ 15.00	person/day		$ -		$ -	2	$ 30.00		$ -			2	$ 30.00
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**4**	**$ 576.22**	**0**	**$ -**			**4**	**$ 576.22**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -			2	$ 900.00
Rentals	$ 1,100.00	week		$ -		$ -	1	$ 1,100.00		$ -			1	$ 1,100.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**3**	**$ 2,000.00**	**0**	**$ -**			**3**	**$ 2,000.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**			**2**	**$ 2,000.00**
Subcontractor(s)/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00			2	$ 9,000.00
Charter standby	$ 8,500.00	day		$ -		$ -	1	$ 8,500.00		$ -			1	$ 8,500.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**1**	**$ 8,500.00**	**1**	**$ 4,500.00**			**3**	**$ 17,500.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	2	$ 226.00		$ -			2	$ 226.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -			2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00			4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50			4	$ 387.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**2**	**$ 226.00**	**4**	**$ 493.50**			**12**	**$ 2,513.00**
Task Totals				$ 5,191.40		$ 10,850.38		$ 14,859.10		$ 9,550.38		$ 3,371.84	$ 43,823.10	$ 43,823.10
Running Total by Task				$ 5,191.40		$ 16,041.78		$ 30,900.88		$ 40,451.26		$ 43,823.10	**GRAND TOTAL**	**$ 43,823.10**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of 15 drum features in 1 day while the charter flight stands by.

TASK 4 - Reporting Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Low Estimate	2022 Rate	Unit	Task 4.1 Periodic Review (Pre-Draft) Units	Cost	Task 4.2 Periodic Review (Pre-Draft RTCs) Units	Cost	Task 4.3 Periodic Review (Draft) Units	Cost	Task 4.4 Periodic Review (Draft RTCs) Units	Cost	Task 4.5 Periodic Review (Final) Units	Cost	Total Units	Subtotal
Professional Labor														
Project Manager	$179.65	hour	15	$ 2,694.80	3	$ 538.96	4	$ 718.61	2	$ 359.31	2	$ 359.31	26	$ 4,670.99
Geospatial Specialist	$105.68	hour	20	$ 2,113.57	4	$ 422.71	5	$ 528.39	3	$ 317.04	3	$ 317.04	35	$ 3,698.74
Engineer	$137.38	hour	50	$ 6,869.10	10	$ 1,373.82	13	$ 1,785.96	7	$ 961.67	7	$ 961.67	87	$ 11,952.23
Scientist	$137.38	hour	50	$ 6,869.10	10	$ 1,373.82	13	$ 1,785.96	7	$ 961.67	7	$ 961.67	87	$ 11,952.23
Tech Editor	$147.95	hour	8	$ 1,183.60		$ -	8	$ 1,183.60		$ -	8	$ 1,183.60	24	$ 3,550.79
Professional Labor Subtotal			**143**	**$ 19,730.16**	**27**	**$ 3,709.31**	**43**	**$ 6,002.53**	**19**	**$ 2,599.69**	**27**	**$ 3,783.29**	**259**	**$ 35,824.98**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment														
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs														
Hard copies	$ 12.00	each	2	$ 24.00		$ -	3	$ 36.00		$ -	3	$ 36.00	8	$ 96.00
Other Direct Costs Subtotal			**2**	**$ 24.00**	**0**	**$ -**	**3**	**$ 36.00**	**0**	**$ -**	**3**	**$ 36.00**	**8**	**$ 96.00**
Subcontractor(s)/Vendors														
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel														
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 19,754.16		$ 3,709.31		$ 6,038.53		$ 2,599.69		$ 3,819.29	$ 35,920.98	$ 35,920.98
Running Total by Task				$ 19,754.16		$ 23,463.47		$ 29,502.00		$ 32,101.69		$ 35,920.98	**GRAND TOTAL**	**$ 35,920.98**

Basis of Estimate:

1 Level of effort based on USACE -AK District and stakeholder review.
2 Pre-draft RTC effort is 20% of the Pre-draft Report development effort.
3 Draft Report effort is 25% of the Pre-Draft Report effort.
4 Draft RTC effort is 50% of the Draft Report development effort.
5 Final Report effort is 50% of the Draft Report.

Site Visit Rentals	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
3 handheld marine grade radios	$ 105.00	$ 310.00	$ 930.00
TOTAL	**$ 368.00**	**$ 1,100.00**	**$ 3,260.00**

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	4	each	$ 1.52	$ 6.08
Rite in the rain pens	3	each	$ 14.36	$ 43.08
Rite in the rain notebooks	1	each	$ 14.36	$ 14.36
Highlighters, pens, pencils	1	misc. box	$ 20.00	$ 20.00
Rite in the rain copier paper	0	box	$ 33.61	$ -
Paper towels	3	roll	$ 3.15	$ 9.45
Contractor trash bags	1	box (50 ct)	$ 24.53	$ 24.53
Clear tape	1	roll	$ 6.34	$ 6.34
Strapping tape	1	roll	$ 5.40	$ 5.40
Extra batteries (AA, AAA, C, D)	1	misc. boxes	$ 45.00	$ 45.00
Alconox, 4-lb box	0	4lb box	$ 38.48	$ -
Scissors	0	each	$ 4.63	$ -
Clipboard	1	each	$ 30.60	$ 30.60
Long-handle brushes (decon)	0	each	$ 18.06	$ -
Survey tape	0	each	$ 2.48	$ -
Tape measure	2	each	$ 20.00	$ 40.00
Ratchet straps	4	each	$ 9.77	$ 39.08
Cloth measuring tape (200')	1	each	$ 51.50	$ 51.50
Spray paint (multiple colors)	0	each	$ 5.50	$ -
Lath 36-inch (bundle of 50)	0	bundle	$ 32.95	$ -
Pin flags (bundle of 100)	1	bundle	$ 10.80	$ 10.80
Ziploc freezer bags, gal (14 ct)	0	box	9.95	$ -
Water spray bottles	0	32-oz	$ 5.54	$ -
Buckets with screw-top lids	0	each	$ 22.50	$ -
Di Water, plastic container, 1 gal	0	each	$ 6.08	$ -
			TOTAL	**$ 346.22**

ALTERNATIVE 2
PROJECT 02 DRUMS INSTITUTIONAL CONTROLS – MIDDLE ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
BASE TASKS							
Task 1	Project Management	1	Job	$ 25,392	$ 25,392	2021	$ 25,392
Task 2	Planning Documents	1	Job	$ 40,951	$ 40,951	2021	$ 40,951
Task 3	Field Activities	1	Job	$ 48,068	$ 48,068	2021	$ 48,068
Task 4	Reporting	1	Job	$ 43,795	$ 43,795	2022	$ 42,602
30 YEARS OF PERIODIC REVIEWS							
1st Review	Periodic Review Inspection	1	Job	$ 131,350	$ 131,350	2026	$ 114,410
1st Review	Periodic Review Report	1	Job	$ 50,279	$ 50,279	2027	$ 42,602
2nd Review	Periodic Review Inspection	1	Job	$ 150,798	$ 150,798	2031	$ 114,410
2nd Review	Periodic Review Report	1	Job	$ 57,723	$ 57,723	2032	$ 42,602
3rd Review	Periodic Review Inspection	1	Job	$ 173,126	$ 173,126	2036	$ 114,410
3rd Review	Periodic Review Report	1	Job	$ 66,270	$ 66,270	2037	$ 42,602
4th Review	Periodic Review Inspection	1	Job	$ 198,760	$ 198,760	2041	$ 114,410
4th Review	Periodic Review Report	1	Job	$ 76,082	$ 76,082	2042	$ 42,602
5th Review	Periodic Review Inspection	1	Job	$ 228,188	$ 228,188	2046	$ 114,410
5th Review	Periodic Review Report	1	Job	$ 87,347	$ 87,347	2047	$ 42,602
6th Review	Periodic Review Inspection	1	Job	$ 261,975	$ 261,975	2051	$ 114,410
6th Review	Periodic Review Report	1	Job	$ 100,280	$ 100,280	2052	$ 42,602
				TOTAL COST	**$ 1,740,384**	**TOTAL NET PRESENT WORTH COST**	**$ 1,099,086**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate		2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	Unit
Professional Labor								
	Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
	Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	hour
	Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
	Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	hour
	Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	hour
	Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	hour
	Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
	Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
	Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
	Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
	Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
	Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
	Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
	Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	hour
	Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
	Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
	Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
	Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
	Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
	Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
Craft Labor								
	Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
	Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
	Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$215.88	hour	6	$ 1,295.28	6	$ 1,295.28	0	$ -	12	$ 2,590.56
Project Manager	$174.76	hour	32	$ 5,592.32	12	$ 2,097.12	6	$ 1,048.56	50	$ 8,738.00
Contract Manager	$143.92	hour	0	$ -	12	$ 1,727.04		$ -	12	$ 1,727.04
Project Controls	$195.32	hour	0	$ -	24	$ 4,687.68	6	$ 1,171.92	30	$ 5,859.60
Administrative Assistant	$92.52	hour	0	$ -	12	$ 1,110.24	6	$ 555.12	18	$ 1,665.36
Engineer	$133.64	hour	36	$ 4,811.04	0	$ -	0	$ -	36	$ 4,811.04
Professional Labor Subtotal			**74**	**$ 11,698.64**	**66**	**$ 10,917.36**	**18**	**$ 2,775.60**	**158**	**$ 25,391.60**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractor(s)/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 11,698.64		$ 10,917.36		$ 2,775.60	$ 25,391.60	$ 25,391.60
Running Total by Task				$ 11,698.64		$ 22,616.00		$ 25,391.60	**GRAND TOTAL**	**$ 25,391.60**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; 8 hours for PM and 24 hours for Eng Mid for Quality Management Plan preparation
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 2 reports total
4 PoP = 12 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Work Plan (Pre-Draft RTCs)		Work Plan (Draft)		Work Plan (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$174.76	hour	6	$ 1,048.56	15	$ 2,621.40	3	$ 524.28	4	$ 699.04	2	$ 349.52	2	$ 349.52	32	$ 5,592.32
Project Controls	$195.32	hour	6	$ 1,171.92		$ -		$ -		$ -		$ -		$ -	6	$ 1,171.92
Geospatial Specialist	$102.80	hour		$ -	25	$ 2,570.00	5	$ 514.00	7	$ 719.60	4	$ 411.20	4	$ 411.20	45	$ 4,626.00
Engineer	$133.64	hour		$ -	50	$ 6,682.00	10	$ 1,336.40	13	$ 1,737.32	7	$ 935.48	7	$ 935.48	87	$ 11,626.68
Scientist	$133.64	hour		$ -	30	$ 4,009.20	6	$ 801.84	8	$ 1,069.12	4	$ 534.56	4	$ 534.56	52	$ 6,949.28
Tech Editor	$143.92	hour		$ -	4	$ 575.68		$ -	4	$ 575.68		$ -	4	$ 575.68	12	$ 1,727.04
Archaeologist	$215.88	hour		$ -	20	$ 4,317.60	4	$ 863.52	5	$ 1,079.40	3	$ 647.64	3	$ 647.64	35	$ 7,555.80
Safety Officer	$154.20	hour		$ -	5	$ 771.00	1	$ 154.20	2	$ 308.40	1	$ 154.20	1	$ 154.20	10	$ 1,542.00
Professional Labor Subtotal			**12**	**$ 2,220.48**	**149**	**$ 21,546.88**	**29**	**$ 4,194.24**	**43**	**$ 6,188.56**	**21**	**$ 3,032.60**	**25**	**$ 3,608.28**	**279**	**$ 40,791.04**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractor(s)/Vendors																
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 2,220.48		$ 21,586.88		$ 4,194.24		$ 6,248.56		$ 3,032.60		$ 3,668.28	$ 40,951.04	$ 40,951.04
Running Total by Task				$ 2,220.48		$ 23,807.36		$ 28,001.60		$ 34,250.16		$ 37,282.76		$ 40,951.04	**GRAND TOTAL**	**$ 40,951.04**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes Work Plan and APP/SSHP.
3 Pre-draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.

TASK 3 - Field Activities			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$174.76	hour	8	$ 1,398.08	2	$ 349.52	6	$ 1,048.56	2	$ 349.52	5	$ 873.80	23	$ 4,019.48
Engineer	$133.64	hour	20	$ 2,672.80	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	15	$ 2,004.60	95	$ 12,695.80
Scientist	$133.64	hour	20	$ 2,672.80	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	15	$ 2,004.60	95	$ 12,695.80
Safety Officer	$154.20	hour	5	$ 771.00		$ -		$ -		$ -		$ -	5	$ 771.00
Professional Labor Subtotal			**53**	**$ 7,514.68**	**26**	**$ 3,556.88**	**78**	**$ 10,670.64**	**26**	**$ 3,556.88**	**35**	**$ 4,883.00**	**218**	**$ 30,182.08**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
various hand tools	$ 200.00	LS		$ -		$ -	1	$ 200.00		$ -			1	$ 200.00
EPL	$ 430.77	LS		$ -		$ -	1	$ 430.77		$ -			1	$ 430.77
PPE	$ 15.00	man-day		$ -		$ -	6	$ 90.00		$ -			6	$ 90.00
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 720.77**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 720.77**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -			2	$ 900.00
Rentals	$ 1,100.00	week		$ -		$ -	1	$ 1,100.00		$ -			1	$ 1,100.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**3**	**$ 2,000.00**	**0**	**$ -**	**0**	**$ -**	**3**	**$ 2,000.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractor(s)/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00			2	$ 9,000.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -			6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -			2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00			4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50			4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	6	$ 1,200.00		$ -			6	$ 1,200.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**12**	**$ 1,878.00**	**4**	**$ 493.50**	**0**	**$ -**	**22**	**$ 4,165.00**
Task Totals				$ 7,514.68		$ 10,850.38		$ 15,269.41		$ 9,550.38		$ 4,883.00	$ 48,067.85	$ 48,067.85
Running Total by Task				$ 7,514.68		$ 18,365.06		$ 33,634.47		$ 43,184.85		$ 48,067.85	**GRAND TOTAL**	**$ 48,067.85**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of 15 drum features per day. Assume 38 features to inspect; therefore 3 days of fieldwork.

TASK 4 - Reporting			Task 4.1		Task 4.2		Task 4.3		Task 4.4		Task 4.5			
			Periodic Review (Pre-Draft)		Periodic Review (Pre-Draft RTCs)		Periodic Review (Draft)		Periodic Review (Draft RTCs)		Periodic Review (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$179.65	hour	20	$ 3,593.07	4	$ 718.61	5	$ 898.27	3	$ 538.96	3	$ 538.96	35	$ 6,287.86
Geospatial Specialist	$105.68	hour	30	$ 3,170.35	6	$ 634.07	8	$ 845.43	4	$ 422.71	4	$ 422.71	52	$ 5,495.28
Engineer	$137.38	hour	60	$ 8,242.92	12	$ 1,648.58	15	$ 2,060.73	8	$ 1,099.06	8	$ 1,099.06	103	$ 14,150.34
Scientist	$137.38	hour	60	$ 8,242.92	12	$ 1,648.58	15	$ 2,060.73	8	$ 1,099.06	8	$ 1,099.06	103	$ 14,150.34
Tech Editor	$147.95	hour	8	$ 1,183.60		$ -	8	$ 1,183.60		$ -	8	$ 1,183.60	24	$ 3,550.79
Professional Labor Subtotal			**178**	**$ 24,432.85**	**34**	**$ 4,649.85**	**51**	**$ 7,048.75**	**23**	**$ 3,159.78**	**31**	**$ 4,343.38**	**317**	**$ 43,634.61**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment														
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs														
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractor(s)/Vendors														
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel														
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 24,472.85		$ 4,649.85		$ 7,108.75		$ 3,159.78		$ 4,403.38	$ 43,794.61	$ 43,794.61
Running Total by Task				$ 24,472.85		$ 29,122.70		$ 36,231.44		$ 39,391.23		$ 43,794.61	**GRAND TOTAL**	**$ 43,794.61**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
3 Draft Report effort is 25% of the Pre-Draft Report effort.
4 Draft RTC effort is 50% of the Draft Report development effort.
5 Final Report effort is 50% of the Draft Report.

Site Visit Rentals	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping-Grade GPS with Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
3 handheld marine-grade radios	$ 105.00	$ 310.00	$ 930.00
TOTAL	**$ 368.00**	**$ 1,100.00**	**$ 3,260.00**

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	4	each	$ 1.52	$ 6.08
Rite in the rain pens	4	each	$ 14.36	$ 57.44
Rite in the rain notebooks	2	each	$ 14.36	$ 28.72
Highlighters, pens, pencils	1	misc. box	$ 20.00	$ 20.00
Rite in the rain copier paper	0	box	$ 33.61	$ -
Paper towels	5	roll	$ 3.15	$ 15.75
Contractor trash bags	1	box (50 ct)	$ 24.53	$ 24.53
Clear tape	1	roll	$ 6.34	$ 6.34
Strapping tape	1	roll	$ 5.40	$ 5.40
Extra batteries (AA, AAA, C, D)	1	misc. boxes	$ 45.00	$ 45.00
Alconox, 4-lb box	0	4lb box	$ 38.48	$ -
Scissors	0	each	$ 4.63	$ -
Clipboard	1	each	$ 30.60	$ 30.60
Long handle brushes (decon)	0	each	$ 18.06	$ -
Survey tape	1	each	$ 2.48	$ 2.48
Tape measure	2	each	$ 20.00	$ 40.00
Ratchet straps	6	each	$ 9.77	$ 58.62
cloth measuring tape (200 feet)	1	each	$ 51.50	$ 51.50
Spray paint (multiple colors)	0	each	$ 5.50	$ -
Lath 36-inch (bundle of 50)	0	bundle	$ 32.95	$ -
Pin Flags (bundle of 100)	1	bundle	$ 10.80	$ 10.80
Ziploc Freezer Bags, gal (14 ct)	1	box	9.95	$ 9.95
Water spray bottles	0	32-oz	$ 5.54	$ -
Buckets with screw-top lids	0	each	$ 22.50	$ -
4-mil nitrile gloves (25)	2	box	$ 8.78	$ 17.56
Di Water, plastic container, 1-gal	0	each	$ 6.08	$ -
			TOTAL	**$ 430.77**

ALTERNATIVE 2
PROJECT 02 DRUMS INSTITUTIONAL CONTROLS – HIGH ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
BASE TASKS							
Task 1	Project Management	1	Job	$ 25,392	$ 25,392	2021	$ 25,392
Task 2	Planning Documents	1	Job	$ 52,763	$ 52,763	2021	$ 52,763
Task 3	Field Activities	1	Job	$ 60,591	$ 60,591	2021	$ 60,591
Task 4	Reporting	1	Job	$ 54,996	$ 54,996	2022	$ 53,498
30 YEARS OF PERIODIC REVIEWS							
1st Review	Periodic Review Inspection	1	Job	$ 159,288	$ 159,288	2026	$ 138,745
1st Review	Periodic Review Report	1	Job	$ 63,139	$ 63,139	2027	$ 53,498
2nd Review	Periodic Review Inspection	1	Job	$ 182,873	$ 182,873	2031	$ 138,745
2nd Review	Periodic Review Report	1	Job	$ 72,487	$ 72,487	2032	$ 53,498
3rd Review	Periodic Review Inspection	1	Job	$ 209,950	$ 209,950	2036	$ 138,745
3rd Review	Periodic Review Report	1	Job	$ 83,220	$ 83,220	2037	$ 53,498
4th Review	Periodic Review Inspection	1	Job	$ 241,035	$ 241,035	2041	$ 138,745
4th Review	Periodic Review Report	1	Job	$ 95,542	$ 95,542	2042	$ 53,498
5th Review	Periodic Review Inspection	1	Job	$ 276,724	$ 276,724	2046	$ 138,745
5th Review	Periodic Review Report	1	Job	$ 109,688	$ 109,688	2047	$ 53,498
6th Review	Periodic Review Inspection	1	Job	$ 317,696	$ 317,696	2051	$ 138,745
6th Review	Periodic Review Report	1	Job	$ 125,928	$ 125,928	2052	$ 53,498
				TOTAL COST	**$ 2,131,312**	**TOTAL NET PRESENT WORTH COST**	**$ 1,345,704**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	Unit
Professional Labor							
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	hour
Craft Labor							
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost		
Professional Labor										
Program Manager	$215.88	hour	6	$ 1,295.28	6	$ 1,295.28	0	$ -	12	$ 2,590.56
Project Manager	$174.76	hour	32	$ 5,592.32	12	$ 2,097.12	6	$ 1,048.56	50	$ 8,738.00
Contract Manager	$143.92	hour	0	$ -	12	$ 1,727.04		$ -	12	$ 1,727.04
Project Controls	$195.32	hour	0	$ -	24	$ 4,687.68	6	$ 1,171.92	30	$ 5,859.60
Administrative Assistant	$92.52	hour	0	$ -	12	$ 1,110.24	6	$ 555.12	18	$ 1,665.36
Engineer	$133.64	hour	36	$ 4,811.04	0	$ -	0	$ -	36	$ 4,811.04
Professional Labor Subtotal			**74**	**$ 11,698.64**	**66**	**$ 10,917.36**	**18**	**$ 2,775.60**	**158**	**$ 25,391.60**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractor(s)/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 11,698.64		$ 10,917.36		$ 2,775.60	$ 25,391.60	$ 25,391.60
Running Total by Task				$ 11,698.64		$ 22,616.00		$ 25,391.60	**GRAND TOTAL**	**$ 25,391.60**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; 8 hours for PM and 24 hours for Eng Mid for Quality Management Plan preparation
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 2 reports total
4 PoP = 12 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Work Plan (Pre-Draft RTCs)		Work Plan (Draft)		Work Plan (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$174.76	hour	8	$ 1,398.08	20	$ 3,495.20	4	$ 699.04	5	$ 873.80	3	$ 524.28	3	$ 524.28	43	$ 7,514.68
Project Controls	$195.32	hour	8	$ 1,562.56		$ -		$ -		$ -		$ -		$ -	8	$ 1,562.56
Geospatial Specialist	$102.80	hour		$ -	30	$ 3,084.00	6	$ 616.80	8	$ 822.40	4	$ 411.20	4	$ 411.20	52	$ 5,345.60
Engineer	$133.64	hour		$ -	60	$ 8,018.40	12	$ 1,603.68	15	$ 2,004.60	8	$ 1,069.12	8	$ 1,069.12	103	$ 13,764.92
Scientist	$133.64	hour		$ -	40	$ 5,345.60	8	$ 1,069.12	10	$ 1,336.40	5	$ 668.20	5	$ 668.20	68	$ 9,087.52
Tech Editor	$143.92	hour		$ -	8	$ 1,151.36		$ -	8	$ 1,151.36		$ -	8	$ 1,151.36	24	$ 3,454.08
Archaeologist	$215.88	hour		$ -	25	$ 5,397.00	5	$ 1,079.40	7	$ 1,511.16	4	$ 863.52	4	$ 863.52	45	$ 9,714.60
Safety Officer	$154.20	hour		$ -	8	$ 1,233.60	2	$ 308.40	2	$ 308.40	1	$ 154.20	1	$ 154.20	14	$ 2,158.80
Professional Labor Subtotal			**16**	**$ 2,960.64**	**191**	**$ 27,725.16**	**37**	**$ 5,376.44**	**55**	**$ 8,008.12**	**25**	**$ 3,690.52**	**33**	**$ 4,841.88**	**357**	**$ 52,602.76**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractor(s)/Vendors																
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 2,960.64		$ 27,765.16		$ 5,376.44		$ 8,068.12		$ 3,690.52		$ 4,901.88	$ 52,762.76	$ 52,762.76
Running Total by Task				$ 2,960.64		$ 30,725.80		$ 36,102.24		$ 44,170.36		$ 47,860.88		$ 52,762.76	**GRAND TOTAL**	**$ 52,762.76**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes Work Plan and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft Work Plan development effort.
6 Final WP effort is 50% of the Draft WP.

TASK 3 - Field Activities			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$174.76	hour	10	$ 1,747.60	2	$ 349.52	10	$ 1,747.60	2	$ 349.52	8	$ 1,398.08	32	$ 5,592.32
Engineer	$133.64	hour	25	$ 3,341.00	12	$ 1,603.68	60	$ 8,018.40	12	$ 1,603.68	20	$ 2,672.80	129	$ 17,239.56
Scientist	$133.64	hour	25	$ 3,341.00	12	$ 1,603.68	60	$ 8,018.40	12	$ 1,603.68	20	$ 2,672.80	129	$ 17,239.56
Safety Officer	$154.20	hour	8	$ 1,233.60		$ -		$ -		$ -		$ -	8	$ 1,233.60
Professional Labor Subtotal			**68**	**$ 9,663.20**	**26**	**$ 3,556.88**	**130**	**$ 17,784.40**	**26**	**$ 3,556.88**	**48**	**$ 6,743.68**	**298**	**$ 41,305.04**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**			**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**			**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -		$ -	1	$ 200.00		$ -			1	$ 200.00
EPL	$ 518.98	LS		$ -		$ -	1	$ 518.98		$ -			1	$ 518.98
PPE	$ 15.00	man-day		$ -		$ -	10	$ 150.00		$ -			10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**12**	**$ 868.98**	**0**	**$ -**			**12**	**$ 868.98**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -			2	$ 900.00
Rentals	$ 1,100.00	week		$ -		$ -	1	$ 1,100.00		$ -			1	$ 1,100.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**3**	**$ 2,000.00**	**0**	**$ -**			**3**	**$ 2,000.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**			**2**	**$ 2,000.00**
Subcontractor(s)/Vendors														
Charter Flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00			2	$ 9,000.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**			**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	10	$ 1,130.00		$ -			10	$ 1,130.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -			2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00			4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50			4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	10	$ 2,000.00		$ -			10	$ 2,000.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**20**	**$ 3,130.00**	**4**	**$ 493.50**			**30**	**$ 5,417.00**
Task Totals				$ 9,663.20		$ 10,850.38		$ 23,783.38		$ 9,550.38		$ 6,743.68	$ 60,591.02	$ 60,591.02
Running Total by Task				$ 9,663.20		$ 20,513.58		$ 44,296.96		$ 53,847.34		$ 60,591.02	**GRAND TOTAL**	**$ 60,591.02**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of 15 drum features per day. Assume 68 features to inspect; therefore 5 days of fieldwork.

TASK 4 - Reporting			Task 4.1		Task 4.2		Task 4.3		Task 4.4		Task 4.5			
			Periodic Review (Pre-Draft)		Periodic Review (Pre-Draft RTCs)		Periodic Review (Draft)		Periodic Review (Draft RTCs)		Periodic Reivew (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Drums; Institutional Controls - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$179.65	hour	25	$ 4,491.33	5	$ 898.27	7	$ 1,257.57	4	$ 718.61	4	$ 718.61	45	$ 8,084.40
Geospatial Specialist	$105.68	hour	40	$ 4,227.14	8	$ 845.43	10	$ 1,056.78	5	$ 528.39	5	$ 528.39	68	$ 7,186.13
Engineer	$137.38	hour	70	$ 9,616.73	14	$ 1,923.35	18	$ 2,472.87	9	$ 1,236.44	9	$ 1,236.44	120	$ 16,485.83
Scientist	$137.38	hour	70	$ 9,616.73	14	$ 1,923.35	18	$ 2,472.87	9	$ 1,236.44	9	$ 1,236.44	120	$ 16,485.83
Tech Editor	$147.95	hour	15	$ 2,219.25		$ -	15	$ 2,219.25		$ -	15	$ 2,219.25	45	$ 6,657.74
Professional Labor Subtotal			**220**	**$ 30,171.18**	**41**	**$ 5,590.39**	**68**	**$ 9,479.35**	**27**	**$ 3,719.88**	**42**	**$ 5,939.13**	**398**	**$ 54,899.93**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment														
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs														
Hard copies	$ 12.00	each	2	$ 24.00		$ -	3	$ 36.00		$ -	3	$ 36.00	8	$ 96.00
Other Direct Costs Subtotal			**2**	**$ 24.00**	**0**	**$ -**	**3**	**$ 36.00**	**0**	**$ -**	**3**	**$ 36.00**	**8**	**$ 96.00**
Subcontractor(s)/Vendors														
Subcontractor/Vendor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel														
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 30,195.18		$ 5,590.39		$ 9,515.35		$ 3,719.88		$ 5,975.13	$ 54,995.93	$ 54,995.93
Running Total by Task				$ 30,195.18		$ 35,785.57		$ 45,300.92		$ 49,020.80		$ 54,995.93	**GRAND TOTAL**	**$ 54,995.93**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
3 Draft Report effort is 25% of the Pre-Draft Report effort.
4 Draft RTC effort is 50% of the Draft Report development effort.
5 Final Report effort is 50% of the Draft Report.

Site Visit Rentals	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping-Grade GPS with Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
3 Handheld Marine-Grade Radios	$ 105.00	$ 310.00	$ 930.00
TOTAL	**$ 368.00**	**$ 1,100.00**	**$ 3,260.00**

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	6	each	$ 1.52	$ 9.12
Rite in the rain pens	6	each	$ 14.36	$ 86.16
Rite in the rain notebooks	2	each	$ 14.36	$ 28.72
Highlighters, pens, pencils	1	misc. box	$ 20.00	$ 20.00
Rite in the rain copier paper	0	box	$ 33.61	$ -
Paper towels	6	roll	$ 3.15	$ 18.90
Contractor trash bags	1	box (50 ct)	$ 24.53	$ 24.53
Clear tape	1	roll	$ 6.34	$ 6.34
Strapping tape	2	roll	$ 5.40	$ 10.80
Extra batteries (AA, AAA, C, D)	1	misc. boxes	$ 45.00	$ 45.00
Alconox, 4 lb box	0	4-lb box	$ 38.48	$ -
Scissors	0	each	$ 4.63	$ -
Clipboard	1	each	$ 30.60	$ 30.60
Long-handle brushes (decon)	0	each	$ 18.06	$ -
Survey tape	1	each	$ 2.48	$ 2.48
Tape measure	2	each	$ 20.00	$ 40.00
Ratchet straps	8	each	$ 9.77	$ 78.16
Cloth measuring tape (200 feet)	1	each	$ 51.50	$ 51.50
Spray paint (multiple colors)	0	each	$ 5.50	$ -
Lath 36-inch (bundle of 50)	0	bundle	$ 32.95	$ -
Pin flags (bundle of 100)	2	bundle	$ 10.80	$ 21.60
Ziploc freezer bags, gallon (14 ct)	1	box	9.95	$ 9.95
Water spray bottles	0	32-oz	$ 5.54	$ -
Buckets with screw-top lids	0	each	$ 22.50	$ -
4-mil nitrile gloves (25)	4	box	$ 8.78	$ 35.12
Di Water, plastic container, 1 gal	0	each	$ 6.08	$ -
			TOTAL	**$ 518.98**

ALTERNATIVE 3
PROJECT 02 INCINERATION – LOW ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 72,854	$ 72,854	2021	$ 72,854
Task 2	Planning Documents	1	Job	$ 100,709	$ 100,709	2021	$ 100,709
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization	1	Job	$ 927,181	$ 927,181	2022	$ 901,927
Task 5	Excavation Field Effort	1	Job	$ 8,246,786	$ 8,246,786	2022	$ 8,022,166
Task 6	Reporting	1	Job	$ 298,202	$ 298,202	2023	$ 282,179
				TOTAL	**$ 9,694,497**	**Total Net Present Worth Cost**	**$ 9,428,600**
				Cost per Cubic Yard	**$ 990**	**Cost per Cubic Yard**	**$ 963**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1-Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	18	$ 3,885.84	26	$ 5,612.88		$ -	44	$ 9,498.72
Project Manager	$ 174.76	hour	84	$ 14,679.84	44	$ 7,689.44	15	$ 2,621.40	143	$ 24,990.68
Contract Manager	$ 143.92	hour		$ -	44	$ 6,332.48		$ -	44	$ 6,332.48
Project Controls	$ 195.32	hour		$ -	80	$ 15,625.60	15	$ 2,929.80	95	$ 18,555.40
Administrative Assistant	$ 92.52	hour		$ -	44	$ 4,070.88	15	$ 1,387.80	59	$ 5,458.68
Engineer	$ 133.64	hour	60	$ 8,018.40		$ -		$ -	60	$ 8,018.40
Professional Labor Subtotal			**162**	**$ 26,584.08**	**238**	**$ 39,331.28**	**45**	**$ 6,939.00**	**445**	**$ 72,854.36**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 26,584.08		$ 39,331.28		$ 6,939.00	$ 72,854.36	$ 72,854.36
Running Total by Task				$ 26,584.08		$ 65,915.36		$ 72,854.36	**GRAND TOTAL**	**$72,854.36**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 5 reports total
4 PoP=36 months

TASK 2 - Planning Documents

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	2021 Rate	Unit	Task 2.1 Project Schedule Units	Task 2.1 Project Schedule Cost	Task 2.2 Work Plan (Pre-Draft) Units	Task 2.2 Work Plan (Pre-Draft) Cost	Task 2.3 Planning Documents (Pre-Draft RTCs) Units	Task 2.3 Planning Documents (Pre-Draft RTCs) Cost	Task 2.4 Work Plan (Draft) Units	Task 2.4 Work Plan (Draft) Cost	Task 2.5 Planning Documents (Draft RTCs) Units	Task 2.5 Planning Documents (Draft RTCs) Cost	Task 2.6 Work Plan (Final) Units	Task 2.6 Work Plan (Final) Cost	Total Units	Subtotal
Professional Labor																
Project Manager	$ 174.76	hour	4	$ 699.04	32	$ 5,592.32	7	$ 1,223.32	8	$ 1,398.08	4	$ 699.04	4	$ 699.04	59	$ 10,310.84
Project Controls	$ 195.32	hour	4	$ 781.28		$ -		$ -		$ -		$ -		$ -	4	$ 781.28
Geospatial Specialist	$ 102.80	hour		$ -	40	$ 4,112.00	8	$ 822.40	10	$ 1,028.00	5	$ 514.00	5	$ 514.00	68	$ 6,990.40
Engineer	$ 133.64	hour		$ -	80	$ 10,691.20	16	$ 2,138.24	20	$ 2,672.80	10	$ 1,336.40	10	$ 1,336.40	136	$ 18,175.04
Scientist	$ 133.64	hour		$ -	100	$ 13,364.00	16	$ 2,138.24	20	$ 2,672.80	10	$ 1,336.40	10	$ 1,336.40	156	$ 20,847.84
Regulatory Specialist	$ 215.88	hour		$ -	36	$ 7,771.68	8	$ 1,727.04	9	$ 1,942.92	5	$ 1,079.40	5	$ 1,079.40	63	$ 13,600.44
Project Chemist	$ 102.80	hour		$ -	56	$ 5,756.80	8	$ 822.40	9	$ 925.20	5	$ 514.00	5	$ 514.00	83	$ 8,532.40
Tech Editor	$ 143.92	hour		$ -	24	$ 3,454.08		$ -	15	$ 2,158.80		$ -	15	$ 2,158.80	54	$ 7,771.68
Archeologist	$ 215.88	hour		$ -	26	$ 5,612.88	6	$ 1,295.28	7	$ 1,511.16	4	$ 863.52	4	$ 863.52	47	$ 10,146.36
Safety Officer	$ 154.20	hour		$ -	12	$ 1,850.40	3	$ 462.60	3	$ 462.60	2	$ 308.40	2	$ 308.40	22	$ 3,392.40
Professional Labor Subtotal			**8**	**$ 1,480.32**	**406**	**$ 58,205.36**	**72**	**$ 10,629.52**	**101**	**$ 14,772.36**	**45**	**$ 6,651.16**	**60**	**$ 8,809.96**	**692**	**$ 100,548.68**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 1,480.32		$ 58,245.36		$ 10,629.52		$ 14,832.36		$ 6,651.16		$ 8,869.96	$ 100,708.68	$ 100,708.68
Running Total by Task				$ 1,480.32		$ 59,725.68		$ 70,355.20		$ 85,187.56		$ 91,838.72		$ 100,708.68	**GRAND TOTAL**	**$100,708.68**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor		**153.42709**												
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping-grade GPS with tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld marine-grade radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**		**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**		**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**		**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$48,765.20**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	48	$ 6,594.33	48	$ 6,594.33	20	$ 2,747.64	156	$ 21,431.58
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archeologist	$ 221.92	hour		$ -	24	$ 5,326.19	24	$ 5,326.19		$ -	48	$ 10,652.38
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**152**	**$ 24,010.13**	**152**	**$ 24,010.13**	**100**	**$ 13,611.38**	**604**	**$ 88,854.40**
Craft Labor												
Operator	$ 147.95	hour		$ -	96	$ 14,203.18	48	$ 7,101.59		$ -	144	$ 21,304.77
Laborer	$ 137.38	hour		$ -	48	$ 6,594.33	72	$ 9,891.50		$ -	120	$ 16,485.83
Truck Driver	$ 105.68	hour		$ -	48	$ 5,072.56	48	$ 5,072.56		$ -	96	$ 10,145.13
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**216**	**$ 29,167.24**	**192**	**$ 25,362.82**	**0**	**$ -**	**408**	**$ 54,530.05**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	36	$ 540.00	36	$ 540.00		$ -	72	$ 1,080.00
Supplies Subtotal			**0**	**$ -**	**36**	**$ 540.00**	**36**	**$ 540.00**	**0**	**$ -**	**72**	**$ 1,080.00**
Equipment												
350 Excavator	$ 2,725.00	week		$ -	1	$ 2,725.00	1	$ 2,725.00		$ -	2	$ 5,450.00
200 Excavator	$ 1,625.00	week		$ -	1	$ 1,625.00	1	$ 1,625.00		$ -	2	$ 3,250.00
750 Dozer	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
15-yard Rock Truck	$ 3,225.00	week		$ -	2	$ 6,450.00	2	$ 6,450.00		$ -	4	$ 12,900.00
Marooka	$ 2,475.00	week		$ -	1	$ 2,475.00	1	$ 2,475.00		$ -	2	$ 4,950.00
Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
Water Truck (4,000-gal)	$ 1,500.00	week		$ -	1	$ 1,500.00	1	$ 1,500.00		$ -	2	$ 3,000.00
960 Loader	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
Light Plant	$ 131.25	week		$ -	2	$ 262.50	2	$ 262.50		$ -	4	$ 525.00
UTV	$ 840.00	week		$ -	4	$ 3,360.00	4	$ 3,360.00		$ -	8	$ 6,720.00
2,000-gal Water Tank	$ 125.00	week		$ -	1	$ 125.00	1	$ 125.00		$ -	2	$ 250.00
Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
Maintenance tools	$ 812.50	week			1	$ 812.50	1	$ 812.50			2	$ 1,625.00
Rentals (1 wk rental to cover mob)	$ 7,802.00	week		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
Equipment Subtotal			**0**	**$ -**	**31**	**$ 39,729.50**	**31**	**$ 39,729.50**	**0**	**$ -**	**62**	**$ 79,459.00**
Other Direct Costs												
Container/Equipment Transport Cost	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Incinerator Mob/Demob	$ 30,000.00	LS		$ -	1	$ 30,000.00	1	$ 30,000.00		$ -	2	$ 60,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**14**	**$ 41,050.00**	**14**	**$ 41,050.00**	**0**	**$ -**	**28**	**$ 82,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge Loading/Unloading Fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	3	$ 13,500.00	3	$ 13,500.00		$ -	6	$ 27,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**10**	**$ 293,460.00**	**10**	**$ 293,460.00**	**0**	**$ -**	**20**	**$ 586,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	25	$ 2,825.00	25	$ 2,825.00		$ -	50	$ 5,650.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	12.5	$ 8,125.00	12.5	$ 8,125.00		$ -	25	$ 16,250.00
Hotel DUT	$ 150.00	day		$ -	25	$ 3,750.00	25	$ 3,750.00		$ -	50	$ 7,500.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	25	$ 2,418.75	25	$ 2,418.75		$ -	50	$ 4,837.50
Travel Subtotal			**0**	**$ -**	**87.5**	**$ 17,118.75**	**87.5**	**$ 17,118.75**	**0**	**$ -**	**175**	**$ 34,237.50**
Task Totals				$ 27,222.76		$ 445,075.62		$ 441,271.20		$ 13,611.38	$ 927,180.95	$ 927,180.95
Running Total by Task				$ 27,222.76		$ 472,298.38		$ 913,569.58		$ 927,180.95	**GRAND TOTAL**	**$927,180.95**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Assumes incineration subcontracted personnel rotate out monthly.
5 Tundra mats originate in Fairbanks.
6 Mobile incinerator equipment originates in Seattle; no rental cost with incinerator unit, as cost is based on price per treated ton

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 179.65	hour	28	$ 5,030.29	51	$ 9,162.32	51	$ 9,162.32	51	$ 9,162.32	51	$ 9,162.32	14	$ 2,515.15	246	$ 44,194.71
Geospatial Specialist	$ 105.68	hour		$ -	672	$ 71,015.88		$ -		$ -		$ -		$ -	672	$ 71,015.88
Engineer	$ 137.38	hour	168	$ 23,080.16	1224	$ 168,155.47		$ -		$ -		$ -	84	$ 11,540.08	1476	$ 202,775.71
Scientist	$ 137.38	hour	336	$ 46,160.33	1224	$ 168,155.47	1224	$ 168,155.47		$ -		$ -	168	$ 23,080.16	2952	$ 405,551.43
Professional Land Surveyor	$ 116.25	hour		$ -	672	$ 78,117.47		$ -		$ -		$ -		$ -	672	$ 78,117.47
Construction Manager	$ 147.95	hour	168	$ 24,855.56		$ -		$ -		$ -	1224	$ 181,090.51	84	$ 12,427.78	1476	$ 218,373.85
Archeologist	$ 221.92	hour	168	$ 37,283.34	1224	$ 271,635.76		$ -		$ -		$ -	84	$ 18,641.67	1476	$ 327,560.77
Superintendent	$ 158.52	hour	168	$ 26,630.96		$ -		$ -		$ -	1224	$ 194,025.54	84	$ 13,315.48	1476	$ 233,971.98
Professional Labor Subtotal				**$ 163,040.64**	**5067**	**$ 766,242.37**	**1275**	**$ 177,317.79**	**51**	**$ 9,162.32**	**2499**	**$ 384,278.37**	**518**	**$ 81,520.32**	**10446**	**$ 1,581,561.80**
Craft Labor																
Operator	$ 147.95	hour	672	$ 99,422.24	1224	$ 181,090.51	2448	$ 362,181.01	1224	$ 181,090.51		$ -	336	$ 49,711.12	5904	$ 873,495.38
Laborer	$ 137.38	hour	336	$ 46,160.33	1224	$ 168,155.47		$ -		$ -	1224	$ 168,155.47	168	$ 23,080.16	2952	$ 405,551.43
Truck Driver	$ 105.68	hour	336	$ 35,507.94	1224	$ 129,350.36		$ -	1224	$ 129,350.36		$ -	168	$ 17,753.97	2952	$ 311,962.64
Mechanic	$ 137.38	hour	168	$ 23,080.16		$ -		$ -		$ -	1224	$ 168,155.47	84	$ 11,540.08	1476	$ 202,775.71
Craft Labor Subtotal				**$ 204,170.67**	**3672**	**$ 478,596.34**	**2448**	**$ 362,181.01**	**2448**	**$ 310,440.87**	**2448**	**$ 336,310.94**	**756**	**$ 102,085.33**	**13284**	**$ 1,793,785.16**
Materials																
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		$ -		$ -	1	$ 14,995.80
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	510	$ 5,100.00	612	$ 6,120.00	204	$ 2,040.00	306	$ 3,060.00	112	$ 1,120.00	1968	$ 19,680.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	724	$ 10,860.00	612	$ 9,180.00	204	$ 3,060.00	510	$ 7,650.00	112	$ 1,680.00	2386	$ 35,790.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	1530	$ 6,120.00		$ -		$ -	510	$ 2,040.00	140	$ 560.00	2460	$ 9,840.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	14450	$ 54,187.50	95594.4	$ 358,479.00	12750	$ 47,812.50	13175	$ 49,406.25	3307.5	$ 12,403.13	148903.8	$ 558,389.13
Supplies Subtotal				**$ 42,820.75**	**17215.0**	**$ 91,263.30**	**96818.4**	**$ 373,779.00**	**13158.0**	**$ 52,912.50**	**14501.0**	**$ 62,156.25**	**3671.5**	**$ 15,763.13**	**155718.8**	**$ 638,694.93**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.4	$ 37,060.00		$ -		$ -		$ -	0.2	$ 2,543.33	4.1	$ 44,690.00
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	3.4	$ 22,100.00		$ -		$ -	0.2	$ 1,516.67	4.1	$ 26,650.00
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	3.4	$ 26,860.00		$ -	0.2	$ 1,843.33	4.1	$ 32,390.00
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	3.4	$ 43,860.00		$ -	3.4	$ 43,860.00		$ -	0.5	$ 6,020.00	8.2	$ 105,780.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	3.4	$ 33,660.00	0.2	$ 2,310.00	4.1	$ 40,590.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	3.4	$ 12,410.00	0.2	$ 851.67	4.1	$ 14,965.00
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	3.4	$ 25,160.00		$ -		$ -	0.2	$ 1,726.67	4.1	$ 30,340.00
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	3.4	$ 20,400.00		$ -		$ -	0.2	$ 1,400.00	4.1	$ 24,600.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	3.4	$ 26,860.00		$ -		$ -	0.2	$ 1,843.33	4.1	$ 32,390.00
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	6.8	$ 3,570.00		$ -		$ -	0.5	$ 245.00	8.2	$ 4,305.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	10.2	$ 34,272.00		$ -		$ -	3.4	$ 11,424.00	0.9	$ 3,136.00	16.4	$ 55,104.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	2.0	$ 2,000.00		$ -	2.0	$ 2,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	1122.0	$ 16,830.00	77.0	$ 1,155.00	1353.0	$ 20,295.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	51.0	$ 34,425.00		$ -	51.0	$ 34,425.00		$ -	7.0	$ 4,725.00	123.0	$ 83,025.00
Rentals	$ 23,371.00	month	0.5	$ 10,906.47	3.4	$ 79,461.40		$ -		$ -		$ -	0.2	$ 5,453.23	4.1	$ 95,821.10
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	3.4	$ 1,700.00	0.2	$ 116.67	4.1	$ 2,050.00
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	3.4	$ 11,050.00	0.2	$ 758.33	4.1	$ 13,325.00
Equipment Subtotal			**176.9**	**$ 71,288.47**	**71.4**	**$ 229,078.40**	**20.4**	**$ 98,090.00**	**57.8**	**$ 105,145.00**	**1141.0**	**$ 89,074.00**	**88.4**	**$ 35,644.23**	**1555.9**	**$ 628,320.10**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each	1	$ 100.00	39	$ 3,900.00	14	$ 1,400.00		$ -		$ -	1	$ 100.00	55.0	$ 5,500.00
Drum Disposal	$ 313,760.00	LS		$ -		$ -		$ -	1	$ 313,760.00		$ -		$ -	1.0	$ 313,760.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	3.4	$ 43,520.00		$ -	3.4	$ 43,520.00
Other Direct Costs Subtotal				**$ 7,869.00**	**39**	**$ 3,900.00**	**14**	**$ 1,400.00**	**1**	**$ 313,760.00**	**3.4**	**$ 43,520.00**	**1**	**$ 100.00**	**60.4**	**$ 370,549.00**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,732,867.17	LS		$ -		$ -	1	$ 1,732,867.17		$ -		$ -		$ -	1.0	$ 1,732,867.17
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	16	$ 280,000.00		$ -	16.0	$ 280,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	102	$ 85,170.00	7	$ 5,845.00	123.0	$ 102,705.00
Analytical Laboratory (confirmation samples)	$ 255,154.00	LS		$ -	1	$ 255,154.00		$ -		$ -		$ -		$ -	1.0	$ 255,154.00
Analytical Laboratory (composite samples)	$ 93,869.00	LS		$ -		$ -	1	$ 93,869.00		$ -		$ -		$ -	1.0	$ 93,869.00
Analytical Laboratory (Baseline ISM samples)	$ 2,310.00	LS	1	$ 2,310.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 2,310.00
Analytical Laboratory (Post-Treatment ISM samples)	$ 2,310.00	LS		$ -		$ -		$ -		$ -		$ -	1	$ 2,310.00	1.0	$ 2,310.00
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	102	$ 66,300.00	7	$ 4,550.00	123.0	$ 79,950.00
Analytical Laboratory (pre-excavation sampling)	$ 23,981.25	LS		$ -	1	$ 23,981.25		$ -		$ -		$ -		$ -	1.0	$ 23,981.25
Subcontractor/Vendors Subtotal				**$ 23,100.00**	**2**	**$ 279,135.25**	**2**	**$ 1,826,736.17**	**0**	**$ -**	**220**	**$ 431,470.00**	**15**	**$ 12,705.00**	**268**	**$ 2,573,146.42**
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	660	$ 74,580.00	510	$ 57,630.00	204	$ 23,052.00	612	$ 69,156.00	133	$ 15,029.00	2385.0	$ 269,505.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	102	$ 306,000.00	7	$ 21,000.00	123.0	$ 369,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	56	$ 16,800.00		$ -		$ -		$ -		$ -	56.0	$ 16,800.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	64	$ 5,424.00		$ -		$ -		$ -		$ -	64.0	$ 5,424.00
Travel Subtotal				**$ 72,058.00**	**780**	**$ 96,804.00**	**510**	**$ 57,630.00**	**204**	**$ 23,052.00**	**714**	**$ 375,156.00**	**140**	**$ 36,029.00**	**2628.0**	**$ 660,729.00**
Task Totals				$ 584,347.52		$ 1,945,019.66		$ 2,897,133.97		$ 814,472.69		$ 1,721,965.56		$ 283,847.01	$ 8,246,786.41	$ 8,246,786.41
Running Total by Task				$ 584,347.52		$ 1,945,019.66		$ 4,842,153.63		$ 5,656,626.32		$ 7,378,591.87		$ 7,662,438.88	**GRAND TOTAL**	**$8,246,786.41**

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this period.
3 Task 5.1 also includes baseline ISM sampling of the treatment area and initial access construction to features for excavation.
4 Task 5.2 includes pre-excavation analytical sampling of each site feature, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 123 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump feature.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes running the incineration equipment. Assumes a duration of 123 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sum.
8 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
9 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 123 days for two operators. Additionally, transport of empty drums to barge landing area is conducted as part of this task in downtime from backfilling.
10 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
11 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observed.
12 Task 5.5 includes site and camp management activities. Assumes a duration of 123 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
13 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
14 Assume weekly charter flights from Anchorage to Fort Glen for sample shipment, personnel rotations, survey team rotations, and resupply.
15 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period.
16 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed.
17 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
18 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
19 Overall duration determined by incineration production rate after startup, which is 140 tons per day.
20 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
21 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 6 - Reporting			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5		Task 6.6		Task 6.7		Task 6.8		Task 6.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																						
Project Manager	$ 184.68	hour	40	$ 7,387.34	8	$ 1,477.47	10	$ 1,846.84	5	$ 923.42	5	$ 923.42	2	$ 369.37	2	$ 369.37	2	$ 369.37		$ -	74	$ 13,666.58
Geospatial Specialist	$ 108.64	hour	160	$ 17,381.98	32	$ 3,476.40	40	$ 4,345.50	20	$ 2,172.75	20	$ 2,172.75	4	$ 434.55	40	$ 4,345.50		$ -		$ -	316	$ 34,329.42
Engineer	$ 141.23	hour	120	$ 16,947.43	24	$ 3,389.49	30	$ 4,236.86	15	$ 2,118.43	15	$ 2,118.43		$ -		$ -		$ -		$ -	204	$ 28,810.64
Scientist	$ 141.23	hour	180	$ 25,421.15	36	$ 5,084.23	45	$ 6,355.29	23	$ 3,248.26	23	$ 3,248.26		$ -		$ -		$ -		$ -	307	$ 43,357.18
Project Chemist	$ 108.64	hour	140	$ 15,209.24	28	$ 3,041.85	35	$ 3,802.31	18	$ 1,955.47	18	$ 1,955.47		$ -		$ -		$ -		$ -	239	$ 25,964.34
Tech Editor	$ 152.09	hour	40	$ 6,083.69		$ -	24	$ 3,650.22		$ -	24	$ 3,650.22		$ -	60	$ 9,125.54		$ -		$ -	148	$ 22,509.67
Archeologist	$ 228.14	hour	140	$ 31,939.39	28	$ 6,387.88	35	$ 7,984.85	18	$ 4,106.49	18	$ 4,106.49	120	$ 27,376.62	120	$ 27,376.62	16	$ 3,650.22	24	$ 5,475.32	519	$ 118,403.90
Professional Labor Subtotal			**820**	**$ 120,370.23**	**156**	**$ 22,857.31**	**219**	**$ 32,221.85**	**99**	**$ 14,524.82**	**123**	**$ 18,175.04**	**126**	**$ 28,180.54**	**222**	**$ 41,217.03**	**18**	**$ 4,019.58**	**24**	**$ 5,475.32**	**1807**	**$ 287,041.73**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 120,410.23		$ 22,857.31		$ 32,281.85		$ 14,524.82		$ 18,235.04		$ 28,180.54		$ 41,217.03		$ 14,019.58		$ 6,475.32	$ 298,201.73	$ 298,201.73
Running Total by Task				$ 120,410.23		$ 143,267.54		$ 175,549.39		$ 190,074.21		$ 208,309.25				$ 41,217.03		$ 55,236.61		$ 61,711.94	**GRAND TOTAL**	**$298,201.73**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist on-site.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report.

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Field Duration Calculation

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	5/14	7	70	490	Treatment startup
5/15	8/25	103	140	14,420	Treatment operation
8/26	9/1	7	0	0	Teardown and site restoration
		Total max treatment tonnage per year		14,910	
		Low volume estimate of soil (cy)		9,790	
		Total tonnage to be treated		14,685	
		Field seasons required for treatment		1	
		Treated tonnage		14,685	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season

Production rate during operation is 140 tons per day; rate falls between 100 and 150 tons per day, but sand is generally amenable to incineration.
Production rate during startup is half of full production.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Field effort: onsite starting 1 May to 31 August with 1 week setup, 1 week startup, 1 week teardown.
2023	Project reporting

Total duration 36 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	5/14	7	70	490	Treatment startup
5/15	8/24	102	140	14,280	Treatment operation
8/25	8/31	7	0	0	Teardown and site restoration
		Total max treated tonnage		14,770	
			Total field duration	123	
		Number of resupply flights		16	

Personnel

4	Operators	
2	Truck drivers	
1	Arch	
2	Laborer	Includes housekeeper
2	Scientist	
1	Field Team Lead	Engineer rate
2	Incineration Operators	Subcontracted, included in incineration cost
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	surveyor	Geospatial specialist rate
1	assistant surveyor	

All personnel except for surveyors (19 people total) will stay in Fort Glenn Lodge
Surveyors will stay in Fort Glenn Cabin

Excavation Team	6	people
Treatment Team	5	people
Backfill Team	2	people
Support Team	6	people
Total Field Crew	19	people

Survey Team	2	people

Equipment Burn Rates

Diesel Equipment	gal/day	Number Used	gal/day total	Notes
350 Excavator	42	1	42	
200 Excavator	25	1	25	
750 Dozer	25	1	25	
15-yard Rock Truck	100	2	200	
Marooka	13	1	13	
Tracked Skidsteer	17	1	17	
Fuel Truck	4	1	4	
Water Truck	15	1	15	
960 Loader	13	1	13	
50kw Generator	100	1	100	
Light Plant	10	2	20	
Truck	0	1	0	Included in incineration estimates
Incinerator (startup)	430	1	430	
Incinerator (full)	861	1	861	
		Total gal/day setup/teardown	473	
		Total gal/day startup	903	
		Total gal/day	1333	
		Total gal/week	9331	
		Total gal	148904	

Incineration operations (including treatment equipment, generators, and truck) have a burn rate of 6.15 gal/ton of treated material

Gasoline Equipment	gal/day	Number Used	Total	Notes
UTV	5	4	20	
		Total gal/day	20	
		Total gal/week	140	
		Total gal Year 1	2460	2x 2000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume
15000-gal AST at Lodge	15000	1	15000
25,000-gal AST rental	25000	2	50000
		Total volume	65000
		Number fueling trips required	2

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Low Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	15	1	2	1	20	$199.50	$3,591.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	15	1	2	0	19	$236.25	$4,016.25	
Pesticides	SW8081	Confirmation	SO	24 hr	15	1	2	0	19	$231.00	$3,927.00	
GRO	AK101	Confirmation	SO	24 hr	15	1	2	1	20	$115.50	$2,079.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	15	1	2	0	19	$136.50	$2,320.50	
PCBs	SW8082	Confirmation	SO	24 hr	15	1	2	0	19	$147.00	$2,499.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	15	1	2	0	19	$220.50	$3,748.50	
									SUBTOTAL =		$22,181.25	$22,181.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$1,800.00	$1,800.00
									TOTAL =		$23,981.25	$23,981.25
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	287	15	29	15	361	$199.50	$66,034.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	287	15	29	0	346	$236.25	$74,655.00	
GRO	AK101	Confirmation	SO	24 hr	287	15	29	15	361	$115.50	$38,230.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	287	15	29	0	346	$136.50	$43,134.00	
									SUBTOTAL =		$222,054.00	$222,054.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$33,100.00	$33,100.00
									TOTAL =		$255,154.00	$255,154.00
ISM Baseline Sampling of Soil Treatment Area												
ISM PREP	ITRC	Baseline ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Baseline Sampling of Soil Treatment Area**
VOCs	SW8260D	Baseline ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Baseline ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Baseline ISM	SO	14 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Baseline ISM	SO	14 day	2	1	2	0	6	$65.00	$260.00	
									SUBTOTAL =		$1,810.00	$1,810.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,310.00	$2,310.00
Composite Sampling of Soil to be Backfilled - Post-Treatment Year 1												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	105	6	11	6	134	$199.50	$24,339.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment Year 1**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	105	6	11	0	128	$236.25	$27,405.00	
GRO	AK101	Treatment Confirmation	SO	24 hr	105	6	11	6	134	$115.50	$14,091.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	105	6	11	0	128	$136.50	$15,834.00	
									SUBTOTAL =		$81,669.00	$81,669.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,200.00	$12,200.00
									TOTAL =		$93,869.00	$93,869.00
ISM Post-Treatment Sampling of Treatment Area												
ISM PREP	ITRC	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Post-Treatment Sampling of Treatment Area**
VOCs	SW8260D	Post-Treatment ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Post-Treatment ISM	SO	15 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Post-Treatment ISM	SO	16 day	2	1	2	0	6	$65.00	$260.00	
									SUBTOTAL =		$1,810.00	$1,810.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,310.00	$2,310.00
									GRAND TOTAL =		$377,624.25	$377,624.25

Notes:
Assume no equipment blanks will be required for this project.
Assume ISM triplicate samples will be collected 1 per 10 primary samples.
Assume composite samples will be collected from treated soil at a frequency of 1 per 140 tons (93 cy).
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
Shipping/courier fees not included in laboratory pricing.
5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

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Empty, Crush, and Dispose of Approximately 2,554 drums

Field Duration 137 days

Equipment	Rate	Number	Unit	Total
Open-top containers	$ 15.00	9	day	$ 18,495.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	**$ 313,760.00**

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3"	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4-lb box	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long-handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
Cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Setup	$5,800.00	
Travel Costs for Setup crew	$500.00	
Food Costs for Setup crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rentals

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping-grade GPS with tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike (2 each)	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,247.00**	**$ 7,802.00**	**$ 23,371.00**	**$ 1,114.57**

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ALTERNATIVE 3
PROJECT 02 INCINERATION – MIDDLE ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 108,875	$ 108,875	2021	$ 108,875
Task 2	Planning Documents	1	Job	$ 127,067	$ 127,067	2021	$ 127,067
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4a	Mobilization/Demobilization 2022	1	Job	$ 927,181	$ 927,181	2022	$ 901,927
Task 4b	Mobilization/Demobilization 2023	1	Job	$ 953,142	$ 953,142	2023	$ 901,927
Task 4c	Mobilization/Demobilization 2024	1	Job	$ 979,830	$ 979,830	2024	$ 901,927
Task 5a	Incineration Field Effort 2022	1	Job	$ 8,328,785	$ 8,328,785	2022	$ 8,101,931
Task 5b	Incineration Field Effort 2023	1	Job	$ 8,049,923	$ 8,049,923	2023	$ 7,617,378
Task 5c	Incineration Field Effort 2024	1	Job	$ 4,318,537	$ 4,318,537	2024	$ 3,975,185
Task 6a	Tech Memo for 2022 Field Effort	1	Job	$ 38,631	$ 38,631	2023	$ 36,556
Task 6b	Tech Memo for 2023 Field Effort	1	Job	$ 39,713	$ 39,713	2024	$ 36,556
Task 7	Reporting	1	Job	$ 342,376	$ 342,376	2025	$ 306,571
				TOTAL	**$24,262,826**	**Total Net Present Worth Cost**	**$ 23,064,664**
				Cost per Cubic Yard	**$ 1,058**	**Cost per Cubic Yard**	**$ 1,005**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and		Monthly Status Reports		Contractor Manpower		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	30	$ 6,476.40	38	$ 8,203.44		$ -	68	$ 14,679.84
Project Manager	$ 174.76	hour	132	$ 23,068.32	68	$ 11,883.68	15	$ 2,621.40	215	$ 37,573.40
Contract Manager	$ 143.92	hour		$ -	68	$ 9,786.56		$ -	68	$ 9,786.56
Project Controls	$ 195.32	hour		$ -	128	$ 25,000.96	15	$ 2,929.80	143	$ 27,930.76
Administrative Assistant	$ 92.52	hour		$ -	68	$ 6,291.36	15	$ 1,387.80	83	$ 7,679.16
Engineer	$ 133.64	hour	84	$ 11,225.76		$ -		$ -	84	$ 11,225.76
Professional Labor Subtotal			**246**	**$ 40,770.48**	**370**	**$ 61,166.00**	**45**	**$ 6,939.00**	**661**	**$ 108,875.48**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 40,770.48		$ 61,166.00		$ 6,939.00	$ 108,875.48	$ 108,875.48
Running Total by Task				$ 40,770.48		$ 101,936.48		$ 108,875.48	**GRAND TOTAL**	**$ 108,875.48**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 5 reports total
4 PoP = 60 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 174.76	hour	8	$ 1,398.08	50	$ 8,738.00	10	$ 1,747.60	13	$ 2,271.88	7	$ 1,223.32	7	$ 1,223.32	95	$ 16,602.20
Project Controls	$ 195.32	hour	8	$ 1,562.56		$ -		$ -		$ -		$ -		$ -	8	$ 1,562.56
Geospatial Specialist	$ 102.80	hour		$ -	50	$ 5,140.00	10	$ 1,028.00	13	$ 1,336.40	7	$ 719.60	7	$ 719.60	87	$ 8,943.60
Engineer	$ 133.64	hour		$ -	100	$ 13,364.00	20	$ 2,672.80	25	$ 3,341.00	13	$ 1,737.32	13	$ 1,737.32	171	$ 22,852.44
Scientist	$ 133.64	hour		$ -	110	$ 14,700.40	22	$ 2,940.08	28	$ 3,741.92	14	$ 1,870.96	14	$ 1,870.96	188	$ 25,124.32
Regulatory Specialist	$ 215.88	hour		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Project Chemist	$ 102.80	hour		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Tech Editor	$ 143.92	hour		$ -	32	$ 4,605.44		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	72	$ 10,362.24
Archeologist	$ 215.88	hour		$ -	32	$ 6,908.16	7	$ 1,511.16	8	$ 1,727.04	4	$ 863.52	4	$ 863.52	55	$ 11,873.40
Safety Officer	$ 154.20	hour		$ -	16	$ 2,467.20	4	$ 616.80	4	$ 616.80	2	$ 308.40	2	$ 308.40	28	$ 4,317.60
Professional Labor Subtotal			**16**	**$ 2,960.64**	**490**	**$ 70,726.40**	**93**	**$ 13,477.08**	**136**	**$ 19,614.24**	**60**	**$ 8,624.92**	**80**	**$ 11,503.32**	**875**	**$ 126,906.60**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 2,960.64		$ 70,766.40		$ 13,477.08		$ 19,674.24		$ 8,624.92		$ 11,563.32	$ 127,066.60	$ 127,066.60
Running Total by Task				$ 2,960.64		$ 73,727.04		$ 87,204.12		$ 106,878.36		$ 115,503.28		$ 127,066.60	**GRAND TOTAL**	**$ 127,066.60**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft Work Plan development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping-grade GPS with tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld-marine grade radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes two-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization 2022			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	48	$ 6,594.33	48	$ 6,594.33	20	$ 2,747.64	156	$ 21,431.58
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archeologist	$ 221.92	hour		$ -	24	$ 5,326.19	24	$ 5,326.19		$ -	48	$ 10,652.38
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**152**	**$ 24,010.13**	**152**	**$ 24,010.13**	**100**	**$ 13,611.38**	**604**	**$ 88,854.40**
Craft Labor												
Operator	$ 147.95	hour		$ -	96	$ 14,203.18	48	$ 7,101.59		$ -	144	$ 21,304.77
Laborer	$ 137.38	hour		$ -	48	$ 6,594.33	72	$ 9,891.50		$ -	120	$ 16,485.83
Truck Driver	$ 105.68	hour		$ -	48	$ 5,072.56	48	$ 5,072.56		$ -	96	$ 10,145.13
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**216**	**$ 29,167.24**	**192**	**$ 25,362.82**	**0**	**$ -**	**408**	**$ 54,530.05**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	36	$ 540.00	36	$ 540.00		$ -	72	$ 1,080.00
Supplies Subtotal			**0**	**$ -**	**36**	**$ 540.00**	**36**	**$ 540.00**	**0**	**$ -**	**72**	**$ 1,080.00**
Equipment												
350 Excavator	$ 2,725.00	week		$ -	1	$ 2,725.00	1	$ 2,725.00		$ -	2	$ 5,450.00
200 Excavator	$ 1,625.00	week		$ -	1	$ 1,625.00	1	$ 1,625.00		$ -	2	$ 3,250.00
750 Dozer	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
15-yard Rock Truck	$ 3,225.00	week		$ -	2	$ 6,450.00	2	$ 6,450.00		$ -	4	$ 12,900.00
Marooka	$ 2,475.00	week		$ -	1	$ 2,475.00	1	$ 2,475.00		$ -	2	$ 4,950.00
Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
Water Truck (4,000-gal)	$ 1,500.00	week		$ -	1	$ 1,500.00	1	$ 1,500.00		$ -	2	$ 3,000.00
960 Loader	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
Light Plant	$ 131.25	week		$ -	2	$ 262.50	2	$ 262.50		$ -	4	$ 525.00
UTV	$ 840.00	week		$ -	4	$ 3,360.00	4	$ 3,360.00		$ -	8	$ 6,720.00
2,000-gal Water Tank	$ 125.00	week		$ -	1	$ 125.00	1	$ 125.00		$ -	2	$ 250.00
Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
Rentals (1 wk rental to cover mob)	$ 7,802.00	week		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
Equipment Subtotal			**0**	**$ -**	**31**	**$ 39,729.50**	**31**	**$ 39,729.50**	**0**	**$ -**	**62**	**$ 79,459.00**

TASK 4 - Mobilization/Demobilization 2022			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Other Direct Costs												
Container/Equipment Transport Cost	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Incinerator Mob/Demob	$ 30,000.00	LS		$ -	1	$ 30,000.00	1	$ 30,000.00		$ -	2	$ 60,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**14**	**$ 41,050.00**	**14**	**$ 41,050.00**	**0**	**$ -**	**28**	**$ 82,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge Loading/Unloading Fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	3	$ 13,500.00	3	$ 13,500.00		$ -	6	$ 27,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**10**	**$ 293,460.00**	**10**	**$ 293,460.00**	**0**	**$ -**	**20**	**$ 586,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	25	$ 2,825.00	25	$ 2,825.00		$ -	50	$ 5,650.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	12.5	$ 8,125.00	12.5	$ 8,125.00		$ -	25	$ 16,250.00
Hotel DUT	$ 150.00	day		$ -	25	$ 3,750.00	25	$ 3,750.00		$ -	50	$ 7,500.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	25	$ 2,418.75	25	$ 2,418.75		$ -	50	$ 4,837.50
Travel Subtotal			**0**	**$ -**	**87.5**	**$ 17,118.75**	**87.5**	**$ 17,118.75**	**0**	**$ -**	**175**	**$ 34,237.50**
Task Totals				$ 27,222.76		$ 445,075.62		$ 441,271.20		$ 13,611.38	$ 927,180.95	$ 927,180.95
Running Total by Task				$ 27,222.76		$ 472,298.38		$ 913,569.58		$ 927,180.95	**GRAND TOTAL**	**$ 927,180.95**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12 hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Assumes incineration subcontracted personnel rotate out monthly.
5 Tundra mats originate in Fairbanks.
6 Mobile incinerator equipment orignates in Seattle; no rental cost with incinerator unit, as cost is based on price per treated ton.

TASK 5 - Incineration Field Effort 2022			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 179.65	hour	28	$ 5,030.29	51.5	$ 9,252.14	51.5	$ 9,252.14	51.5	$ 9,252.14	51.5	$ 9,252.14	14	$ 2,515.15	248	$ 44,554.01
Geospatial Specialist	$ 105.68	hour		$ -	672	$ 71,015.88		$ -		$ -		$ -		$ -	672	$ 71,015.88
Engineer	$ 137.38	hour	168	$ 23,080.16	1236	$ 169,804.05		$ -		$ -		$ -	84	$ 11,540.08	1488	$ 204,424.30
Scientist	$ 137.38	hour	336	$ 46,160.33	1236	$ 169,804.05	1236	$ 169,804.05		$ -		$ -	168	$ 23,080.16	2976	$ 408,848.59
Professional Land Surveyor	$ 116.25	hour		$ -	672	$ 78,117.47		$ -		$ -		$ -		$ -	672	$ 78,117.47
Construction Manager	$ 147.95	hour	168	$ 24,855.56		$ -		$ -		$ -	1236	$ 182,865.90	84	$ 12,427.78	1488	$ 220,149.24
Archeologist	$ 221.92	hour	168	$ 37,283.34	1236	$ 274,298.86		$ -		$ -		$ -	84	$ 18,641.67	1488	$ 330,223.86
Superintendent	$ 158.52	hour	168	$ 26,630.96		$ -		$ -		$ -	1236	$ 195,927.75	84	$ 13,315.48	1488	$ 235,874.19
Professional Labor Subtotal			**1036**	**$ 163,040.64**	**5103.5**	**$ 772,292.46**	**1287.5**	**$ 179,056.20**	**51.5**	**$ 9,252.14**	**2523.5**	**$ 388,045.80**	**518**	**$ 81,520.32**	**10520**	**$ 1,593,207.56**
Craft Labor																
Operator	$ 147.95	hour	672	$ 99,422.24	1236	$ 182,865.90	2472	$ 365,731.81	1236	$ 182,865.90		$ -	336	$ 49,711.12	5952	$ 880,596.97
Laborer	$ 137.38	hour	336	$ 46,160.33	1236	$ 169,804.05		$ -		$ -	1236	$ 169,804.05	168	$ 23,080.16	2976	$ 408,848.59
Truck Driver	$ 105.68	hour	336	$ 35,507.94	1236	$ 130,618.50		$ -	1236	$ 130,618.50		$ -	168	$ 17,753.97	2976	$ 314,498.92
Mechanic	$ 137.38	hour	168	$ 23,080.16		$ -		$ -		$ -	1236	$ 169,804.05	84	$ 11,540.08	1488	$ 204,424.30
Craft Labor Subtotal			**1512**	**$ 204,170.67**	**3708**	**$ 483,288.46**	**2472**	**$ 365,731.81**	**2472**	**$ 313,484.41**	**2472**	**$ 339,608.11**	**756**	**$ 102,085.33**	**13392**	**$ 1,808,368.78**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		$ -		$ -	1	$ 14,995.80
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	515	$ 5,150.00	618	$ 6,180.00	206	$ 2,060.00	309	$ 3,090.00	112	$ 1,120.00	1984	$ 19,840.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	730	$ 10,950.00	618	$ 9,270.00	206	$ 3,090.00	515	$ 7,725.00	112	$ 1,680.00	2405	$ 36,075.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	1545	$ 6,180.00		$ -		$ -	515	$ 2,060.00	140	$ 560.00	2480	$ 9,920.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	14591.7	$ 54,718.75	96531.6	$ 361,993.50	12875.0	$ 48,281.25	13304.2	$ 49,890.63	3307.5	$ 12,403.13	150236.8	$ 563,388.00
Supplies Subtotal			**10354.9**	**$ 42,820.75**	**17382.7**	**$ 91,994.55**	**97767.6**	**$ 377,443.50**	**13287.0**	**$ 53,431.25**	**14643.2**	**$ 62,765.63**	**3671.5**	**$ 15,763.13**	**157106.8**	**$ 644,218.80**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.4	$ 37,423.33		$ -		$ -		$ -	0.2	$ 2,543.33	4.1	$ 45,053.33
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	3.4	$ 22,316.67		$ -		$ -	0.2	$ 1,516.67	4.1	$ 26,866.67
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	3.4	$ 27,123.33		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	3.4	$ 44,290.00		$ -	3.4	$ 44,290.00		$ -	0.5	$ 6,020.00	8.3	$ 106,640.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	3.4	$ 33,990.00	0.2	$ 2,310.00	4.1	$ 40,920.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	3.4	$ 12,531.67	0.2	$ 851.67	4.1	$ 15,086.67
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	3.4	$ 25,406.67		$ -		$ -	0.2	$ 1,726.67	4.1	$ 30,586.67
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	3.4	$ 20,600.00		$ -		$ -	0.2	$ 1,400.00	4.1	$ 24,800.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	3.4	$ 27,123.33		$ -		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	6.9	$ 3,605.00		$ -		$ -	0.5	$ 245.00	8.3	$ 4,340.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	10.3	$ 34,608.00		$ -		$ -	3.4	$ 11,536.00	0.9	$ 3,136.00	16.5	$ 55,552.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	2.0	$ 2,000.00		$ -	2.0	$ 2,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	1133.0	$ 16,995.00	77.0	$ 1,155.00	1364.0	$ 20,460.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	51.5	$ 34,762.50		$ -	51.5	$ 34,762.50		$ -	7.0	$ 4,725.00	124.0	$ 83,700.00
Rentals	$ 23,371.00	month	0.5	$ 10,906.47	3.4	$ 80,240.43		$ -		$ -		$ -	0.2	$ 5,453.23	4.1	$ 96,600.13
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	3.4	$ 1,716.67	0.2	$ 116.67	4.1	$ 2,066.67
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	3.4	$ 11,158.33	0.2	$ 758.33	4.1	$ 13,433.33
Equipment Subtotal			**176.9**	**$ 71,288.47**	**72.1**	**$ 231,324.27**	**20.6**	**$ 99,051.67**	**58.4**	**$ 106,175.83**	**1152.2**	**$ 89,927.67**	**88.4**	**$ 35,644.23**	**1568.5**	**$ 633,412.13**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each	1	$ 100.00	80	$ 8,000.00	14	$ 1,400.00		$ -		$ -		$ -	95.0	$ 9,500.00
Drum Disposal	$ 313,895.00	LS		$ -		$ -		$ -	1	$ 313,895.00		$ -		$ -	1.0	$ 313,895.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	3.4	$ 43,946.67		$ -	3.4	$ 43,946.67
Other Direct Costs Subtotal			**2**	**$ 7,869.00**	**80**	**$ 8,000.00**	**14**	**$ 1,400.00**	**1**	**$ 313,895.00**	**3.4**	**$ 43,946.67**	**0**	**$ -**	**100.4**	**$ 375,110.67**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	16	$ 280,000.00		$ -	16.0	$ 280,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	103	$ 86,005.00	7	$ 5,845.00	124.0	$ 103,540.00
Analytical Laboratory (confirmation samples)	$ 228,263.99	LS		$ -	1	$ 228,263.99		$ -		$ -		$ -		$ -	1.0	$ 228,263.99
Analytical Laboratory (composite samples)	$ 95,444.50	LS		$ -		$ -	1	$ 95,444.50		$ -		$ -		$ -	1.0	$ 95,444.50
Analytical Laboratory (Baseline ISM samples)	$ 2,310.00	LS	1	$ 2,310.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 2,310.00
Analytical Laboratory (pre-excavation sampling)	$ 59,052.50	LS		$ -	1	$ 59,052.50		$ -		$ -		$ -		$ -	1.0	$ 59,052.50
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	103	$ 66,950.00	7	$ 4,550.00	124.0	$ 80,600.00
Subcontractors/Vendors Subtotal			**29.0**	**$ 23,100.00**	**2**	**$ 287,316.49**	**2**	**$ 1,854,824.50**	**0**	**$ -**	**222**	**$ 432,955.00**	**14**	**$ 10,395.00**	**269**	**$ 2,608,590.99**

TASK 5 - Incineration Field Effort 2022			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	666	$ 75,258.00	515	$ 58,195.00	206	$ 23,278.00	618	$ 69,834.00	133	$ 15,029.00	2404.0	$ 271,652.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	103	$ 309,000.00	7	$ 21,000.00	124.0	$ 372,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	56	$ 16,800.00		$ -		$ -		$ -		$ -	56.0	$ 16,800.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	64	$ 5,424.00		$ -		$ -		$ -		$ -	64.0	$ 5,424.00
Travel Subtotal			**280**	**$ 72,058.00**	**786**	**$ 97,482.00**	**515**	**$ 58,195.00**	**206**	**$ 23,278.00**	**721**	**$ 378,834.00**	**140**	**$ 36,029.00**	**2648.0**	**$ 665,876.00**
Task Totals				$ 584,347.52		$ 1,971,698.23		$ 2,935,702.67		$ 819,516.63		$ 1,736,082.87		$ 281,437.01	$ 8,328,784.93	$ 8,328,784.93
Running Total by Task				$ 584,347.52		$ 2,556,045.75		$ 5,491,748.42		$ 6,311,265.06		$ 8,047,347.92		$ 8,328,784.93	**GRAND TOTAL**	**$ 8,328,784.93**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this period.
3 Task 5.1 also includes baseline ISM sampling of the treatment area and initial access construction to features for excavation.
4 Task 5.2 includes pre-excavation analytical sampling of each site feature, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 124 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist.
Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump feature.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes running the incineration equipment. Assumes a duration of 124 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sum.
8 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
9 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 124 days for two operators. Additionally, transport of empty drums to barge landing area is conducted as part of this task in downtime from backfilling.
10 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
11 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observed.
12 Task 5.5 includes site and camp management activities. Assumes a duration of 124 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
13 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
14 Assume weekly charter flights from Anchorage to Fort Glen for sample shipment, personnel rotations, survey team rotations, and resupply.
15 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period.
16 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed.
17 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
18 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
19 Overall duration determined by incineration production rate after startup, which is 140 tons per day.
20 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary
21 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed

TASK 5 - Incineration Field Effort 2023			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 184.68	hour	28	$ 5,171.14	51.5	$ 9,511.20	51.5	$ 9,511.20	51.5	$ 9,511.20	51.5	$ 9,511.20	14	$ 2,585.57	248	$ 45,801.53
Geospatial Specialist	$ 108.64	hour		$ -	672	$ 73,004.33		$ -		$ -		$ -		$ -	672	$ 73,004.33
Engineer	$ 141.23	hour	168	$ 23,726.41	1236	$ 174,558.57		$ -		$ -		$ -	84	$ 11,863.20	1488	$ 210,148.18
Scientist	$ 141.23	hour	336	$ 47,452.81	1236	$ 174,558.57	1236	$ 174,558.57		$ -		$ -	168	$ 23,726.41	2976	$ 420,296.35
Professional Land Surveyor	$ 119.50	hour		$ -	672	$ 80,304.76		$ -		$ -		$ -		$ -	672	$ 80,304.76
Construction Manager	$ 152.09	hour	168	$ 25,551.52		$ -		$ -		$ -	1236	$ 187,986.15	84	$ 12,775.76	1488	$ 226,313.42
Archeologist	$ 228.14	hour	168	$ 38,327.27	1236	$ 281,979.22		$ -		$ -		$ -	84	$ 19,163.64	1488	$ 339,470.13
Superintendent	$ 162.96	hour	168	$ 27,376.62		$ -		$ -		$ -	1236	$ 201,413.73	84	$ 13,688.31	1488	$ 242,478.67
Professional Labor Subtotal			**1036**	**$ 167,605.77**	**5103.5**	**$ 793,916.65**	**1287.5**	**$ 184,069.77**	**51.5**	**$ 9,511.20**	**2523.5**	**$ 398,911.08**	**518**	**$ 83,802.89**	**10520**	**$ 1,637,817.37**
Craft Labor																
Operator	$ 152.09	hour	672	$ 102,206.06	1236	$ 187,986.15	2472	$ 375,972.30	1236	$ 187,986.15		$ -	336	$ 51,103.03	5952	$ 905,253.69
Laborer	$ 141.23	hour	336	$ 47,452.81	1236	$ 174,558.57		$ -		$ -	1236	$ 174,558.57	168	$ 23,726.41	2976	$ 420,296.35
Truck Driver	$ 108.64	hour	336	$ 36,502.16	1236	$ 134,275.82		$ -	1236	$ 134,275.82		$ -	168	$ 18,251.08	2976	$ 323,304.89
Mechanic	$ 141.23	hour	168	$ 23,726.41		$ -		$ -		$ -	1236	$ 174,558.57	84	$ 11,863.20	1488	$ 210,148.18
Craft Labor Subtotal			**1512**	**$ 209,887.45**	**3708**	**$ 496,820.54**	**2472**	**$ 375,972.30**	**2472**	**$ 322,261.97**	**2472**	**$ 349,117.13**	**756**	**$ 104,943.72**	**13392**	**$ 1,859,003.11**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 15,847.32	LS		$ -	1	$ 16,747.20		$ -		$ -		$ -		$ -	1	$ 16,747.20
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	515	$ 5,150.00	618	$ 6,180.00	206	$ 2,060.00	309	$ 3,090.00	112	$ 1,120.00	1984	$ 19,840.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	730	$ 10,950.00	618	$ 9,270.00	206	$ 3,090.00	515	$ 7,725.00	112	$ 1,680.00	2405	$ 36,075.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	1545	$ 6,180.00		$ -		$ -	515	$ 2,060.00	140	$ 560.00	2480	$ 9,920.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	14591.66667	$ 54,718.75	96531.6	$ 361,993.50	12875	$ 48,281.25	13304.16667	$ 49,890.63	3307.5	$ 12,403.13	150236.8	$ 563,388.00
Supplies Subtotal			**10354.9**	**$ 42,820.75**	**17382.7**	**$ 93,745.95**	**97767.6**	**$ 377,443.50**	**13287.0**	**$ 53,431.25**	**14643.2**	**$ 62,765.63**	**3671.5**	**$ 15,763.13**	**157106.8**	**$ 645,970.20**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.4	$ 37,423.33		$ -		$ -		$ -	0.2	$ 2,543.33	4.1	$ 45,053.33
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	3.4	$ 22,316.67		$ -		$ -	0.2	$ 1,516.67	4.1	$ 26,866.67
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	3.4	$ 27,123.33		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	3.4	$ 44,290.00		$ -	3.4	$ 44,290.00		$ -	0.5	$ 6,020.00	8.3	$ 106,640.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	3.4	$ 33,990.00	0.2	$ 2,310.00	4.1	$ 40,920.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	3.4	$ 12,531.67	0.2	$ 851.67	4.1	$ 15,086.67
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	3.4	$ 25,406.67		$ -		$ -	0.2	$ 1,726.67	4.1	$ 30,586.67
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	3.4	$ 20,600.00		$ -		$ -	0.2	$ 1,400.00	4.1	$ 24,800.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	3.4	$ 27,123.33		$ -		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	6.9	$ 3,605.00		$ -		$ -	0.5	$ 245.00	8.3	$ 4,340.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	10.3	$ 34,608.00		$ -		$ -	3.4	$ 11,536.00	0.9	$ 3,136.00	16.5	$ 55,552.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	2.0	$ 2,000.00		$ -	2.0	$ 2,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	1133.0	$ 16,995.00	77.0	$ 1,155.00	1364.0	$ 20,460.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	51.5	$ 34,762.50		$ -	51.5	$ 34,762.50		$ -	7.0	$ 4,725.00	124.0	$ 83,700.00
Rentals	$ 23,371.00	month	0.5	$ 10,906.47	3.4	$ 80,240.43		$ -		$ -		$ -	0.2	$ 5,453.23	4.1	$ 96,600.13
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	3.4	$ 1,716.67	0.2	$ 116.67	4.1	$ 2,066.67
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	3.4	$ 11,158.33	0.2	$ 758.33	4.1	$ 13,433.33
Equipment Subtotal			**176.9**	**$ 71,288.47**	**72.1**	**$ 231,324.27**	**20.6**	**$ 99,051.67**	**58.4**	**$ 106,175.83**	**1152.2**	**$ 89,927.67**	**88.4**	**$ 35,644.23**	**1568.5**	**$ 633,412.13**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	75	$ 7,500.00	14	$ 1,400.00		$ -		$ -		$ -	89.0	$ 8,900.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	3.4	$ 43,946.67		$ -	3.4	$ 43,946.67
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**75**	**$ 7,500.00**	**14**	**$ 1,400.00**	**0**	**$ -**	**3.4**	**$ 43,946.67**	**0**	**$ -**	**93.4**	**$ 60,615.67**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	16	$ 280,000.00		$ -	16.0	$ 280,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	103	$ 86,005.00	7	$ 5,845.00	124.0	$ 103,540.00
Analytical Laboratory (confirmation samples)	$ 228,263.99	LS		$ -	1	$ 228,263.99		$ -		$ -		$ -		$ -	1.0	$ 228,263.99
Analytical Laboratory (composite samples)	$ 95,444.50	LS		$ -		$ -	1	$ 95,444.50		$ -		$ -		$ -	1.0	$ 95,444.50
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	103	$ 66,950.00	7	$ 4,550.00	124.0	$ 80,600.00
Subcontractors/Vendors Subtotal			**28.0**	**$ 20,790.00**	**1**	**$ 228,263.99**	**2**	**$ 1,854,824.50**	**0**	**$ -**	**222**	**$ 432,955.00**	**14**	**$ 10,395.00**	**267**	**$ 2,547,228.49**

TASK 5 - Incineration Field Effort 2023			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	666	$ 75,258.00	515	$ 58,195.00	206	$ 23,278.00	618	$ 69,834.00	133	$ 15,029.00	2404.0	$ 271,652.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	103	$ 309,000.00	7	$ 21,000.00	124.0	$ 372,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	56	$ 16,800.00		$ -		$ -		$ -		$ -	56.0	$ 16,800.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	64	$ 5,424.00		$ -		$ -		$ -		$ -	64.0	$ 5,424.00
Travel Subtotal			**280**	**$ 72,058.00**	**786**	**$ 97,482.00**	**515**	**$ 58,195.00**	**206**	**$ 23,278.00**	**721**	**$ 378,834.00**	**140**	**$ 36,029.00**	**2648.0**	**$ 665,876.00**
Task Totals				$ 592,219.44		$ 1,949,053.39		$ 2,950,956.73		$ 514,658.26		$ 1,756,457.17		$ 286,577.97	$ 8,049,922.97	$ 8,049,922.97
Running Total by Task				$ 592,219.44		$ 2,541,272.83		$ 5,492,229.57		$ 6,006,887.82		$ 7,763,345.00		$ 8,049,922.97	**GRAND TOTAL**	**$ 8,049,922.97**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this perioc
3 Task 5.1 also includes baseline ISM sampling of the treatment area, as well as initial access construction to features for excavation.
4 Task 5.2 includes excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 124 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer
5 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
6 Task 5.3 includes running the incineration equipment. Assumes a duration of 124 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sur
7 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
8 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 124 days for two operators
9 Task 5.5 includes site and camp management activities. Assumes a duration of 124 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT
10 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs
11 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply
12 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed
14 Refueling costs from Dutch Harbor are per gal of diesel delivered, no per trip charge.
15 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
16 Overall duration determined by incineration production rate after startup, which is 140 tons per day
17 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
18 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 5 - Incineration Field Effort 2024			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	2024 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 189.85	hour	28	$ 5,315.93	15	$ 2,847.82	15	$ 2,847.82	15	$ 2,847.82	15	$ 2,847.82	14	$ 2,657.97	102	$ 19,365.18
Geospatial Specialist	$ 111.68	hour		$ -	252	$ 28,143.17		$ -		$ -		$ -		$ -	252	$ 28,143.17
Engineer	$ 145.18	hour	168	$ 24,390.75	360	$ 52,265.89		$ -		$ -		$ -	84	$ 12,195.37	612	$ 88,852.01
Scientist	$ 145.18	hour	336	$ 48,781.49	360	$ 52,265.89	360	$ 52,265.89		$ -		$ -	168	$ 24,390.75	1224	$ 177,704.01
Professional Land Surveyor	$ 122.85	hour		$ -	252	$ 30,957.49		$ -		$ -		$ -		$ -	252	$ 30,957.49
Construction Manager	$ 156.35	hour	168	$ 26,266.96		$ -		$ -		$ -	360	$ 56,286.34	84	$ 13,133.48	612	$ 95,686.77
Archeologist	$ 234.53	hour	168	$ 39,400.44	360	$ 84,429.51		$ -		$ -		$ -	84	$ 19,700.22	612	$ 143,530.16
Superintendent	$ 167.52	hour	168	$ 28,143.17		$ -		$ -		$ -	360	$ 60,306.79	84	$ 14,071.58	612	$ 102,521.54
Professional Labor Subtotal			**1,036**	**$ 172,298.73**	**1,599**	**$ 250,909.75**	**375**	**$ 55,113.71**	**15**	**$ 2,847.82**	**735**	**$ 119,440.95**	**518**	**$ 86,149.37**	**4,278**	**$ 686,760.33**
Craft Labor																
Operator	$ 156.35	hour	672	$ 105,067.83	360	$ 56,286.34	720	$ 112,572.68	360	$ 56,286.34		$ -	336	$ 52,533.92	2448	$ 382,747.10
Laborer	$ 145.18	hour	336	$ 48,781.49	360	$ 52,265.89		$ -		$ -	360	$ 52,265.89	168	$ 24,390.75	1224	$ 177,704.01
Truck Driver	$ 111.68	hour	336	$ 37,524.23	360	$ 40,204.53		$ -	360	$ 40,204.53		$ -	168	$ 18,762.11	1224	$ 136,695.39
Mechanic	$ 145.18	hour	168	$ 24,390.75		$ -		$ -		$ -	360	$ 52,265.89	84	$ 12,195.37	612	$ 88,852.01
Craft Labor Subtotal			**1,512**	**$ 215,764.30**	**1,080**	**$ 148,756.75**	**720**	**$ 112,572.68**	**720**	**$ 96,490.87**	**720**	**$ 104,531.77**	**756**	**$ 107,882.15**	**5,508**	**$ 785,998.51**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		$ -		$ -	1	$ 14,995.80
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	150	$ 1,500.00	180	$ 1,800.00	60	$ 600.00	90	$ 900.00	112	$ 1,120.00	816	$ 8,160.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	222	$ 3,330.00	180	$ 2,700.00	60	$ 900.00	150	$ 2,250.00	112	$ 1,680.00	948	$ 14,220.00
Gasoline	$ 4.00	gal	280.0	$ 1,120.00	450	$ 1,800.00		$ -		$ -	150	$ 600.00	140	$ 560.00	1020	$ 4,080.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	4,250.0	$ 15,937.50	28116	$ 105,435.00	3750	$ 14,062.50	3875	$ 14,531.25	3307.5	$ 12,403.13	52925.4	$ 198,470.13
Supplies Subtotal			**10,354.9**	**$ 42,820.75**	**5,073.0**	**$ 37,563.30**	**28,476.0**	**$ 109,935.00**	**3,870.0**	**$ 15,562.50**	**4,265.0**	**$ 18,281.25**	**3,671.5**	**$ 15,763.13**	**55,710.4**	**$ 239,925.93**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	1.0	$ 10,900.00		$ -		$ -		$ -	0.2	$ 2,543.33	1.7	$ 18,530.00
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	1.0	$ 6,500.00		$ -		$ -	0.2	$ 1,516.67	1.7	$ 11,050.00
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	1.0	$ 7,900.00		$ -	0.2	$ 1,843.33	1.7	$ 13,430.00
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	1.0	$ 12,900.00		$ -	1.0	$ 12,900.00		$ -	0.5	$ 6,020.00	3.4	$ 43,860.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	1.0	$ 9,900.00	0.2	$ 2,310.00	1.7	$ 16,830.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	1.0	$ 3,650.00	0.2	$ 851.67	1.7	$ 6,205.00
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	1.0	$ 7,400.00		$ -		$ -	0.2	$ 1,726.67	1.7	$ 12,580.00
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	1.0	$ 6,000.00		$ -		$ -	0.2	$ 1,400.00	1.7	$ 10,200.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	1.0	$ 7,900.00		$ -		$ -	0.2	$ 1,843.33	1.7	$ 13,430.00
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	2.0	$ 1,050.00		$ -		$ -	0.5	$ 245.00	3.4	$ 1,785.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	3.0	$ 10,080.00		$ -		$ -	1.0	$ 3,360.00	0.9	$ 3,136.00	6.8	$ 22,848.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	1.0	$ 1,000.00		$ -	1.0	$ 1,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	330.0	$ 4,950.00	77.0	$ 1,155.00	561.0	$ 8,415.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	15.0	$ 10,125.00		$ -	15.0	$ 10,125.00		$ -	7.0	$ 4,725.00	51.0	$ 34,425.00
Rentals	$ 23,371.00	month	0.5	$ 10,906.47	1.0	$ 23,371.00		$ -		$ -		$ -	0.2	$ 5,453.23	1.7	$ 39,730.70
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	1.0	$ 500.00	0.2	$ 116.67	1.7	$ 850.00
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	1.0	$ 3,250.00	0.2	$ 758.33	1.7	$ 5,525.00
Equipment Subtotal			**176.9**	**$ 71,288.47**	**21.0**	**$ 67,376.00**	**6.0**	**$ 28,850.00**	**17.0**	**$ 30,925.00**	**336.0**	**$ 26,610.00**	**88.4**	**$ 35,644.23**	**645.3**	**$ 260,693.70**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	75	$ 7,500.00	14	$ 1,400.00		$ -		$ -	1	$ 100.00	90.0	$ 9,000.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	1.0	$ 12,800.00		$ -	1.0	$ 12,800.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**75**	**$ 7,500.00**	**14**	**$ 1,400.00**	**0**	**$ -**	**1.0**	**$ 12,800.00**	**1**	**$ 100.00**	**92.0**	**$ 29,569.00**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	6	$ 105,000.00		$ -	6.0	$ 105,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	30	$ 25,050.00	7	$ 5,845.00	51.0	$ 42,585.00
Analytical Laboratory (confirmation samples)	$ 70,322.76	LS		$ -	1	$ 70,322.76		$ -		$ -		$ -		$ -	1.0	$ 70,322.76
Analytical Laboratory (composite samples)	$ 29,976.75	LS		$ -		$ -	1	$ 29,976.75		$ -		$ -		$ -	1.0	$ 29,976.75
Analytical Laboratory (Post-Treatment ISM samples)	$ 2,310.00	LS		$ -		$ -		$ -		$ -		$ -	1	$ 2,310.00	1.0	$ 2,310.00
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	30	$ 19,500.00	7	$ 4,550.00	51.0	$ 33,150.00
Subcontractors/Vendors Subtotal			**28**	**$ 20,790.00**	**1**	**$ 70,322.76**	**2**	**$ 1,789,356.75**	**0**	**$ -**	**66**	**$ 149,550.00**	**15**	**$ 12,705.00**	**112**	**$ 2,042,724.51**
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	198	$ 22,374.00	150	$ 16,950.00	60	$ 6,780.00	180	$ 20,340.00	133	$ 15,029.00	987	$ 111,531.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	30	$ 90,000.00	7	$ 21,000.00	51	$ 153,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	21	$ 6,300.00		$ -		$ -		$ -		$ -	21	$ 6,300.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	24	$ 2,034.00		$ -		$ -		$ -		$ -	24	$ 2,034.00
Travel Subtotal			**280**	**$ 72,058.00**	**243**	**$ 30,708.00**	**150**	**$ 16,950.00**	**60**	**$ 6,780.00**	**210**	**$ 110,340.00**	**140**	**$ 36,029.00**	**1083**	**$ 272,865.00**
		Task Totals		$ 602,789.25		$ 613,136.57		$ 2,114,178.13		$ 152,606.19		$ 541,553.97		$ 294,272.87	$ 4,318,536.98	$ 4,318,536.98
		Running Total by Task		$ 602,789.25		$ 1,215,925.81		$ 3,330,103.95		$ 3,482,710.13		$ 4,024,264.10		$ 4,318,536.98	**GRAND TOTAL**	**$ 4,318,536.98**

TASK 5 - Incineration Field Effort 2024			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site Set Up and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2024 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this period.
3 Task 5.1 also includes baseline ISM sampling of the treatment area, as well as initial access construction to features for excavation.
4 Task 5.2 includes excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 51 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer.
5 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
6 Task 5.3 includes running the incineration equipment. Assumes a duration of 51 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sum.
7 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
8 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 51 days for two operators.
9 Task 5.5 includes site and camp management activities. Assumes a duration of 51 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
10 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
11 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
12 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period.
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen are observed.
14 Refueling costs from Dutch Harbor are per gal of diesel delivered, no per trip charge.
15 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
16 Overall duration determined by incineration production rate after startup, which is 140 tons per day for remaining tonnage.
17 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
18 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

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TASK 6 - Tech Memo for 2022 Field Effort			Task 6.1			
			Annual Tech Memo		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**		
Professional Labor						
Project Manager	$ 184.68	hour	16	$ 2,954.94	16	$ 2,954.94
Geospatial Specialist	$ 108.64	hour	68	$ 7,387.34	68	$ 7,387.34
Engineer	$ 141.23	hour	48	$ 6,778.97	48	$ 6,778.97
Scientist	$ 141.23	hour	68	$ 9,603.55	68	$ 9,603.55
Project Chemist	$ 108.64	hour	48	$ 5,214.59	48	$ 5,214.59
Tech Editor	$ 152.09	hour	20	$ 3,041.85	20	$ 3,041.85
Archeologist	$ 228.14	hour	16	$ 3,650.22	16	$ 3,650.22
Professional Labor Subtotal			**284**	**$ 38,631.46**	**284**	**$ 38,631.46**
Craft Labor						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**
Materials						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**
Supplies						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**
Equipment						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**
Other Direct Costs						
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**
Travel						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**
Task Totals				$ 38,631.46	$ 38,631.46	$ 38,631.46
Running Total by Task				$ 38,631.46	**GRAND TOTAL**	**$ 38,631.46**

Basis of Estimate:

1 This is a technical memorandum that will be written at the end of each interim field season to document the tasks that were completed and summarize the remaining work. It will be submitted as a PDF only.

2 Level of effort based on USACE-AK District and stakeholder review.

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TASK 7 - Reporting			Task 7.1		Task 7.2		Task 7.3		Task 7.4		Task 7.5		Task 7.6		Task 7.7		Task 7.8		Task 7.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - Middle Estimate	2025 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 195.17	hour	50	$ 9,758.53	10	$ 1,951.71	13	$ 2,537.22	7	$ 1,366.19	7	$ 1,366.19	2	$ 390.34	2	$ 390.34	2	$ 390.34		$ -	93	$ 18,150.87
Geospatial Specialist	$ 114.81	hour	184	$ 21,124.35	37	$ 4,247.83	46	$ 5,281.09	23	$ 2,640.54	23	$ 2,640.54	4	$ 459.23	40	$ 4,592.25		$ -		$ -	357	$ 40,985.84
Engineer	$ 149.25	hour	136	$ 20,297.75	28	$ 4,178.95	34	$ 5,074.44	17	$ 2,537.22	17	$ 2,537.22		$ -		$ -		$ -		$ -	232	$ 34,625.57
Scientist	$ 149.25	hour	204	$ 30,446.62	41	$ 6,119.17	51	$ 7,611.66	26	$ 3,880.45	26	$ 3,880.45		$ -		$ -		$ -		$ -	348	$ 51,938.35
Project Chemist	$ 114.81	hour	156	$ 17,909.78	32	$ 3,673.80	39	$ 4,477.44	20	$ 2,296.13	20	$ 2,296.13		$ -		$ -		$ -		$ -	267	$ 30,653.27
Tech Editor	$ 160.73	hour	48	$ 7,714.98		$ -	28	$ 4,500.41		$ -	28	$ 4,500.41		$ -	60	$ 9,643.73		$ -		$ -	164	$ 26,359.52
Archeologist	$ 241.09	hour	148	$ 35,681.79	30	$ 7,232.79	37	$ 8,920.45	19	$ 4,580.77	19	$ 4,580.77	120	$ 28,931.18	120	$ 28,931.18	16	$ 3,857.49	24	$ 5,786.24	533	$ 128,502.65
Professional Labor Subtotal			**926**	**$ 142,933.80**	**178**	**$ 27,404.25**	**248**	**$ 38,402.69**	**112**	**$ 17,301.30**	**140**	**$ 21,801.71**	**126**	**$ 29,780.74**	**222**	**$ 43,557.50**	**18**	**$ 4,247.83**	**24**	**$ 5,786.24**	**1994**	**$ 331,216.06**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 142,973.80		$ 27,404.25		$ 38,462.69		$ 17,301.30		$ 21,861.71		$ 29,780.74		$ 43,557.50		$ 14,247.83		$ 6,786.24	$ 342,376.06	$ 342,376.06
Running Total by Task				$ 142,973.80		$ 170,378.05		$ 208,840.74		$ 226,142.05		$ 248,003.76		$ 277,784.50		$ 321,342.00		$ 335,589.83		$ 342,376.06	**GRAND TOTAL**	**$ 342,376.06**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist on-site.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report.

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Field Duration Calculation

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	5/14	7	70	490	Treatment startup
5/15	8/25	103	140	14,420	Treatment operation
8/26	9/1	7	0	0	Teardown and site restoration
			Total max treatment tonnage per year	14,910	
			Middle volume estimate of soil (cy)	22,942	
			Total tonnage to be treated	34,413	
			Field seasons required for treatment	3	
			Treated tonnage year 1	14,910	
			Treated tonnage year 2	14,910	
			Treated tonnage year 3	4,593	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season
Production rate during operation is 140 tons per day; rate falls between 100 and 150 tons per day, but sand is generally amenable to incineration.
Production rate during startup is half of full production.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Field effort: onsite starting 1 May to 1 September with 1 week setup, 1 week startup, 1 week teardown.
2023	Tech memo for 2022 field effort; additional field effort: onsite starting 1 May to 1 September with 1 week setup, 1 week startup, 1 week teardown.
2024	Tech memo for 2023 field effort; additional field effort: onsite starting 1 May to 24 June with 1 week setup, 1 week startup, 1 week teardown.
2025	Project reporting

Total duration 60 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	5/14/22	7	70	490	Treatment startup
5/15/22	8/25/22	103	140	14,420	Treatment operation
8/26/22	9/1/22	7	0	0	Teardown and site restoration
			Total treated tonnage	14,910	
			Total field duration	124	
			Number of resupply flights	16	

2023 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/23	5/7/23	7	0	0	Setup and site access
5/8/23	5/14/23	7	70	490	Treatment startup
5/15/23	8/25/23	103	140	14,420	Treatment operation
8/26/23	9/1/23	7	0	0	Teardown and site restoration
			Total treated tonnage	14,910	
			Total field duration	124	
			Number of resupply flights	16	

2024 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/24	5/7/24	7	0	0	Setup and site access
5/8/24	5/14/24	7	70	490	Treatment startup
5/15/24	6/13/24	30	140	4,200	Treatment operation
6/14/24	6/20/24	7	0	0	Teardown and site restoration
			Total treated tonnage	4,690	
			Total field duration	51	
			Number of resupply flights	6	

Personnel

4	Operators	
2	Truck drivers	
1	Arch	
2	Laborer	Includes housekeeper
2	Scientist	
1	Field Team Lead	Engineer rate
2	Incineration Operators	Subcontracted, included in incineration cost
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	Geospatial specialist rate
1	Assistant surveyor	

Excavation Team	6	people
Treatment Team	5	people
Backfill Team	2	people
Support Team	6	people
Total Field Crew	19	people
Survey Team	2	people

All personnel except for surveyors (19 people total) will stay in Fort Glenn Lodge
Surveyors will stay in Fort Glenn Cabin

Equipment Burn Rates	gal/day	Number Used	gal/day total	Notes
Diesel Equipment	42	1	42	
350 Excavator	25	1	25	
200 Excavator	25	1	25	
750 Dozer	100	2	200	
15-yard Rock Truck	13	1	13	
Marooka	17	1	17	
Tracked Skidsteer	4	1	4	
Fuel Truck	15	1	15	
Water Truck	13	1	13	
960 Loader	100	1	100	
50kw Generator	10	2	20	
Light Plant	0	1	0	Included in incineration estimates
Truck	430	1	430	
Incinerator (startup)	861	1	861	
Incinerator (full)		Total gal/day setup/teardown	473	
		Total gal/day startup	903	
		Total gal/day	1,333	
		Total gal/week	9,331	
		Total gal 2022	150,237	
		Total gal 2023	150,237	
		Total gal 2024	52,925	

Incineration operations (including treatment equipment, generators, and truck) have a burn rate of 6.15 gal/ton of treated material

Gasoline Equipment	gal/day	Number Used	gal/day total	
UTV	5	4	20	
		Total gal/day	20	
		Total gal/week	140	
		Total gal 2022	2,480	2x 2000 gal with mob
		Total gal 2023	2,480	2x 2000 gal with mob
		Total gal 2024	1,020	1x 2000 gal with mob

	Volume	Number	Total Volume
Diesel Fuel Storage	15,000	1	15,000
15000-gal AST at Lodge	25,000	2	50,000
25,000-gal AST rental		Total volume	65,000
		Number fueling trips required 2022	2
		Number fueling trips required 2023	2
		Number fueling trips required 2024	0

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Incineration - Middle Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	38	2	4	2	48	$199.50	$8,778.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	38	2	4	0	46	$236.25	$9,922.50	
Pesticides	SW8081	Confirmation	SO	24 hr	38	2	4	0	46	$231.00	$9,702.00	
GRO	AK101	Confirmation	SO	24 hr	38	2	4	2	48	$115.50	$5,082.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	38	2	4	0	46	$136.50	$5,733.00	
PCBs	SW8082	Confirmation	SO	24 hr	38	2	4	0	46	$147.00	$6,174.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	38	2	4	0	46	$220.50	$9,261.00	
									SUBTOTAL =		$54,652.50	$54,652.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$4,400.00	$4,400.00
									TOTAL =		$59,052.50	$59,052.50
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	593	30	60	30	743	$199.50	$136,258.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	593	30	60	0	713	$236.25	$154,271.25	
GRO	AK101	Confirmation	SO	24 hr	593	30	60	30	743	$115.50	$78,886.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	593	30	60	0	713	$136.50	$89,134.50	
									SUBTOTAL =		$458,550.75	$458,550.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$68,300.00	$68,300.00
									TOTAL =		$526,850.75	$526,850.75
ISM Baseline Sampling of Soil Treatment Area												
ISM PREP	ITRC	Baseline ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Baseline Sampling of Soil Treatment Area**
VOCs	SW8260D	Baseline ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Baseline ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Baseline ISM	SO	14 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Baseline ISM	SO	14 day	2	1	2	0	6	$65.00	$260.00	
									SUBTOTAL =		$1,810.00	$1,810.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,310.00	$2,310.00
Composite Sampling of Soil to be Backfilled - Post-Treatment 2022												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$199.50	$24,738.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2022**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$236.25	$27,877.50	
GRO	AK101	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$115.50	$14,322.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$136.50	$16,107.00	
									SUBTOTAL =		$83,044.50	$83,044.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,400.00	$12,400.00
									TOTAL =		$95,444.50	$95,444.50
Composite Sampling of Soil to be Backfilled - Post-Treatment 2023												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$199.50	$24,738.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2023**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$236.25	$27,877.50	
GRO	AK101	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$115.50	$14,322.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$136.50	$16,107.00	
									SUBTOTAL =		$83,044.50	$83,044.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,400.00	$12,400.00
									TOTAL =		$95,444.50	$95,444.50

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02 Incineration - Middle Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling of Soil to be Backfilled - Post-Treatment 2024												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	33	2	4	2	43	$199.50	$7,780.50	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2024**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	33	2	4	0	41	$236.25	$8,741.25	
GRO	AK101	Treatment Confirmation	SO	24 hr	33	2	4	2	43	$115.50	$4,504.50	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	33	2	4	0	41	$136.50	$5,050.50	
									SUBTOTAL =		$26,076.75	$26,076.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$3,900.00	$3,900.00
									TOTAL =		$29,976.75	$29,976.75
ISM Post-Treatment Sampling of Treatment Area												
ISM PREP	ITRC	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Post-Treatment Sampling of Treatment Area**
VOCs	SW8260D	Post-Treatment ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Post-Treatment ISM	SO	14 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$65.00	$260.00	
									SUBTOTAL =		$1,810.00	$1,810.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,310.00	$2,310.00
									GRAND TOTAL =		$811,389.00	$811,389.00

Notes:
Assume no equipment blanks will be required for this project.
Assume ISM triplicate samples will be collected 1 per 10 primary samples.
Assume composite samples will be collected from treated soil at a frequency of 1 per 140 tons (93 CY).
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
Shipping/courier fees not included in laboratory pricing.
5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 138 days

Equipment	Rate	Number	Unit	Total
open-top containers	$ 15.00	9	day	$ 18,630.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	**$ 313,895.00**

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Set up	$5,800.00	
Travel Costs for Set up crew	$500.00	
Food Costs for Set up crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rental

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike (2 each)	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,247.00**	**$ 7,802.00**	**$ 23,371.00**	**$ 1,114.57**

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ALTERNATIVE 3
PROJECT 02 INCINERATION – HIGH ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 108,875	$ 108,875	2021	$ 108,875
Task 2	Planning Documents	1	Job	$ 147,801	$ 147,801	2021	$ 147,801
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4a	Mobilization/Demobilization 2022	1	1	$ 926,281	$ 926,281	2022	$ 901,052
Task 4b	Mobilization/Demobilization 2023	1	1	$ 952,217	$ 952,217	2023	$ 901,052
Task 4c	Mobilization/Demobilization 2024	1	1	$ 978,879	$ 978,879	2024	$ 901,052
Task 5a	Incineration Field Effort 2022	1	Job	$ 8,458,777	$ 8,458,777	2022	$ 8,228,382
Task 5b	Incineration Field Effort 2023	1	Job	$ 8,133,039	$ 8,133,039	2023	$ 7,696,028
Task 5c	Incineration Field Effort 2024	1	Job	$ 4,967,400	$ 4,967,400	2024	$ 4,572,458
Task 6a	Tech Memo for 2022 Field Effort	1	Job	$ 38,631	$ 38,631	2023	$ 36,556
Task 6b	Tech Memo for 2023 Field Effort	1	Job	$ 39,713	$ 39,713	2024	$ 36,556
Task 7	Reporting	1	Job	$ 369,137	$ 369,137	2025	$ 330,534
				TOTAL	**$ 25,169,516**	**Total Net Present Worth Cost**	**$ 23,909,110**
				Cost per Cubic Yard	**$ 1,044**	**Cost per Cubic Yard**	**$ 992**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	30	$ 6,476.40	38	$ 8,203.44		$ -	68	$ 14,679.84
Project Manager	$ 174.76	hour	132	$ 23,068.32	68	$ 11,883.68	15	$ 2,621.40	215	$ 37,573.40
Contract Manager	$ 143.92	hour		$ -	68	$ 9,786.56		$ -	68	$ 9,786.56
Project Controls	$ 195.32	hour		$ -	128	$ 25,000.96	15	$ 2,929.80	143	$ 27,930.76
Administrative Assistant	$ 92.52	hour		$ -	68	$ 6,291.36	15	$ 1,387.80	83	$ 7,679.16
Engineer	$ 133.64	hour	84	$ 11,225.76		$ -		$ -	84	$ 11,225.76
Professional Labor Subtotal			**246**	**$ 40,770.48**	**370**	**$ 61,166.00**	**45**	**$ 6,939.00**	**661**	**$ 108,875.48**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 40,770.48		$ 61,166.00		$ 6,939.00	$ 108,875.48	$ 108,875.48
Running Total by Task				$ 40,770.48		$ 101,936.48		$ 108,875.48	**GRAND TOTAL**	**$ 108,875.48**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 5 reports total
4 PoP=60 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	hour	12	$ 2,097.12	60	$ 10,485.60	12	$ 2,097.12	15	$ 2,621.40	8	$ 1,398.08	8	$ 1,398.08	115	$ 20,097.40
Project Controls	$ 195.32	hour	12	$ 2,343.84		$ -		$ -		$ -		$ -		$ -	12	$ 2,343.84
Geospatial Specialist	$ 102.80	hour		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Engineer	$ 133.64	hour		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Scientist	$ 133.64	hour		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Regulatory Specialist	$ 215.88	hour		$ -	48	$ 10,362.24	10	$ 2,158.80	12	$ 2,590.56	6	$ 1,295.28	6	$ 1,295.28	82	$ 17,702.16
Project Chemist	$ 102.80	hour		$ -	56	$ 5,756.80	12	$ 1,233.60	14	$ 1,439.20	7	$ 719.60	7	$ 719.60	96	$ 9,868.80
Tech Editor	$ 143.92	hour		$ -	40	$ 5,756.80		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	80	$ 11,513.60
Archaeologist	$ 215.88	hour		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Safety Officer	$ 154.20	hour		$ -	24	$ 3,700.80	5	$ 771.00	6	$ 925.20	3	$ 462.60	3	$ 462.60	41	$ 6,322.20
Professional Labor Subtotal			**24**	**$ 4,440.96**	**568**	**$ 82,939.04**	**107**	**$ 15,635.88**	**152**	**$ 22,173.96**	**67**	**$ 9,786.56**	**87**	**$ 12,664.96**	**1005**	**$ 147,641.36**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 4,440.96		$ 82,979.04		$ 15,635.88		$ 22,233.96		$ 9,786.56		$ 12,724.96	$ 147,801.36	$ 147,801.36
Running Total by Task				$ 4,440.96		$ 87,420.00		$ 103,055.88		$ 125,289.84		$ 135,076.40		$ 147,801.36	**GRAND TOTAL**	**$ 147,801.36**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor		**153.4**												
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization 2022			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	48	$ 6,594.33	48	$ 6,594.33	20	$ 2,747.64	156	$ 21,431.58
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archaeologist	$ 221.92	hour		$ -	24	$ 5,326.19	24	$ 5,326.19		$ -	48	$ 10,652.38
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**152**	**$ 24,010.13**	**152**	**$ 24,010.13**	**100**	**$ 13,611.38**	**604**	**$ 88,854.40**
Craft Labor												
Operator	$ 147.95	hour		$ -	96	$ 14,203.18	48	$ 7,101.59		$ -	144	$ 21,304.77
Laborer	$ 137.38	hour		$ -	48	$ 6,594.33	72	$ 9,891.50		$ -	120	$ 16,485.83
Truck Driver	$ 105.68	hour		$ -	48	$ 5,072.56	48	$ 5,072.56		$ -	96	$ 10,145.13
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**216**	**$ 29,167.24**	**192**	**$ 25,362.82**	**0**	**$ -**	**408**	**$ 54,530.05**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	36	$ 540.00	36	$ 540.00		$ -	72	$ 1,080.00
Supplies Subtotal			**0**	**$ -**	**36**	**$ 540.00**	**36**	**$ 540.00**	**0**	**$ -**	**72**	**$ 1,080.00**
Equipment												
350 Excavator	$ 2,725.00	week		$ -	1	$ 2,725.00	1	$ 2,725.00		$ -	2	$ 5,450.00
200 Excavator	$ 1,625.00	week		$ -	1	$ 1,625.00	1	$ 1,625.00		$ -	2	$ 3,250.00
750 Dozer	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
15-yard Rock Truck	$ 3,225.00	week		$ -	2	$ 6,450.00	2	$ 6,450.00		$ -	4	$ 12,900.00
Marooka	$ 2,475.00	week		$ -	1	$ 2,475.00	1	$ 2,475.00		$ -	2	$ 4,950.00
Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
Water Truck (4,000-gal)	$ 1,500.00	week		$ -	1	$ 1,500.00	1	$ 1,500.00		$ -	2	$ 3,000.00
960 Loader	$ 1,975.00	week		$ -	1	$ 1,975.00	1	$ 1,975.00		$ -	2	$ 3,950.00
Light Plant	$ 131.25	week		$ -	2	$ 262.50	2	$ 262.50		$ -	4	$ 525.00
UTV	$ 840.00	week		$ -	4	$ 3,360.00	4	$ 3,360.00		$ -	8	$ 6,720.00
2,000-gal Water Tank	$ 125.00	week		$ -	1	$ 125.00	1	$ 125.00		$ -	2	$ 250.00
Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
Maintenance tools	$ 812.50	week			1	$ 812.50	1	$ 812.50			2	$ 1,625.00
Rentals (1 wk rental to cover mob)	$ 7,352.00	week		$ -	1	$ 7,352.00	1	$ 7,352.00		$ -	2	$ 14,704.00
Equipment Subtotal			**0**	**$ -**	**31**	**$ 39,279.50**	**31**	**$ 39,279.50**	**0**	**$ -**	**62**	**$ 78,559.00**
Other Direct Costs												
Container/Equipment Transport Cost	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Incinerator Mob/Demob	$ 30,000.00	LS		$ -	1	$ 30,000.00	1	$ 30,000.00		$ -	2	$ 60,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**14**	**$ 41,050.00**	**14**	**$ 41,050.00**	**0**	**$ -**	**28**	**$ 82,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge Loading/Unloading Fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	3	$ 13,500.00	3	$ 13,500.00		$ -	6	$ 27,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**10**	**$ 293,460.00**	**10**	**$ 293,460.00**	**0**	**$ -**	**20**	**$ 586,920.00**

TASK 4 - Mobilization/Demobilization 2022			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel												
Meals / Incidentals	$ 113.00	day		$ -	25	$ 2,825.00	25	$ 2,825.00		$ -	50	$ 5,650.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	12.5	$ 8,125.00	12.5	$ 8,125.00		$ -	25	$ 16,250.00
Hotel DUT	$ 150.00	day		$ -	25	$ 3,750.00	25	$ 3,750.00		$ -	50	$ 7,500.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	25	$ 2,418.75	25	$ 2,418.75		$ -	50	$ 4,837.50
Travel Subtotal			**0**	**$ -**	**87.5**	**$ 17,118.75**	**87.5**	**$ 17,118.75**	**0**	**$ -**	**175**	**$ 34,237.50**
Task Totals				$ 27,222.76		$ 444,625.62		$ 440,821.20		$ 13,611.38	$ 926,280.95	$ 926,280.95
Running Total by Task				$ 27,222.76		$ 471,848.38		$ 912,669.58		$ 926,280.95	**GRAND TOTAL**	**$ 926,280.95**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12 hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Assumes incineration subcontracted personnel rotate out monthly.
5 Tundra mats originate in Fairbanks.
6 Mobile incinerator equipment originates in Seattle; no rental cost with incinerator unit, as cost is based on price per treated ton.

TASK 5 - Incineration Field Effort 2022			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 179.65	hour	28	$ 5,030.29	51.5	$ 9,252.14	51.5	$ 9,252.14	51.5	$ 9,252.14	51.5	$ 9,252.14	14	$ 2,515.15	248	$ 44,554.01
Geospatial Specialist	$ 105.68	hour		$ -	672	$ 71,015.88		$ -		$ -		$ -		$ -	672	$ 71,015.88
Engineer	$ 137.38	hour	168	$ 23,080.16	1,236	$ 169,804.05		$ -		$ -		$ -	84	$ 11,540.08	1488	$ 204,424.30
Scientist	$ 137.38	hour	336	$ 46,160.33	1,236	$ 169,804.05	1236	$ 169,804.05		$ -		$ -	168	$ 23,080.16	2976	$ 408,848.59
Professional Land Surveyor	$ 116.25	hour		$ -	672	$ 78,117.47		$ -		$ -		$ -		$ -	672	$ 78,117.47
Construction Manager	$ 147.95	hour	168	$ 24,855.56		$ -		$ -		$ -	1236	$ 182,865.90	84	$ 12,427.78	1488	$ 220,149.24
Archaeologist	$ 221.92	hour	168	$ 37,283.34	1,236	$ 274,298.86		$ -		$ -		$ -	84	$ 18,641.67	1488	$ 330,223.86
Superintendent	$ 158.52	hour	168	$ 26,630.96		$ -		$ -		$ -	1236	$ 195,927.75	84	$ 13,315.48	1488	$ 235,874.19
Professional Labor Subtotal				**$ 163,040.64**	**5103.5**	**$ 772,292.46**	**1,287.5**	**$ 179,056.20**	**51.5**	**$ 9,252.14**	**2523.5**	**$ 388,045.80**	**518**	**$ 81,520.32**	**10,520**	**$ 1,593,207.56**
Craft Labor																
Operator	$ 147.95	hour	672	$ 99,422.24	1,236	$ 182,865.90	2,472	$ 365,731.81	1236	$ 182,865.90		$ -	336	$ 49,711.12	5952	$ 880,596.97
Laborer	$ 137.38	hour	336	$ 46,160.33	1,236	$ 169,804.05		$ -		$ -	1236	$ 169,804.05	168	$ 23,080.16	2976	$ 408,848.59
Truck Driver	$ 105.68	hour	336	$ 35,507.94	1,236	$ 130,618.50		$ -	1236	$ 130,618.50		$ -	168	$ 17,753.97	2976	$ 314,498.92
Mechanic	$ 137.38	hour	168	$ 23,080.16		$ -		$ -		$ -	1236	$ 169,804.05	84	$ 11,540.08	1488	$ 204,424.30
Craft Labor Subtotal				**$ 204,170.67**	**3,708**	**$ 483,288.46**	**2,472**	**$ 365,731.81**	**2,472**	**$ 313,484.41**	**2,472**	**$ 339,608.11**	**756**	**$ 102,085.33**	**13,392**	**$ 1,808,368.78**
Materials																
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		$ -		$ -	1	$ 14,995.80
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	515	$ 5,150.00	618	$ 6,180.00	206	$ 2,060.00	309	$ 3,090.00	112	$ 1,120.00	1984	$ 19,840.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	730	$ 10,950.00	618	$ 9,270.00	206	$ 3,090.00	515	$ 7,725.00	112	$ 1,680.00	2405	$ 36,075.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	1,545	$ 6,180.00		$ -		$ -	515	$ 2,060.00	140	$ 560.00	2480	$ 9,920.00
Diesel	$ 3.75	gal	9,626.9	$ 36,100.75	14591.7	$ 54,718.75	96531.6	$ 361,993.50	12875.0	$ 48,281.25	13304.2	$ 49,890.63	3307.5	$ 12,403.13	150236.8	$ 563,388.00
Supplies Subtotal				**$ 42,820.75**	**17,382.7**	**$ 91,994.55**	**97,767.6**	**$ 377,443.50**	**13,287.0**	**$ 53,431.25**	**14,643.2**	**$ 62,765.63**	**3,671.5**	**$ 15,763.13**	**157,106.8**	**$ 644,218.80**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.4	$ 37,423.33		$ -		$ -		$ -	0.2	$ 2,543.33	4.1	$ 45,053.33
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	3.4	$ 22,316.67		$ -		$ -	0.2	$ 1,516.67	4.1	$ 26,866.67
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	3.4	$ 27,123.33		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	3.4	$ 44,290.00		$ -	3.4	$ 44,290.00		$ -	0.5	$ 6,020.00	8.3	$ 106,640.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	3.4	$ 33,990.00	0.2	$ 2,310.00	4.1	$ 40,920.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	3.4	$ 12,531.67	0.2	$ 851.67	4.1	$ 15,086.67
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	3.4	$ 25,406.67		$ -		$ -	0.2	$ 1,726.67	4.1	$ 30,586.67
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	3.4	$ 20,600.00		$ -		$ -	0.2	$ 1,400.00	4.1	$ 24,800.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	3.4	$ 27,123.33		$ -		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	6.9	$ 3,605.00		$ -		$ -	0.5	$ 245.00	8.3	$ 4,340.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	10.3	$ 34,608.00		$ -		$ -	3.4	$ 11,536.00	0.9	$ 3,136.00	16.5	$ 55,552.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	2.0	$ 2,000.00		$ -	2.0	$ 2,000.00
Shipping Container	$ 15.00	day	154	$ 2,310.00		$ -		$ -		$ -	1,133	$ 16,995.00	77	$ 1,155.00	1364	$ 20,460.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	51.5	$ 34,762.50		$ -	51.5	$ 34,762.50		$ -	7.0	$ 4,725.00	124.0	$ 83,700.00
Rentals	$ 22,021.00	month	0.5	$ 10,276.47	3.4	$ 75,605.43		$ -		$ -		$ -	0.2	$ 5,138.23	4.1	$ 91,020.13
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	3.4	$ 1,716.67	0.2	$ 116.67	4.1	$ 2,066.67
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	3.4	$ 11,158.33	0.2	$ 758.33	4.1	$ 13,433.33
Equipment Subtotal			**176.9**	**$ 70,658.47**	**72.1**	**$ 226,689.27**	**20.6**	**$ 99,051.67**	**58.4**	**$ 106,175.83**	**1,152.2**	**$ 89,927.67**	**88.4**	**$ 35,329.23**	**1,568.5**	**$ 627,832.13**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each	1	$ 100.00	116	$ 11,600.00	14	$ 1,400.00		$ -		$ -		$ -	131.0	$ 13,100.00
Drum Disposal	$ 313,895.00	LS		$ -		$ -		$ -	1	$ 313,895.00		$ -		$ -	1.0	$ 313,895.00
Site Communications (internet/radios) setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	3.4	$ 43,946.67		$ -	3.4	$ 43,946.67
Other Direct Costs Subtotal			**2**	**$ 7,869.00**	**116**	**$ 11,600.00**	**14**	**$ 1,400.00**	**1**	**$ 313,895.00**	**3.4**	**$ 43,946.67**	**0**	**$ -**	**136.4**	**$ 378,710.67**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	16	$ 280,000.00		$ -	16.0	$ 280,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	103	$ 86,005.00	7	$ 5,845.00	124.0	$ 103,540.00
Analytical Laboratory (confirmation samples)	$ 313,659.96	LS		$ -	1	$ 313,659.96		$ -		$ -		$ -		$ -	1.0	$ 313,659.96
Analytical Laboratory (composite samples)	$ 95,444.50	LS		$ -		$ -	1	$ 95,444.50		$ -		$ -		$ -	1.0	$ 95,444.50
Analytical Laboratory (Baseline ISM samples)	$ 2,310.00	LS	1	$ 2,310.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 2,310.00
Analytical Laboratory (pre-excavation sampling)	$ 105,628.75	LS		$ -	1	$ 105,628.75		$ -		$ -		$ -		$ -	1.0	$ 105,628.75
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	103	$ 66,950.00	7	$ 4,550.00	124.0	$ 80,600.00
Subcontractors/Vendors Subtotal			**29**	**$ 23,100.00**	**2**	**$ 419,288.71**	**2**	**$ 1,854,824.50**	**0**	**$ -**	**222**	**$ 432,955.00**	**14**	**$ 10,395.00**	**269**	**$ 2,740,563.21**

TASK 5 - Incineration Field Effort 2022			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	666	$ 75,258.00	515	$ 58,195.00	206	$ 23,278.00	618	$ 69,834.00	133	$ 15,029.00	2404.0	$ 271,652.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	103	$ 309,000.00	7	$ 21,000.00	124.0	$ 372,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	56	$ 16,800.00		$ -		$ -		$ -		$ -	56.0	$ 16,800.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	64	$ 5,424.00		$ -		$ -		$ -		$ -	64.0	$ 5,424.00
Travel Subtotal			**280**	**$ 72,058.00**	**786**	**$ 97,482.00**	**515**	**$ 58,195.00**	**206**	**$ 23,278.00**	**721**	**$ 378,834.00**	**140**	**$ 36,029.00**	**2,648.0**	**$ 665,876.00**
Task Totals				$ 583,717.52		$ 2,102,635.45		$ 2,935,702.67		$ 819,516.63		$ 1,736,082.87		$ 281,122.01	$ 8,458,777.15	$ 8,458,777.15
Running Total by Task				$ 583,717.52		$ 2,686,352.97		$ 5,622,055.64		$ 6,441,572.27		$ 8,177,655.14		$ 8,458,777.15	**GRAND TOTAL**	**$ 8,458,777.15**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this period
3 Task 5.1 also includes baseline ISM sampling of the treatment area and initial access construction to features for excavation
4 Task 5.2 includes pre-excavation analytical sampling of each site feature, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 124 days for one scientist, one archaeologist, one operator, one truck driver, and one labore
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump featur
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes running the incineration equipment. Assumes a duration of 124 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sum
8 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
9 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 124 days for two operators. Additionally, transport of empty drums to barge landing area is conducted as part of this task in downtime from backfilling
10 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report
11 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observe
12 Task 5.5 includes site and camp management activities. Assumes a duration of 124 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT
13 There is a drinking water source on island, which is assumed sufficient for drinking, washing, bathing, and incineration needs
14 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply
15 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period
16 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed
17 Refueling costs from Dutch Harbor are per gal of diesel delivered, no per trip charge
18 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
19 Overall duration determined by incineration production rate after startup, which is 140 tons per day
20 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
21 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed

TASK 5 - Incineration Field Effort 2023			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	2023 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 184.68	hour	28	$ 5,171.14	51.5	$ 9,511.20	51.5	$ 9,511.20	51.5	$ 9,511.20	51.5	$ 9,511.20	14	$ 2,585.57	248	$ 45,801.53
Geospatial Specialist	$ 108.64	hour		$ -	672	$ 73,004.33		$ -		$ -		$ -		$ -	672	$ 73,004.33
Engineer	$ 141.23	hour	168	$ 23,726.41	1236	$ 174,558.57		$ -		$ -		$ -	84	$ 11,863.20	1488	$ 210,148.18
Scientist	$ 141.23	hour	336	$ 47,452.81	1236	$ 174,558.57	1236	$ 174,558.57		$ -		$ -	168	$ 23,726.41	2976	$ 420,296.35
Professional Land Surveyor	$ 119.50	hour		$ -	672	$ 80,304.76		$ -		$ -		$ -		$ -	672	$ 80,304.76
Construction Manager	$ 152.09	hour	168	$ 25,551.52		$ -		$ -		$ -	1236	$ 187,986.15	84	$ 12,775.76	1488	$ 226,313.42
Archaeologist	$ 228.14	hour	168	$ 38,327.27	1236	$ 281,979.22		$ -		$ -		$ -	84	$ 19,163.64	1488	$ 339,470.13
Superintendent	$ 162.96	hour	168	$ 27,376.62		$ -		$ -		$ -	1236	$ 201,413.73	84	$ 13,688.31	1488	$ 242,478.67
Professional Labor Subtotal			**1036**	**$ 167,605.77**	**5103.5**	**$ 793,916.65**	**1287.5**	**$ 184,069.77**	**51.5**	**$ 9,511.20**	**2523.5**	**$ 398,911.08**	**518**	**$ 83,802.89**	**10520**	**$ 1,637,817.37**
Craft Labor																
Operator	$ 152.09	hour	672	$ 102,206.06	1236	$ 187,986.15	2472	$ 375,972.30	1236	$ 187,986.15		$ -	336	$ 51,103.03	5952	$ 905,253.69
Laborer	$ 141.23	hour	336	$ 47,452.81	1236	$ 174,558.57		$ -		$ -	1236	$ 174,558.57	168	$ 23,726.41	2976	$ 420,296.35
Truck Driver	$ 108.64	hour	336	$ 36,502.16	1236	$ 134,275.82		$ -	1236	$ 134,275.82		$ -	168	$ 18,251.08	2976	$ 323,304.89
Mechanic	$ 141.23	hour	168	$ 23,726.41		$ -		$ -		$ -	1236	$ 174,558.57	84	$ 11,863.20	1488	$ 210,148.18
Craft Labor Subtotal			**1512**	**$ 209,887.45**	**3708**	**$ 496,820.54**	**2472**	**$ 375,972.30**	**2472**	**$ 322,261.97**	**2472**	**$ 349,117.13**	**756**	**$ 104,943.72**	**13392**	**$ 1,859,003.11**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 15,847.32	LS		$ -	1	$ 16,747.20		$ -		$ -		$ -		$ -	1	$ 16,747.20
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	515	$ 5,150.00	618	$ 6,180.00	206	$ 2,060.00	309	$ 3,090.00	112	$ 1,120.00	1984	$ 19,840.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	730	$ 10,950.00	618	$ 9,270.00	206	$ 3,090.00	515	$ 7,725.00	112	$ 1,680.00	2405	$ 36,075.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	1545	$ 6,180.00		$ -		$ -	515	$ 2,060.00	140	$ 560.00	2480	$ 9,920.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	14591.667	$ 54,718.75	96531.6	$ 361,993.50	12875	$ 48,281.25	13304.167	$ 49,890.63	3307.5	$ 12,403.13	150236.8	$ 563,388.00
Supplies Subtotal			**10354.867**	**$ 42,820.75**	**17382.7**	**$ 93,745.95**	**97767.6**	**$ 377,443.50**	**13287.0**	**$ 53,431.25**	**14643.2**	**$ 62,765.63**	**3671.5**	**$ 15,763.13**	**157107**	**$ 645,970.20**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.4	$ 37,423.33		$ -		$ -		$ -	0.2	$ 2,543.33	4.1	$ 45,053.33
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	3.4	$ 22,316.67		$ -		$ -	0.2	$ 1,516.67	4.1	$ 26,866.67
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	3.4	$ 27,123.33		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	3.4	$ 44,290.00		$ -	3.4	$ 44,290.00		$ -	0.5	$ 6,020.00	8.3	$ 106,640.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	3.4	$ 33,990.00	0.2	$ 2,310.00	4.1	$ 40,920.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	3.4	$ 12,531.67	0.2	$ 851.67	4.1	$ 15,086.67
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	3.4	$ 25,406.67		$ -		$ -	0.2	$ 1,726.67	4.1	$ 30,586.67
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	3.4	$ 20,600.00		$ -		$ -	0.2	$ 1,400.00	4.1	$ 24,800.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	3.4	$ 27,123.33		$ -		$ -	0.2	$ 1,843.33	4.1	$ 32,653.33
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	6.9	$ 3,605.00		$ -		$ -	0.5	$ 245.00	8.3	$ 4,340.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	10.3	$ 34,608.00		$ -		$ -	3.4	$ 11,536.00	0.9	$ 3,136.00	16.5	$ 55,552.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	2.0	$ 2,000.00		$ -	2.0	$ 2,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	1133.0	$ 16,995.00	77.0	$ 1,155.00	1364.0	$ 20,460.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	51.5	$ 34,762.50		$ -	51.5	$ 34,762.50		$ -	7.0	$ 4,725.00	124.0	$ 83,700.00
Rentals	$ 22,021.00	month	0.5	$ 10,276.47	3.4	$ 75,605.43		$ -		$ -		$ -	0.2	$ 5,138.23	4.1	$ 91,020.13
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	3.4	$ 1,716.67	0.2	$ 116.67	4.1	$ 2,066.67
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	3.4	$ 11,158.33	0.2	$ 758.33	4.1	$ 13,433.33
Equipment Subtotal			**176.9**	**$ 70,658.47**	**72.1**	**$ 226,689.27**	**20.6**	**$ 99,051.67**	**58.4**	**$ 106,175.83**	**1152.2**	**$ 89,927.67**	**88.4**	**$ 35,329.23**	**1568.5**	**$ 627,832.13**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	108	$ 10,800.00	14	$ 1,400.00		$ -		$ -		$ -	122.0	$ 12,200.00
Site Communications (internet/radios) setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	3.4	$ 43,946.67		$ -	3.4	$ 43,946.67
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**108**	**$ 10,800.00**	**14**	**$ 1,400.00**	**0**	**$ -**	**3.4**	**$ 43,946.67**	**0**	**$ -**	**126.4**	**$ 63,915.67**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	16	$ 280,000.00		$ -	16.0	$ 280,000.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	103	$ 86,005.00	7	$ 5,845.00	124.0	$ 103,540.00
Analytical Laboratory (confirmation samples)	$ 313,659.96	LS		$ -	1	$ 313,659.96		$ -		$ -		$ -		$ -	1.0	$ 313,659.96
Analytical Laboratory (composite samples)	$ 95,444.50	LS		$ -		$ -	1	$ 95,444.50		$ -		$ -		$ -	1.0	$ 95,444.50
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	103	$ 66,950.00	7	$ 4,550.00	124.0	$ 80,600.00
Subcontractors/Vendors Subtotal			**28.0**	**$ 20,790.00**	**1**	**$ 313,659.96**	**2**	**$ 1,854,824.50**	**0**	**$ -**	**222**	**$ 432,955.00**	**14**	**$ 10,395.00**	**267**	**$ 2,632,624.46**

TASK 5 - Incineration Field Effort 2023			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	666	$ 75,258.00	515	$ 58,195.00	206	$ 23,278.00	618	$ 69,834.00	133	$ 15,029.00	2404.0	$ 271,652.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	103	$ 309,000.00	7	$ 21,000.00	124.0	$ 372,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	56	$ 16,800.00		$ -		$ -		$ -		$ -	56.0	$ 16,800.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	64	$ 5,424.00		$ -		$ -		$ -		$ -	64.0	$ 5,424.00
Travel Subtotal			**280**	**$ 72,058.00**	**786**	**$ 97,482.00**	**515**	**$ 58,195.00**	**206**	**$ 23,278.00**	**721**	**$ 378,834.00**	**140**	**$ 36,029.00**	**2648.0**	**$ 665,876.00**
Task Totals				$ 591,589.44		$ 2,033,114.36		$ 2,950,956.73		$ 514,658.26		$ 1,756,457.17		$ 286,262.97	$ 8,133,038.93	$ 8,133,038.93
Running Total by Task				$ 591,589.44		$ 2,624,703.80		$ 5,575,660.53		$ 6,090,318.79		$ 7,846,775.97		$ 8,133,038.93	**GRAND TOTAL**	**$ 8,133,038.93**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this period.
3 Task 5.1 also includes baseline ISM sampling of the treatment area, as well as initial access construction to features for excavation.
4 Task 5.2 includes excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 124 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer.
5 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
6 Task 5.3 includes running the incineration equipment. Assumes a duration of 124 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sum.
7 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
8 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 124 days for two operators.
9 Task 5.5 includes site and camp management activities. Assumes a duration of 124 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
10 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
11 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
12 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this period.
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed.
14 Refueling costs from Dutch Harbor are per gal of diesel delivered, no per trip charge.
15 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
16 Overall duration determined by incineration production rate after startup, which is 140 tons per day.
17 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
18 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 5 - Incineration Field Effort 2024			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	2024 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 189.85	hour	28	$ 5,315.93	21	$ 3,986.95	21	$ 3,986.95	21	$ 3,986.95	21	$ 3,986.95	14	$ 2,657.97	126	$ 23,921.69
Geospatial Specialist	$ 111.68	hour		$ -	294	$ 32,833.70		$ -		$ -		$ -		$ -	294	$ 32,833.70
Engineer	$ 145.18	hour	168	$ 24,390.75	504	$ 73,172.24		$ -		$ -		$ -	84	$ 12,195.37	756	$ 109,758.36
Scientist	$ 145.18	hour	336	$ 48,781.49	504	$ 73,172.24	504	$ 73,172.24		$ -		$ -	168	$ 24,390.75	1512	$ 219,516.72
Professional Land Surveyor	$ 122.85	hour		$ -	294	$ 36,117.07		$ -		$ -		$ -		$ -	294	$ 36,117.07
Construction Manager	$ 156.35	hour	168	$ 26,266.96		$ -		$ -		$ -	504	$ 78,800.87	84	$ 13,133.48	756	$ 118,201.31
Archaeologist	$ 234.53	hour	168	$ 39,400.44	504	$ 118,201.31		$ -		$ -		$ -	84	$ 19,700.22	756	$ 177,301.97
Superintendent	$ 167.52	hour	168	$ 28,143.17		$ -		$ -		$ -	504	$ 84,429.51	84	$ 14,071.58	756	$ 126,644.26
Professional Labor Subtotal			**1036**	**$ 172,298.73**	**2121**	**$ 337,483.50**	**525**	**$ 77,159.19**	**21**	**$ 3,986.95**	**1029**	**$ 167,217.33**	**518**	**$ 86,149.37**	**5250**	**$ 844,295.07**
Craft Labor																
Operator	$ 156.35	hour	672	$ 105,067.83	504	$ 78,800.87	1008	$ 157,601.75	504	$ 78,800.87		$ -	336	$ 52,533.92	3024	$ 472,805.24
Laborer	$ 145.18	hour	336	$ 48,781.49	504	$ 73,172.24		$ -		$ -	504	$ 73,172.24	168	$ 24,390.75	1512	$ 219,516.72
Truck Driver	$ 111.68	hour	336	$ 37,524.23	504	$ 56,286.34		$ -	504	$ 56,286.34		$ -	168	$ 18,762.11	1512	$ 168,859.01
Mechanic	$ 145.18	hour	168	$ 24,390.75		$ -		$ -		$ -	504	$ 73,172.24	84	$ 12,195.37	756	$ 109,758.36
Craft Labor Subtotal			**1512**	**$ 215,764.30**	**1512**	**$ 208,259.45**	**1008**	**$ 157,601.75**	**1008**	**$ 135,087.21**	**1008**	**$ 146,344.48**	**756**	**$ 107,882.15**	**6804**	**$ 970,939.33**
Materials																
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		$ -		$ -	1	$ 14,995.80
Maintenance supplies	$ 10.00	equip-day	224	$ 2,240.00	210	$ 2,100.00	252	$ 2,520.00	84	$ 840.00	126	$ 1,260.00	112	$ 1,120.00	1008	$ 10,080.00
Health and Safety/PPE	$ 15.00	man-day	224	$ 3,360.00	301	$ 4,515.00	252	$ 3,780.00	84	$ 1,260.00	210	$ 3,150.00	112	$ 1,680.00	1183	$ 17,745.00
Gasoline	$ 4.00	gal	280	$ 1,120.00	630	$ 2,520.00		$ -		$ -	210	$ 840.00	140	$ 560.00	1260	$ 5,040.00
Diesel	$ 3.75	gal	9626.9	$ 36,100.75	5950	$ 22,312.50	39362.4	$ 147,609.00	5250	$ 19,687.50	5425	$ 20,343.75	3307.5	$ 12,403.13	68921.8	$ 258,456.63
Supplies Subtotal			**10354.867**	**$ 42,820.75**	**7092.0**	**$ 46,443.30**	**39866.4**	**$ 153,909.00**	**5418.0**	**$ 21,787.50**	**5971.0**	**$ 25,593.75**	**3671.5**	**$ 15,763.13**	**72374**	**$ 306,317.43**
Equipment																
350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	1.4	$ 15,260.00		$ -		$ -		$ -	0.2	$ 2,543.33	2.1	$ 22,890.00
200 Excavator	$ 6,500.00	month	0.5	$ 3,033.33		$ -	1.4	$ 9,100.00		$ -		$ -	0.2	$ 1,516.67	2.1	$ 13,650.00
750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -		$ -	1.4	$ 11,060.00		$ -	0.2	$ 1,843.33	2.1	$ 16,590.00
15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	1.4	$ 18,060.00		$ -	1.4	$ 18,060.00		$ -	0.5	$ 6,020.00	4.2	$ 54,180.00
Marooka	$ 9,900.00	month	0.5	$ 4,620.00		$ -		$ -		$ -	1.4	$ 13,860.00	0.2	$ 2,310.00	2.1	$ 20,790.00
Tracked Skidsteer	$ 3,650.00	month	0.5	$ 1,703.33		$ -		$ -		$ -	1.4	$ 5,110.00	0.2	$ 851.67	2.1	$ 7,665.00
Fuel Truck	$ 7,400.00	month	0.5	$ 3,453.33		$ -	1.4	$ 10,360.00		$ -		$ -	0.2	$ 1,726.67	2.1	$ 15,540.00
Water Truck (4,000-gal)	$ 6,000.00	month	0.5	$ 2,800.00		$ -	1.4	$ 8,400.00		$ -		$ -	0.2	$ 1,400.00	2.1	$ 12,600.00
960 Loader	$ 7,900.00	month	0.5	$ 3,686.67		$ -	1.4	$ 11,060.00		$ -		$ -	0.2	$ 1,843.33	2.1	$ 16,590.00
Light Plant	$ 525.00	month	0.9	$ 490.00		$ -	2.8	$ 1,470.00		$ -		$ -	0.5	$ 245.00	4.2	$ 2,205.00
UTV	$ 3,360.00	month	1.9	$ 6,272.00	4.2	$ 14,112.00		$ -		$ -	1.4	$ 4,704.00	0.9	$ 3,136.00	8.4	$ 28,224.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -		$ -	1.0	$ 1,000.00		$ -	1.0	$ 1,000.00
Shipping Container	$ 15.00	day	154.0	$ 2,310.00		$ -		$ -		$ -	462.0	$ 6,930.00	77.0	$ 1,155.00	693.0	$ 10,395.00
Tundra Mats (75)	$ 675.00	day	14.0	$ 9,450.00	21.0	$ 14,175.00		$ -	21.0	$ 14,175.00		$ -	7.0	$ 4,725.00	63.0	$ 42,525.00
Rentals	$ 22,021.00	month	0.5	$ 10,276.47	1.4	$ 30,829.40		$ -		$ -		$ -	0.2	$ 5,138.23	2.1	$ 46,244.10
2,000-gal Water Tank	$ 500.00	month	0.5	$ 233.33		$ -		$ -		$ -	1.4	$ 700.00	0.2	$ 116.67	2.1	$ 1,050.00
Maintenance tools	$ 3,250.00	month	0.5	$ 1,516.67		$ -		$ -		$ -	1.4	$ 4,550.00	0.2	$ 758.33	2.1	$ 6,825.00
Equipment Subtotal			**176.9**	**$ 70,658.47**	**29.4**	**$ 92,436.40**	**8.4**	**$ 40,390.00**	**23.8**	**$ 43,295.00**	**470.0**	**$ 36,854.00**	**88.4**	**$ 35,329.23**	**796.9**	**$ 318,963.10**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	108	$ 10,800.00	14	$ 1,400.00		$ -		$ -	1	$ 100.00	123.0	$ 12,300.00
Site Communications (internet/radios) setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -		$ -	1.4	$ 17,920.00		$ -	1.4	$ 17,920.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**108**	**$ 10,800.00**	**14**	**$ 1,400.00**	**0**	**$ -**	**1.4**	**$ 17,920.00**	**1**	**$ 100.00**	**125.4**	**$ 37,989.00**
Subcontractors/Vendors																
Mobile Incinerator Unit	$ 1,759,380.00	LS		$ -		$ -	1	$ 1,759,380.00		$ -		$ -		$ -	1.0	$ 1,759,380.00
Charter Flights (resupply)	$ 17,500.00	RT		$ -		$ -		$ -		$ -	7	$ 122,500.00		$ -	7.0	$ 122,500.00
EMT3	$ 835.00	day	14	$ 11,690.00		$ -		$ -		$ -	42	$ 35,070.00	7	$ 5,845.00	63.0	$ 52,605.00
Analytical Laboratory (confirmation samples)	$ 133,373.33	LS		$ -	1	$ 133,373.33		$ -		$ -		$ -		$ -	1.0	$ 133,373.33
Analytical Laboratory (composite samples)	$ 41,420.25	LS		$ -		$ -	1	$ 41,420.25		$ -		$ -		$ -	1.0	$ 41,420.25
Analytical Laboratory (Post-Treatment ISM samples	$ 2,310.00	LS		$ -		$ -		$ -		$ -		$ -	1	$ 2,310.00	1.0	$ 2,310.00
Camp Cook	$ 650.00	day	14	$ 9,100.00		$ -		$ -		$ -	42	$ 27,300.00	7	$ 4,550.00	63.0	$ 40,950.00
Subcontractors/Vendors Subtotal			**28.0**	**$ 20,790.00**	**1**	**$ 133,373.33**	**2**	**$ 1,800,800.25**	**0**	**$ -**	**91**	**$ 184,870.00**	**15**	**$ 12,705.00**	**137**	**$ 2,152,538.58**

TASK 5 - Incineration Field Effort 2024			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup and Treatment Startup		Excavation and Sampling Activities		Treatment Activities		Backfill Activities		Site Management Activities		Teardown and Site Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	2024 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Travel																
Meals / Incidentals	$ 113.00	day	266	$ 30,058.00	273	$ 30,849.00	210	$ 23,730.00	84	$ 9,492.00	252	$ 28,476.00	133	$ 15,029.00	1218.0	$ 137,634.00
Fort Glenn Lodge	$ 3,000.00	day	14	$ 42,000.00		$ -		$ -		$ -	42	$ 126,000.00	7	$ 21,000.00	63.0	$ 189,000.00
Fort Glenn Cabin	$ 300.00	day		$ -	24.5	$ 7,350.00		$ -		$ -		$ -		$ -	24.5	$ 7,350.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	28	$ 2,373.00		$ -		$ -		$ -		$ -	28.0	$ 2,373.00
Travel Subtotal			**280**	**$ 72,058.00**	**325.5**	**$ 40,572.00**	**210**	**$ 23,730.00**	**84**	**$ 9,492.00**	**294**	**$ 154,476.00**	**140**	**$ 36,029.00**	**1333.5**	**$ 336,357.00**
Task Totals				$ 602,159.25		$ 869,367.98		$ 2,254,990.19		$ 213,648.66		$ 733,275.56		$ 293,957.87	$ 4,967,399.51	$ 4,967,399.51
Running Total by Task				$ 602,159.25		$ 1,471,527.23		$ 3,726,517.41		$ 3,940,166.07		$ 4,673,441.63		$ 4,967,399.51	**GRAND TOTAL**	**$ 4,967,399.51**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production), and treatment startup takes 7 days (at half treatment production rate). All crew (19 people) and equipment used during this perio
3 Task 5.1 also includes baseline ISM sampling of the treatment area, as well as initial access construction to features for excavatior
4 Task 5.2 includes excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 63 days for one scientist, one archaeologist, one operator, one truck driver, and one labore
5 Assume confirmation sampling will be conducted in accordance with ADEC guidance
6 Task 5.3 includes running the incineration equipment. Assumes a duration of 63 days for one scientist, two operators, and two subcontracted technicians. Labor cost for subcontracted personnel included in incineration lump sur
7 As part of treatment, composite samples are collected from daily stockpiles to confirm treatment is complete.
8 Task 5.4 includes backfill of treated material (after analytical results confirming treatment is complete). Assumes a duration of 63 days for two operators
9 Task 5.5 includes site and camp management activities. Assumes a duration of 63 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT
10 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs
11 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply
12 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (19 people) and equipment are used during this perioc
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed
14 Refueling costs from Dutch Harbor are per gal of diesel delivered, no per trip charge
15 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel
16 Overall duration determined by incineration production rate after startup, which is 140 tons per day
17 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary
18 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performec

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TASK 6 - Tech Memo for 2022 Field Effort			Task 6.1			
			Annual Tech Memo		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**		
Professional Labor						
Project Manager	$ 184.68	hour	16	$ 2,954.94	16	$ 2,954.94
Geospatial Specialist	$ 108.64	hour	68	$ 7,387.34	68	$ 7,387.34
Engineer	$ 141.23	hour	48	$ 6,778.97	48	$ 6,778.97
Scientist	$ 141.23	hour	68	$ 9,603.55	68	$ 9,603.55
Project Chemist	$ 108.64	hour	48	$ 5,214.59	48	$ 5,214.59
Tech Editor	$ 152.09	hour	20	$ 3,041.85	20	$ 3,041.85
Archaeologist	$ 228.14	hour	16	$ 3,650.22	16	$ 3,650.22
Professional Labor Subtotal			**284**	**$ 38,631.46**	**284**	**$ 38,631.46**
Craft Labor						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**
Materials						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**
Supplies						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**
Equipment						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**
Other Direct Costs						
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**
Travel						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**
Task Totals				$ 38,631.46	$ 38,631.46	$ 38,631.46
Running Total by Task				$ 38,631.46	**GRAND TOTAL**	**$ 38,631.46**

Basis of Estimate:

1 This is a technical memorandum that will be written at the end of each interim field season to document the tasks that were completed and summarize the remaining work. It will be submitted as a PDF only.

2 Level of effort based on USACE-AK District and stakeholder review.

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TASK 7 - Reporting			Task 7.1		Task 7.2		Task 7.3		Task 7.4		Task 7.5		Task 7.6		Task 7.7		Task 7.8		Task 7.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate	2025 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 195.17	hour	60	$ 11,710.24	12	$ 2,342.05	15	$ 2,927.56	8	$ 1,561.37	8	$ 1,561.37	2	$ 390.34	2	$ 390.34	2	$ 390.34		$ -	109	$ 21,273.60
Geospatial Specialist	$ 114.81	hour	200	$ 22,961.25	40	$ 4,592.25	50	$ 5,740.31	25	$ 2,870.16	25	$ 2,870.16	4	$ 459.23	40	$ 4,592.25		$ -		$ -	384	$ 44,085.60
Engineer	$ 149.25	hour	160	$ 23,879.70	32	$ 4,775.94	40	$ 5,969.93	20	$ 2,984.96	20	$ 2,984.96		$ -		$ -		$ -		$ -	272	$ 40,595.49
Scientist	$ 149.25	hour	220	$ 32,834.59	44	$ 6,566.92	55	$ 8,208.65	28	$ 4,178.95	28	$ 4,178.95		$ -		$ -		$ -		$ -	375	$ 55,968.05
Project Chemist	$ 114.81	hour	180	$ 20,665.13	36	$ 4,133.03	45	$ 5,166.28	23	$ 2,640.54	23	$ 2,640.54		$ -		$ -		$ -		$ -	307	$ 35,245.52
Tech Editor	$ 160.73	hour	56	$ 9,000.81		$ -	32	$ 5,143.32		$ -	32	$ 5,143.32		$ -	60	$ 9,643.73		$ -		$ -	180	$ 28,931.18
Archaeologist	$ 241.09	hour	156	$ 37,610.53	32	$ 7,714.98	39	$ 9,402.63	20	$ 4,821.86	20	$ 4,821.86	120	$ 28,931.18	120	$ 28,931.18	16	$ 3,857.49	24	$ 5,786.24	547	$ 131,877.95
Professional Labor Subtotal			**1032**	**$ 158,662.25**	**196**	**$ 30,125.16**	**276**	**$ 42,558.68**	**124**	**$ 19,057.84**	**156**	**$ 24,201.16**	**126**	**$ 29,780.74**	**222**	**$ 43,557.50**	**18**	**$ 4,247.83**	**24**	**$ 5,786.24**	**2174**	**$ 357,977.40**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 158,702.25		$ 30,125.16		$ 42,618.68		$ 19,057.84		$ 24,261.16		$ 29,780.74		$ 43,557.50		$ 14,247.83		$ 6,786.24	$ 369,137.40	$ 369,137.40
Running Total by Task				$ 158,702.25		$ 188,827.42		$ 231,446.10		$ 250,503.94		$ 274,765.10		$ 304,545.84		$ 348,103.34		$ 362,351.17		$ 369,137.40	**GRAND TOTAL**	**$ 369,137.40**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report

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Field Duration Calculation

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	5/14	7	70	490	Treatment startup
5/15	8/25	103	140	14420	Treatment operation
8/26	9/1	7	0	0	Teardown and site restoration
			Total max treatment tonnage per year	14910	
			High volume estimate of soil (cy)	24106.65	
			Total tonnage to be treated	36160	
			Field seasons required for treatment	3	
			Treated tonnage year 1	14910	
			Treated tonnage year 2	14910	
			Treated tonnage year 3	6340	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season.
Production rate during operation is 140 tons per day; rate falls between 100 and 150 tons per day, but sand is generally amenable to incineration.
Production rate during startup is half of full production.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Field effort: onsite starting May 1 to September 1. 1 week setup, 1 week startup, 1 week teardown
2023	Tech memo for 2022 field effort; additional field effort: onsite starting 1 May to 1 September with 1 week setup, 1 week startup, 1 week teardown.
2024	Tech memo for 2023 field effort; additional field effort: onsite starting 1 May to 23 July with 1 week setup, 1 week startup, 1 week teardown.
2025	Project reporting

Total duration 60 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	5/14/22	7	70	490	Treatment startup
5/15/22	8/25/22	103	140	14,420	Treatment operation
8/26/22	9/1/22	7	0	0	Teardown and site restoration
			Total treated tonnage	14,910	
			Total field duration	124	
			Number of resupply flights	16	

2023 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/23	5/7/23	7	0	0	Setup and site access
5/8/23	5/14/23	7	70	490	Treatment startup
5/15/23	8/25/23	103	140	14,420	Treatment operation
8/26/23	9/1/23	7	0	0	Teardown and site restoration
			Total treated tonnage	14,910	
			Total field duration	124	
			Number of resupply flights	16	

2024 Field Schedule

Start Date	Finish Date	Duration	Production Rate (tons per day)	Total Production (tons)	Description
5/1/24	5/7/24	7	0	0	Setup and site access
5/8/24	5/14/24	7	70	490	Treatment startup
5/15/24	6/25/24	42	140	5,880	Treatment operation
6/26/24	7/2/24	7	0	0	Teardown and site restoration
			Total treated tonnage	6,370	
			Total field duration	63	
			Number of resupply flights	7	

Personnel

4	Operators		6	people
2	Truck drivers		5	people
1	Arch		2	people
2	Laborer	Includes housekeeper	6	people
2	Scientist		19	people
1	Field Team Lead	Engineer rate		
2	Incineration Operators	Subcontracted, included in incineration cost	2	people
1	Superintendent			
1	Mechanic			
1	Cook	Subcontracted		
1	Camp manager	Construction manager rate		
1	EMT	Subcontracted		
1	Surveyor	Geospatial specialist rate		
1	Assistant surveyor			

All personnel except for surveyors (19 people total) will stay in Fort Glenn Lodge.
Surveyors will stay in Fort Glenn Cabin.

Equipment Burn Rates

Diesel Equipment	gal/day	Number Used	gal/day total	Notes
350 Excavator	42	1	42	
200 Excavator	25	1	25	
750 Dozer	25	1	25	
15-yard Rock Truck	100	2	200	
Marooka	13	1	13	
Tracked Skidsteer	17	1	17	
Fuel Truck	4	1	4	
Water Truck	15	1	15	
960 Loader	13	1	13	
50kw Generator	100	1	100	
Light Plant	10	2	20	
Truck	0	1	0	Included in incineration estimates
Incinerator (startup)	430	1	430	
Incinerator (full)	861	1	861	
		Total gal/day setup/teardown	473	
		Total gal/day startup	903	
		Total gal/day	1,333	
		Total gal/week	9,331	
		Total gal 2022	150,237	
		Total gal 2023	150,237	
		Total gal 2024	68,922	

Incineration operations (including treatment equipment, generators, and truck) have a burn rate of 6.15 gal/ton of treated material.

Gasoline Equipment	gal/day	Number Used	gal/day total	Notes
UTV	5	4	20	
		Total gal/day	20	
		Total gal/week	140	
		Total gal 2022	2,480	2x 2000 gal with mob
		Total gal 2023	2,480	2x 2000 gal with mob
		Total gal 2024	1,260	1x 2000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume
15000-gal AST at Lodge	15,000	1	15,000
25,000-gal AST rental	25,000	2	50,000
		Total volume	65,000
		Number fueling trips required 2022	2
		Number fueling trips required 2023	2
		Number fueling trips required 2024	1

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Incineration - High Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	68	4	7	4	87	$199.50	$15,760.50	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	68	4	7	0	83	$236.25	$17,718.75	
Pesticides	SW8081	Confirmation	SO	24 hr	68	4	7	0	83	$231.00	$17,325.00	
GRO	AK101	Confirmation	SO	24 hr	68	4	7	4	87	$115.50	$9,124.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	68	4	7	0	83	$136.50	$10,237.50	
PCBs	SW8082	Confirmation	SO	24 hr	68	4	7	0	83	$147.00	$11,025.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	68	4	7	0	83	$220.50	$16,537.50	
									SUBTOTAL =		$97,728.75	$97,728.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$7,900.00	$7,900.00
									TOTAL =		$105,628.75	$105,628.75
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	857	43	86	43	1072	$199.50	$196,707.00	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	857	43	86	0	1029	$236.25	$222,783.75	
GRO	AK101	Confirmation	SO	24 hr	857	43	86	43	1072	$115.50	$113,883.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	857	43	86	0	1029	$136.50	$128,719.50	
									SUBTOTAL =		$662,093.25	$662,093.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$98,600.00	$98,600.00
									TOTAL =		$760,693.25	$760,693.25
ISM Baseline Sampling of Soil Treatment Area												
ISM PREP	ITRC	Baseline ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Baseline Sampling of Soil Treatment Area**
VOCs	SW8260D	Baseline ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Baseline ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Baseline ISM	SO	14 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Baseline ISM	SO	14 day	2	1	2	0	6	$65.00	$260.00	
									SUBTOTAL =		$1,810.00	$1,810.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,310.00	$2,310.00
Composite Sampling of Soil to be Backfilled - Post-Treatment 2022												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$199.50	$24,738.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2022**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$236.25	$27,877.50	
GRO	AK101	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$115.50	$14,322.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$136.50	$16,107.00	
									SUBTOTAL =		$83,044.50	$83,044.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,400.00	$12,400.00
									TOTAL =		$95,444.50	$95,444.50
Composite Sampling of Soil to be Backfilled - Post-Treatment 2023												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$199.50	$24,738.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2023**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$236.25	$27,877.50	
GRO	AK101	Treatment Confirmation	SO	24 hr	107	6	11	6	136	$115.50	$14,322.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	107	6	11	0	130	$136.50	$16,107.00	
									SUBTOTAL =		$83,044.50	$83,044.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,400.00	$12,400.00
									TOTAL =		$95,444.50	$95,444.50

Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling of Soil to be Backfilled - Post-Treatment 2024												
VOCs	SW8260D	Treatment Confirmation	SO	24 hr	46	3	5	3	60	$199.50	$10,773.00	**Composite Sampling of Soil to be Backfilled - Post-Treatment 2024**
PAH	SW8270C	Treatment Confirmation	SO	24 hr	46	3	5	0	57	$236.25	$12,048.75	
GRO	AK101	Treatment Confirmation	SO	24 hr	46	3	5	3	60	$115.50	$6,237.00	
DRO/RRO	AK102/103	Treatment Confirmation	SO	24 hr	46	3	5	0	57	$136.50	$6,961.50	
										SUBTOTAL =	$36,020.25	$36,020.25
										OTHER CHARGES/EDDs/DELIVERABLES =	$5,400.00	$5,400.00
										TOTAL =	$41,420.25	$41,420.25
ISM Post-Treatment Sampling of Treatment Area												
ISM PREP	ITRC	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Post-Treatment Sampling of Treatment Area**
VOCs	SW8260D	Post-Treatment ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAHs	SW8270C	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Post-Treatment ISM	SO	14 day	2	1	2	1	7	$55.00	$275.00	
DRO/RRO	AK102/103	Post-Treatment ISM	SO	14 day	2	1	2	0	6	$65.00	$260.00	
										SUBTOTAL =	$1,810.00	$1,810.00
										OTHER CHARGES/EDDs/DELIVERABLES =	$500.00	$500.00
										TOTAL =	$2,310.00	$2,310.00
										GRAND TOTAL =	$1,103,251.25	$1,103,251.25

Notes:

Assume no equipment blanks will be required for this project.

Assume ISM triplicate samples will be collected 1 per 10 primary samples.

Assume composite samples will be collected from treated soil at a frequency of 1 per 140 tons (93 CY).

Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).

Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.

Shipping/courier fees not included in laboratory pricing.

5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 138 days

Equipment	Rate	Number	Unit	Total
Open-top containers	$ 15.00	9	day	$ 18,630.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	$ 313,895.00

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gal	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Setup	$5,800.00	
Travel Costs for Setup Crew	$500.00	
Food Costs for Setup Crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rentals

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike (2 each)	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,097.00**	**$ 7,352.00**	**$ 22,021.00**	**$ 1,050.29**

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ALTERNATIVE 4
PROJECT 02 EXCAVATION AND OFFSITE DISPOSAL – LOW ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 64,569	$ 64,569	2021	$ 64,569
Task 2	Planning Documents	1	Job	$ 104,050	$ 104,050	2021	$ 104,050
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization	1	Job	$ 993,751	$ 993,751	2022	$ 966,684
Task 5	Field Effort	1	Job	$ 10,812,590	$ 10,812,590	2022	$ 10,518,084
Task 6	Reporting	1	Job	$ 294,291	$ 294,291	2023	$ 278,478
				TOTAL	**$ 12,318,016**	**Total Net Present Worth Cost**	**$ 11,980,629**
				Total per CY	**$ 1,258**	**Total per CY**	**$ 1,224**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	18	$ 3,885.84	18	$ 3,885.84		$ -	36	$ 7,771.68
Project Manager	$ 174.76	hour	84	$ 14,679.84	36	$ 6,291.36	9	$ 1,572.84	129	$ 22,544.04
Contract Manager	$ 143.92	hour		$ -	36	$ 5,181.12		$ -	36	$ 5,181.12
Project Controls	$ 195.32	hour		$ -	72	$ 14,063.04	9	$ 1,757.88	81	$ 15,820.92
Administrative Assistant	$ 92.52	hour		$ -	36	$ 3,330.72	9	$ 832.68	45	$ 4,163.40
Engineer	$ 133.64	hour	68	$ 9,087.52		$ -		$ -	68	$ 9,087.52
Professional Labor Subtotal			**170**	**$ 27,653.20**	**198**	**$ 32,752.08**	**27**	**$ 4,163.40**	**395**	**$ 64,568.68**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 27,653.20		$ 32,752.08		$ 4,163.40	$ 64,568.68	$ 64,568.68
Running Total by Task				$ 27,653.20		$ 60,405.28		$ 64,568.68	**GRAND TOTAL**	**$ 64,568.68**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 3 reports total
4 PoP=36 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	hour	4	$ 699.04	32	$ 5,592.32	7	$ 1,223.32	8	$ 1,398.08	4	$ 699.04	4	$ 699.04	59	$ 10,310.84
Project Controls	$ 195.32	hour	4	$ 781.28		$ -		$ -		$ -		$ -		$ -	4	$ 781.28
Geospatial Specialist	$ 102.80	hour		$ -	40	$ 4,112.00	8	$ 822.40	10	$ 1,028.00	5	$ 514.00	5	$ 514.00	68	$ 6,990.40
Engineer	$ 133.64	hour		$ -	80	$ 10,691.20	16	$ 2,138.24	20	$ 2,672.80	10	$ 1,336.40	10	$ 1,336.40	136	$ 18,175.04
Scientist	$ 133.64	hour		$ -	100	$ 13,364.00	20	$ 2,672.80	25	$ 3,341.00	13	$ 1,737.32	13	$ 1,737.32	171	$ 22,852.44
Regulatory Specialist	$ 215.88	hour		$ -	36	$ 7,771.68	8	$ 1,727.04	9	$ 1,942.92	5	$ 1,079.40	5	$ 1,079.40	63	$ 13,600.44
Project Chemist	$ 102.80	hour		$ -	56	$ 5,756.80	12	$ 1,233.60	14	$ 1,439.20	7	$ 719.60	7	$ 719.60	96	$ 9,868.80
Tech Editor	$ 143.92	hour		$ -	24	$ 3,454.08		$ -	15	$ 2,158.80		$ -	15	$ 2,158.80	54	$ 7,771.68
Archaeologist	$ 215.88	hour		$ -	26	$ 5,612.88	6	$ 1,295.28	7	$ 1,511.16	4	$ 863.52	4	$ 863.52	47	$ 10,146.36
Safety Officer	$ 154.20	hour		$ -	12	$ 1,850.40	3	$ 462.60	3	$ 462.60	2	$ 308.40	2	$ 308.40	22	$ 3,392.40
Professional Labor Subtotal			**8**	**$ 1,480.32**	**406**	**$ 58,205.36**	**80**	**$ 11,575.28**	**111**	**$ 15,954.56**	**50**	**$ 7,257.68**	**65**	**$ 9,416.48**	**720**	**$ 103,889.68**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 1,480.32		$ 58,245.36		$ 11,575.28		$ 16,014.56		$ 7,257.68		$ 9,476.48	$ 104,049.68	$ 104,049.68
Running Total by Task				$ 1,480.32		$ 59,725.68		$ 71,300.96		$ 87,315.52		$ 94,573.20		$ 104,049.68	**GRAND TOTAL**	**$ 104,049.68**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios (3 each)	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00			2	$ 9,000.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	48	$ 6,594.33	48	$ 6,594.33	20	$ 2,747.64	156	$ 21,431.58
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archaeologist	$ 221.92	hour		$ -	48	$ 10,652.38	48	$ 10,652.38		$ -	96	$ 21,304.77
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**176**	**$ 29,336.32**	**176**	**$ 29,336.32**	**100**	**$ 13,611.38**	**652**	**$ 99,506.78**
Craft Labor												
Operator	$ 147.95	hour		$ -	168	$ 24,855.56	168	$ 24,855.56		$ -	336	$ 49,711.12
Laborer	$ 137.38	hour		$ -	72	$ 9,891.50	72	$ 9,891.50		$ -	144	$ 19,783.00
Truck Driver	$ 105.68	hour		$ -	96	$ 10,145.13	96	$ 10,145.13		$ -	192	$ 20,290.25
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**360**	**$ 48,189.35**	**360**	**$ 48,189.35**	**0**	**$ -**	**720**	**$ 96,378.70**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	48	$ 720.00	48	$ 720.00		$ -	96	$ 1,440.00
Supplies Subtotal			**0**	**$ -**	**48**	**$ 720.00**	**48**	**$ 720.00**	**0**	**$ -**	**96**	**$ 1,440.00**
Equipment												
3 350 Excavator	$ 2,725.00	week		$ -	3	$ 8,175.00	3	$ 8,175.00		$ -	6	$ 16,350.00
3 960 Loader	$ 1,975.00	week		$ -	3	$ 5,925.00	3	$ 5,925.00		$ -	6	$ 11,850.00
4 15-yard Rock Truck	$ 3,225.00	week		$ -	4	$ 12,900.00	4	$ 12,900.00		$ -	8	$ 25,800.00
4 UTV	$ 840.00	week		$ -	4	$ 3,360.00	4	$ 3,360.00		$ -	8	$ 6,720.00
1 Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
2 750 Dozer	$ 1,975.00	week		$ -	2	$ 3,950.00	2	$ 3,950.00		$ -	4	$ 7,900.00
2 Rentals (1 wk rental to cover mob/demob)	$ 5,792.00	LS		$ -	2	$ 11,584.00	2	$ 11,584.00		$ -	4	$ 23,168.00
1 Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
15 Shipping Container	$ 105.00	week		$ -	15	$ 1,575.00	15	$ 1,575.00		$ -	30	$ 3,150.00
2 Marooka	$ 9,900.00	week		$ -	2	$ 19,800.00	2	$ 19,800.00		$ -	4	$ 39,600.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
1 Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
Equipment Subtotal			**0**	**$ -**	**38**	**$ 76,069.00**	**38**	**$ 76,069.00**	**0**	**$ -**	**76**	**$ 152,138.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	15	$ 4,500.00	15	$ 4,500.00		$ -	30	$ 9,000.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Other Direct Costs Subtotal			**0**	**$ -**	**17**	**$ 12,250.00**	**17**	**$ 12,250.00**	**0**	**$ -**	**34**	**$ 24,500.00**

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	3	$ 13,500.00	3	$ 13,500.00		$ -	6	$ 27,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**10**	**$ 293,460.00**	**10**	**$ 293,460.00**	**0**	**$ -**	**20**	**$ 586,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	24	$ 2,712.00	24	$ 2,712.00		$ -	48	$ 5,424.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	12	$ 7,800.00	12	$ 7,800.00		$ -	24	$ 15,600.00
Hotel DUT	$ 150.00	day		$ -	24	$ 3,600.00	24	$ 3,600.00		$ -	48	$ 7,200.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	24	$ 2,322.00	24	$ 2,322.00		$ -	48	$ 4,644.00
Travel Subtotal			**0**	**$ -**	**84**	**$ 16,434.00**	**84**	**$ 16,434.00**	**0**	**$ -**	**168**	**$ 32,868.00**
Task Totals				$ 27,222.76		$ 476,458.67		$ 476,458.67		$ 13,611.38	$ 993,751.48	$ 993,751.48
Running Total by Task				$ 27,222.76		$ 503,681.43		$ 980,140.10		$ 993,751.48	**GRAND TOTAL**	**$ 993,751.48**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5			
			Site Set Up		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 179.65	hour	14	$ 2,515.15		$ -		$ -	124	$ 22,277.01	14	$ 2,515.15	152	$ 27,307.30
Geospatial Specialist	$ 105.68	hour		$ -	504	$ 53,261.91		$ -		$ -		$ -	504	$ 53,261.91
Engineer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	744	$ 102,212.15	120	$ 16,485.83	948	$ 130,238.06
Scientist	$ 137.38	hour	168	$ 23,080.16	1488	$ 204,424.30		$ -		$ -	240	$ 32,971.66	1896	$ 260,476.12
Professional Land Surveyor	$ 116.25	hour		$ -	504	$ 58,588.10		$ -		$ -		$ -	504	$ 58,588.10
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	744	$ 110,074.62	120	$ 17,753.97	948	$ 140,256.37
Archaeologist	$ 221.92	hour	168	$ 37,283.34	1488	$ 330,223.86		$ -		$ -	240	$ 53,261.91	1896	$ 420,769.12
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	744	$ 117,937.09	120	$ 19,022.11	948	$ 150,274.68
Professional Labor Subtotal			**602**	**$ 100,161.99**	**3,984**	**$ 646,498.18**	**0**	**$ -**	**2,356**	**$ 352,500.87**	**854**	**$ 142,010.63**	**7,796**	**$ 1,241,171.67**
Craft Labor														
Operator	$ 147.95	hour	588	$ 86,994.46	2232	$ 330,223.86	2976	$ 440,298.49		$ -	840	$ 124,277.80	6636	$ 981,794.61
Laborer	$ 137.38	hour	252	$ 34,620.24	1488	$ 204,424.30		$ -	744	$ 102,212.15	360	$ 49,457.49	2844	$ 390,714.18
Truck Driver	$ 105.68	hour	336	$ 35,507.94	1488	$ 157,249.46	1488	$ 157,249.46		$ -	336	$ 35,507.94	3648	$ 385,514.80
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	744	$ 102,212.15	84	$ 11,540.08	912	$ 125,292.31
Craft Labor Subtotal			**1,260**	**$ 168,662.73**	**5,208**	**$ 691,897.62**	**4,464**	**$ 597,547.94**	**1,488**	**$ 204,424.30**	**1,620**	**$ 220,783.31**	**14,040**	**$ 1,883,315.90**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
EPL	$ 14,995.80	LS		$ -	2	$ 29,991.60		$ -		$ -		$ -	2.0	$ 29,991.60
Health and Safety/PPE	$ 15.00	man-day	168	$ 2,520.00	766	$ 11,490.00	372	$ 5,580.00	434	$ 6,510.00	225	$ 3,375.00	1965.0	$ 29,475.00
5-CY supersacks with liners	$ 335.00	each		$ -	2350	$ 787,250.00		$ -		$ -		$ -	2350.0	$ 787,250.00
Gasoline	$ 4.00	gal	140	$ 560.00	620	$ 2,480.00	0	$ -	620	$ 2,480.00	200	$ 800.00	1580.0	$ 6,320.00
Diesel	$ 3.75	gal	5308.3	$ 19,906.25	19116.7	$ 71,687.50	19,633.3	$ 73,625.00	8266.7	$ 31,000.00	7583.3	$ 28,437.50	59908.3	$ 224,656.25
Maintenance supplies	$ 10.00	equip-day	112	$ 1,120.00	372	$ 3,720.00	434	$ 4,340.00	186	$ 1,860.00	160	$ 1,600.00	1264.0	$ 12,640.00
Supplies Subtotal			**5,728.3**	**$ 24,106.25**	**23,226.7**	**$ 906,619.10**	**20,439.3**	**$ 83,545.00**	**9,506.7**	**$ 41,850.00**	**8,168.3**	**$ 34,212.50**	**67,069.3**	**$ 1,090,332.85**
Equipment														
3 350 Excavator	$ 10,900.00	month	0.7	$ 7,630.00	4.13	$ 45,053.33	2.07	$ 22,526.67		$ -	1.0	$ 10,900.00	7.9	$ 86,110.00
3 960 Loader	$ 7,900.00	month	0.7	$ 5,530.00	2.07	$ 16,326.67	2.07	$ 16,326.67	2.07	$ 16,326.67	1.0	$ 7,900.00	7.9	$ 62,410.00
4 15-yard Rock Truck	$ 12,900.00	month	0.9	$ 12,040.00	4.13	$ 53,320.00	4.13	$ 53,320.00		$ -	1.3	$ 17,200.00	10.5	$ 135,880.00
4 UTV	$ 3,360.00	month	0.9	$ 3,136.00	4.13	$ 13,888.00		$ -	4.13	$ 13,888.00	1.3	$ 4,480.00	10.5	$ 35,392.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	2.07	$ 7,543.33	0.3	$ 1,216.67	2.6	$ 9,611.67
2 750 Dozer	$ 7,900.00	month	0.5	$ 3,686.67		$ -	4.13	$ 32,653.33		$ -	0.7	$ 5,266.67	5.3	$ 41,606.67
2 Rentals	$ 17,336.00	month	0.5	$ 8,090.13	4.13	$ 71,655.47		$ -		$ -	0.7	$ 11,557.33	5.3	$ 91,302.93
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	2.07	$ 15,293.33	0.3	$ 2,466.67	2.6	$ 19,486.67
15 Shipping Container	$ 15.00	day	105	$ 1,575.00		$ -		$ -	930.00	$ 13,950.00	150.0	$ 2,250.00	1185.0	$ 17,775.00
2 Marooka	$ 9,900.00	month	0.5	$ 4,620.00	2.07	$ 20,460.00	2.07	$ 20,460.00		$ -	0.7	$ 6,600.00	5.3	$ 52,140.00
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	2.07	$ 1,033.33	0.3	$ 166.67	2.6	$ 1,316.67
1 Tundra Mats (75)	$ 675.00	day	7.0	$ 4,725.00	31	$ 20,925.00	31	$ 20,925.00		$ -	10.0	$ 6,750.00	79.0	$ 53,325.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	2.07	$ 6,716.67	0.3	$ 1,083.33	2.6	$ 8,558.33
Equipment Subtotal			**117.6**	**$ 54,486.13**	**51.67**	**$ 241,628.47**	**45.47**	**$ 166,211.67**	**944.47**	**$ 74,751.33**	**168**	**$ 77,837.33**	**1,327.2**	**$ 614,914.93**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -	50	$ 5,000.00		$ -		$ -		$ -	50.0	$ 5,000.00
Drum Disposal	$ 307,820.00	LS		$ -	1	$ 307,820.00		$ -		$ -		$ -	1.0	$ 307,820.00
Lift Frame - 6'x4'x4'	$ 5,355.00	each		$ -	2	$ 10,710.00		$ -		$ -		$ -	2.0	$ 10,710.00
Load Frame - 6'x4'x4'	$ 4,335.00	each		$ -	2	$ 8,670.00		$ -		$ -		$ -	2.0	$ 8,670.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	2.1	$ 26,453.33		$ -	2.1	$ 26,453.33
2,000-gal AST	$ 1,000.00	each		$ -		$ -		$ -	1	$ 1,000.00		$ -	1.0	$ 1,000.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**55**	**$ 332,200.00**	**0**	**$ -**	**3.1**	**$ 27,453.33**	**0**	**$ -**	**59.1**	**$ 367,422.33**

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5			
			Site Set Up		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	62	$ 40,300.00	10	$ 6,500.00	79	$ 51,350.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	9	$ 157,500.00		$ -	9	$ 157,500.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	62	$ 51,770.00	10	$ 8,350.00	79	$ 65,965.00
Analytical Laboratory (confirmation samples)	$ 255,154.00	LS		$ -	1	$ 255,154.00		$ -		$ -		$ -	1	$ 255,154.00
Analytical Laboratory (waste charac samples)	$ 98,722.00	LS		$ -	1	$ 98,722.00		$ -		$ -		$ -	1	$ 98,722.00
Waste Disposal	$ 4,456,993.10	LS		$ -	1	$ 4,456,993.10		$ -		$ -		$ -	1	$ 4,456,993.10
Analytical Laboratory (pre-excavation sampling)	$ 23,981.25	LS		$ -	1	$ 23,981.25		$ -		$ -		$ -	1	$ 23,981.25
Subcontractor/Vendors Subtotal			**14**	**$ 10,395.00**	**4**	**$ 4,834,850.35**	**0**	**$ -**	**133**	**$ 249,570.00**	**20**	**$ 14,850.00**	**171**	**$ 5,109,665.35**
Travel														
Meals / Incidentals	$ 113.00	day	168	$ 18,984.00	742	$ 83,846.00	372	$ 42,036.00	434	$ 49,042.00	225	$ 25,425.00	1941	$ 219,333.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	62	$ 186,000.00	10	$ 30,000.00	79	$ 237,000.00
Fort Glenn Cabin #1	$ 300.00	day	7	$ 2,100.00		$ -		$ -	62	$ 18,600.00	10	$ 3,000.00	79	$ 23,700.00
Fort Glenn Cabin #2	$ 300.00	day	7	$ 2,100.00		$ -		$ -	62	$ 18,600.00	10	$ 3,000.00	79	$ 23,700.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	24	$ 2,034.00		$ -		$ -		$ -	24	$ 2,034.00
Travel Subtotal			**189**	**$ 44,184.00**	**766**	**$ 85,880.00**	**372**	**$ 42,036.00**	**620**	**$ 272,242.00**	**255**	**$ 61,425.00**	**2,202**	**$ 505,767.00**
Task Totals				$ 409,765.10		$ 7,739,573.72		$ 889,340.61		$ 1,222,791.83		$ 551,118.78	$ 10,812,590.04	$ 10,812,590.04
Running Total by Task				$ 409,765.10		$ 8,149,338.82		$ 9,038,679.43		$ 10,261,471.26		$ 10,812,590.04	**GRAND TOTAL**	**$ 10,812,590.04**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production). All crew (24 people) and equipment used during this period.
3 Task 5.2 includes removal of drums, pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assume a duration of 62 days for two teams of one scientist, one archaeologist, one operator, one truck driver, and one laborer. Soils will be loaded into 5-cy supersacks. Another operator will be using the skid steer to stage supersacks at the barge landing.
4 Task 5.2 includes survey collection of all sample locations, excavation boundaries, and all other pertinent site features. The surveyor and surveyor assistant will be on-island 2/3 of the time (traveling on weekly re-supply charter flights) to collect this information.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum and composite samples will be collected from each drum area and drum dump.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the backfill of excavated areas once confirmation sample results have been received. This task assumes a local, clean borrow source accessible by road, and last as long as excavation activities. Each backfill team will consist of two operators and a truck driver. An additional operator will be at the borrow source loading backfill into trucks/marookas.
8 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
9 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor observed.
10 Task 5.4 includes all site management activities to include management of subcontractors, schedule, cost, and safety. Assumes a duration of 62 days for field team lead, superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
11 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, and bathing needs.
12 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen are observed.
14 Task 5.5 includes teardown and site restoration activities, as well as loading the supersacks onto the separate waste barge for disposal. Duration is 10 days, and assumes all crew (24 people) and equipment are used during this period.
15 Supersacks for disposal will be staged near the barge landing area as part of Task 5.2. Waste loading uses two laborers and two scientists. Waste is assumed to be contaminated but non-hazardous.
16 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
17 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
18 Assume an excavation production rate of 80 cy/day per Excavation Team; this determines overall field duration.
19 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
20 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 6 - Reporting			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5		Task 6.6		Task 6.7		Task 6.8		Task 6.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate	2023 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 184.68	hour	40	$ 7,387.34	8	$ 1,477.47	10	$ 1,846.84	5	$ 923.42	5	$ 923.42	2	$ 369.37	2	$ 369.37	2	$ 369.37		$ -	74	$ 13,666.58
Geospatial Specialist	$ 108.64	hour	160	$ 17,381.98	32	$ 3,476.40	40	$ 4,345.50	20	$ 2,172.75	20	$ 2,172.75	4	$ 434.55	4	$ 434.55		$ -		$ -	280	$ 30,418.47
Engineer	$ 141.23	hour	120	$ 16,947.43	24	$ 3,389.49	30	$ 4,236.86	15	$ 2,118.43	15	$ 2,118.43		$ -		$ -		$ -		$ -	204	$ 28,810.64
Scientist	$ 141.23	hour	180	$ 25,421.15	36	$ 5,084.23	45	$ 6,355.29	23	$ 3,248.26	23	$ 3,248.26		$ -		$ -		$ -		$ -	307	$ 43,357.18
Project Chemist	$ 108.64	hour	140	$ 15,209.24	28	$ 3,041.85	35	$ 3,802.31	18	$ 1,955.47	18	$ 1,955.47		$ -		$ -		$ -		$ -	239	$ 25,964.34
Tech Editor	$ 152.09	hour	40	$ 6,083.69		$ -	24	$ 3,650.22		$ -	24	$ 3,650.22		$ -	60	$ 9,125.54		$ -		$ -	148	$ 22,509.67
Archaeologist	$ 228.14	hour	140	$ 31,939.39	28	$ 6,387.88	35	$ 7,984.85	18	$ 4,106.49	18	$ 4,106.49	120	$ 27,376.62	120	$ 27,376.62	16	$ 3,650.22	24	$ 5,475.32	519	$ 118,403.90
Professional Labor Subtotal			**820**	**$ 120,370.23**	**156**	**$ 22,857.31**	**219**	**$ 32,221.85**	**99**	**$ 14,524.82**	**123**	**$ 18,175.04**	**126**	**$ 28,180.54**	**186**	**$ 37,306.08**	**18**	**$ 4,019.58**	**24**	**$ 5,475.32**	**1771**	**$ 283,130.78**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 120,410.23		$ 22,857.31		$ 32,281.85		$ 14,524.82		$ 18,235.04		$ 28,180.54		$ 37,306.08		$ 14,019.58		$ 6,475.32	$ 294,290.78	$ 294,290.78
Running Total by Task				$ 120,410.23		$ 143,267.54		$ 175,549.39		$ 190,074.21		$ 208,309.25		$ 236,489.79		$ 273,795.87		$ 287,815.45		$ 294,290.78	**GRAND TOTAL**	**$ 294,290.78**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report.

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Low Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	15	1	2	1	20	$199.50	$3,591.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	15	1	2	0	19	$236.25	$4,016.25	
Pesticides	SW8081	Confirmation	SO	24 hr	15	1	2	0	19	$231.00	$3,927.00	
GRO	AK101	Confirmation	SO	24 hr	15	1	2	1	20	$115.50	$2,079.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	15	1	2	0	19	$136.50	$2,320.50	
PCBs	SW8082	Confirmation	SO	24 hr	15	1	2	0	19	$147.00	$2,499.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	15	1	2	0	19	$220.50	$3,748.50	
									SUBTOTAL =		$22,181.25	$22,181.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$1,800.00	$1,800.00
									TOTAL =		$23,981.25	$23,981.25
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	287	15	29	15	361	$199.50	$66,034.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	287	15	29	0	346	$236.25	$74,655.00	
GRO	AK101	Confirmation	SO	24 hr	287	15	29	15	361	$115.50	$38,230.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	287	15	29	0	346	$136.50	$43,134.00	
									SUBTOTAL =		$222,054.00	$222,054.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$33,100.00	$33,100.00
									TOTAL =		$255,154.00	$255,154.00
Waste Characterization												
GRO	AK101	Waste characterization	SO	Standard	109	0	0	6	115	$45.00	$5,175.00	**Waste Characterization**
DRO/RRO	AK102/AK103	Waste characterization	SO	Standard	109	0	0	0	109	$45.00	$4,905.00	
VOCs	SW8260D/SW8260DSIM	Waste characterization	SO	Standard	109	0	0	6	115	$95.00	$10,925.00	
SVOC	SW8270D	Waste characterization	SO	Standard	109	0	0	0	109	$130.00	$14,170.00	
PAH	SW8270DSIM	Waste characterization	SO	Standard	109	0	0	0	109	$58.00	$6,322.00	
PCB	SW8082A	Waste characterization	SO	Standard	109	0	0	0	109	$60.00	$6,540.00	
Pesticides	SW8081A	Waste characterization	SO	Standard	109	0	0	0	109	$95.00	$10,355.00	
Herbicides	SW8151A	Waste characterization	SO	Standard	109	0	0	0	109	$140.00	$15,260.00	
TCLP RCRA Metals	SW1311/SW6020B	Waste characterization	SO	Standard	109	0	0	0	109	$180.00	$19,620.00	
									SUBTOTAL =		$93,272.00	$93,272.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$5,450.00	$5,450.00
									TOTAL =		$98,722.00	$98,722.00
									GRAND TOTAL =		$377,857.25	$377,857.25

Notes:

Assume no equipment blanks will be required for this project.

Assume waste characterization samples are collected one per feature. If more than 100 cy is removed from one feature, samples will be collected at a frequency of 1 per 100 cy.

Assume no field QC samples collected for waste characterization samples.

Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).

Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.

EMax - 5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

Shipping/courier fees not included in laboratory pricing.

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Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 93 days

Equipment	Rate	Number	Unit	Total
Open top containers	$ 15.00	9	day	$ 12,555.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	$ 307,820.00

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Rentals

Item	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00
Scale, 320g	$ 8.00	$ 24.00	$ 72.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00
Drone	$ 650.00	$ 3,000.00	$ 9,000.00
Totals	**$ 1,577.00**	**$ 5,792.00**	**$ 17,336.00**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Set up	$5,800.00	
Travel Costs for Set up crew	$500.00	
Food Costs for Set up crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/22	107	80	8,560	Excavation operations
8/23	9/1	10	0	0	Teardown and site restoration

Max excavation/backfill per year per team	8,560
Low volume estimate of soil (cy)	9,790
Excavation/Backfill Teams required	2

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting May 1 to July 18. 1 week setup, 10-day teardown
2023	Project reporting

Total duration 36 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cy per day)	Total Production (cy)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	7/8/22	62	160	9,920	Excavation operations
7/9/22	7/18/22	10	0	0	Teardown and site restoration

Total treated volume	9,790
Total field duration	79
Number of resupply flights	9

Personnel

7	Operators	
4	Truck drivers	
2	Arch	
3	Laborer	Includes housekeeper
2	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	surveyor	
1	assistant surveyor	Geospatial specialist rate

Excavation Teams	11	people
Backfill Teams	6	people
Support Team	7	people
Total Crew	24	people

Survey Team	2	people

Soil fluff factor	0.2
Cubic yards for shipment	11,748
Supersacks needed	2,350
Supersacks per pallet	30
Pallets per shipping container	20
Shipping containers needed	4

All personnel will stay in Fort Glenn Lodge

Excavation Team

Equipment	Personnel
350 Excavator	Operator
15-yard Rock Truck	Truck driver
UTV	Arch
	Scientist
	Laborer

Backfill Team

Equipment	Personnel
Dozer	Operator
Rock truck	Driver

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Survey Team

Equipment	Personnel
	Surveyor
	Assistant surveyor

Staging Area

Equipment	Personnel
Loader	Operator

Borrow Pit

Equipment	Personnel
Excavator	Operator
Loader	Operator

Marooka - Used by both Excavation and Backfill Teams as needed (1 per pair)

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Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge

Total gal/day	758.33
Total gal	59,908.33

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total
UTV (excavation)	5	4	20
		Total gal	1580

1x 2000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	Notes
15000-gal AST at Lodge	15000	1	15000	
25,000-gal AST rental	25000	2	50000	**onsite for excavation and backfill only**
		Total volume	65000	
		Number fueling trips required 2022	0	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully.

ALTERNATIVE 4
PROJECT 02 EXCAVATION AND OFFSITE DISPOSAL – MIDDLE ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 64,569	$ 64,569	2021	$ 64,569
Task 2	Planning Documents	1	Job	$ 127,067	$ 127,067	2021	$ 127,067
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization	1	Job	$ 1,165,031	$ 1,165,031	2022	$ 1,133,299
Task 5	Field Effort	1	Job	$ 22,820,704	$ 22,820,704	2022	$ 22,199,128
Task 6	Reporting	1	Job	$ 320,668	$ 320,668	2023	$ 303,438
				TOTAL	**$ 24,546,804**	**Total Net Present Worth Cost**	**$ 23,876,265**
				Total per CY	**$ 1,070**	**Total per CY**	**$ 1,041**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1-Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and		Monthly Status		Contractor Manpower		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	18	$ 3,885.84	18	$ 3,885.84	0	$ -	36	$ 7,771.68
Project Manager	$ 174.76	hour	84	$ 14,679.84	36	$ 6,291.36	9	$ 1,572.84	129	$ 22,544.04
Contract Manager	$ 143.92	hour		$ -	36	$ 5,181.12		$ -	36	$ 5,181.12
Project Controls	$ 195.32	hour		$ -	72	$ 14,063.04	9	$ 1,757.88	81	$ 15,820.92
Administrative Assistant	$ 92.52	hour		$ -	36	$ 3,330.72	9	$ 832.68	45	$ 4,163.40
Engineer	$ 133.64	hour	68	$ 9,087.52		$ -		$ -	68	$ 9,087.52
Professional Labor Subtotal			**170**	**$ 27,653.20**	**198**	**$ 32,752.08**	**27**	**$ 4,163.40**	**395**	**$ 64,568.68**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 27,653.20		$ 32,752.08		$ 4,163.40	$ 64,568.68	$ 64,568.68
Running Total by Task				$ 27,653.20		$ 60,405.28		$ 64,568.68	**GRAND TOTAL**	**$ 64,568.68**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 3 reports total
4 PoP=36 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	200.6354	8	$ 1,398.08	50	$ 8,738.00	10	$ 1,747.60	13	$ 2,271.88	7	$ 1,223.32	7	$ 1,223.32	95	$ 16,602.20
Project Controls	$ 195.32	224.2396	8	$ 1,562.56		$ -		$ -		$ -		$ -		$ -	8	$ 1,562.56
Geospatial Specialist	$ 102.80	118.0208		$ -	50	$ 5,140.00	10	$ 1,028.00	13	$ 1,336.40	7	$ 719.60	7	$ 719.60	87	$ 8,943.60
Engineer	$ 133.64	153.4271		$ -	100	$ 13,364.00	20	$ 2,672.80	25	$ 3,341.00	13	$ 1,737.32	13	$ 1,737.32	171	$ 22,852.44
Scientist	$ 133.64	153.4271		$ -	110	$ 14,700.40	22	$ 2,940.08	28	$ 3,741.92	14	$ 1,870.96	14	$ 1,870.96	188	$ 25,124.32
Regulatory Specialist	$ 215.88	247.8438		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Project Chemist	$ 102.80	118.0208		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Tech Editor	$ 143.92	165.2292		$ -	32	$ 4,605.44		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	72	$ 10,362.24
Archaeologist	$ 215.88	247.8438		$ -	32	$ 6,908.16	7	$ 1,511.16	8	$ 1,727.04	4	$ 863.52	4	$ 863.52	55	$ 11,873.40
Safety Officer	$ 154.20	177.0313		$ -	16	$ 2,467.20	4	$ 616.80	4	$ 616.80	2	$ 308.40	2	$ 308.40	28	$ 4,317.60
Professional Labor Subtotal			**16**	**$ 2,960.64**	**490**	**$ 70,726.40**	**93**	**$ 13,477.08**	**136**	**$ 19,614.24**	**60**	**$ 8,624.92**	**80**	**$ 11,503.32**	**875**	**$ 126,906.60**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 2,960.64		$ 70,766.40		$ 13,477.08		$ 19,674.24		$ 8,624.92		$ 11,563.32	$ 127,066.60	$ 127,066.60
Running Total by Task				$ 2,960.64		$ 73,727.04		$ 87,204.12		$ 106,878.36		$ 115,503.28		$ 127,066.60	**GRAND TOTAL**	**$ 127,066.60**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	165.22917	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	247.84376	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	153.42709	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	177.03125	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor		**153.42709**												
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios (3 each)	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00			2	$ 9,000.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	72	$ 9,891.50	72	$ 9,891.50	20	$ 2,747.64	204	$ 28,025.91
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archaeologist	$ 221.92	hour		$ -	72	$ 15,978.57	72	$ 15,978.57		$ -	144	$ 31,957.15
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**224**	**$ 37,959.68**	**224**	**$ 37,959.68**	**100**	**$ 13,611.38**	**748**	**$ 116,753.50**
Craft Labor												
Operator	$ 147.95	hour		$ -	216	$ 31,957.15	216	$ 31,957.15		$ -	432	$ 63,914.30
Laborer	$ 137.38	hour		$ -	96	$ 13,188.66	96	$ 13,188.66		$ -	192	$ 26,377.33
Truck Driver	$ 105.68	hour		$ -	144	$ 15,217.69	144	$ 15,217.69		$ -	288	$ 30,435.38
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**480**	**$ 63,660.67**	**480**	**$ 63,660.67**	**0**	**$ -**	**960**	**$ 127,321.34**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	62	$ 930.00	62	$ 930.00		$ -	124	$ 1,860.00
Supplies Subtotal			**0**	**$ -**	**62**	**$ 930.00**	**62**	**$ 930.00**	**0**	**$ -**	**124**	**$ 1,860.00**
Equipment												
4 350 Excavator	$ 2,725.00	week		$ -	4	$ 10,900.00	4	$ 10,900.00		$ -	8	$ 21,800.00
3 960 Loader	$ 1,975.00	week		$ -	3	$ 5,925.00	3	$ 5,925.00		$ -	6	$ 11,850.00
6 15-yard Rock Truck	$ 3,225.00	week		$ -	6	$ 19,350.00	6	$ 19,350.00		$ -	12	$ 38,700.00
5 UTV	$ 840.00	week		$ -	5	$ 4,200.00	5	$ 4,200.00		$ -	10	$ 8,400.00
1 Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
3 750 Dozer	$ 1,975.00	week		$ -	3	$ 5,925.00	3	$ 5,925.00		$ -	6	$ 11,850.00
3 Rentals (1 wk rental to cover mob/demob)	$ 5,792.00	LS		$ -	3	$ 17,376.00	3	$ 17,376.00		$ -	6	$ 34,752.00
1 Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
21 Shipping Container	$ 105.00	week		$ -	21	$ 2,205.00	21	$ 2,205.00		$ -	42	$ 4,410.00
3 Marooka	$ 9,900.00	week		$ -	3	$ 29,700.00	3	$ 29,700.00		$ -	6	$ 59,400.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
1 Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
Equipment Subtotal			**0**	**$ -**	**51**	**$ 104,381.00**	**51**	**$ 104,381.00**	**0**	**$ -**	**102**	**$ 208,762.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	21	$ 6,300.00	21	$ 6,300.00		$ -	42	$ 12,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Mobile Camp Mob/Demob	$ 8,750.00	LS		$ -	1	$ 8,750.00	1	$ 8,750.00		$ -	2	$ 17,500.00
Other Direct Costs Subtotal			**0**	**$ -**	**24**	**$ 22,800.00**	**24**	**$ 22,800.00**	**0**	**$ -**	**48**	**$ 45,600.00**

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	5	$ 22,500.00	5	$ 22,500.00		$ -	10	$ 45,000.00
10-Man Camp	$ 37,200.00	month		$ -	0.23	$ 8,680.00	0.23	$ 8,680.00		$ -	0.47	$ 17,360.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**12.23**	**$ 311,140.00**	**12.23**	**$ 311,140.00**	**0**	**$ -**	**24.47**	**$ 622,280.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	31	$ 3,503.00	31	$ 3,503.00		$ -	62	$ 7,006.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	15.5	$ 10,075.00	15.5	$ 10,075.00		$ -	31	$ 20,150.00
Hotel DUT	$ 150.00	day		$ -	31	$ 4,650.00	31	$ 4,650.00		$ -	62	$ 9,300.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	31	$ 2,999.25	31	$ 2,999.25		$ -	62	$ 5,998.50
Travel Subtotal			**0**	**$ -**	**108.5**	**$ 21,227.25**	**108.5**	**$ 21,227.25**	**0**	**$ -**	**217**	**$ 42,454.50**
Task Totals				$ 27,222.76		$ 562,098.60		$ 562,098.60		$ 13,611.38	$ 1,165,031.33	$ 1,165,031.33
Running Total by Task				$ 27,222.76		$ 589,321.36		$ 1,151,419.95		$ 1,165,031.33	**GRAND TOTAL**	**$ 1,165,031.33**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Waste Barge Loading		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 179.65	hour	14	$ 2,515.15		$ -		$ -	192	$ 34,493.43	14	$ 2,515.15		$ -	220	$ 39,523.72
Geospatial Specialist	$ 105.68	hour	84	$ 8,876.99	1152	$ 121,741.52		$ -		$ -	84	$ 8,876.99		$ -	1320	$ 139,495.49
Engineer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1152	$ 158,263.97	84	$ 11,540.08		$ -	1320	$ 181,344.13
Scientist	$ 137.38	hour	252	$ 34,620.24	3456	$ 474,791.92		$ -		$ -	252	$ 34,620.24		$ -	3960	$ 544,032.40
Professional Land Surveyor	$ 116.25	hour	84	$ 9,764.68	1152	$ 133,915.67		$ -		$ -	84	$ 9,764.68		$ -	1320	$ 153,445.04
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	1152	$ 170,438.12	84	$ 12,427.78		$ -	1320	$ 195,293.68
Archaeologist	$ 221.92	hour	252	$ 55,925.01	3456	$ 766,971.56		$ -		$ -	252	$ 55,925.01		$ -	3960	$ 878,821.57
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	1152	$ 182,612.28	84	$ 13,315.48		$ -	1320	$ 209,243.23
Professional Labor Subtotal			**938**	**$ 148,985.41**	**9216**	**$ 1,497,420.66**	**0**	**$ -**	**3648**	**$ 545,807.80**	**938**	**$ 148,985.41**	**0**	**$ -**	**14740**	**$ 2,341,199.27**
Craft Labor																
Operator	$ 147.95	hour	756	$ 111,850.02	4608	$ 681,752.49	5760	$ 852,190.62		$ -	756	$ 111,850.02	432	$ 63,914.30	12312	$ 1,821,557.45
Laborer	$ 137.38	hour	336	$ 46,160.33	3456	$ 474,791.92		$ -	1152	$ 158,263.97	336	$ 46,160.33	1728	$ 237,395.96	7008	$ 962,772.50
Truck Driver	$ 105.68	hour	504	$ 53,261.91	3456	$ 365,224.55	3456	$ 365,224.55		$ -	504	$ 53,261.91		$ -	7920	$ 836,972.93
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1152	$ 158,263.97	84	$ 11,540.08		$ -	1320	$ 181,344.13
Craft Labor Subtotal			**1680**	**$ 222,812.34**	**11520**	**$ 1,521,768.96**	**9216**	**$ 1,217,415.17**	**2304**	**$ 316,527.94**	**1680**	**$ 222,812.34**	**2160**	**$ 301,310.25**	**28560**	**$ 3,802,647.00**
Materials																
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	3	$ 44,987.40		$ -		$ -		$ -		$ -	3	$ 44,987.40
Health and Safety/PPE	$ 15.00	man-day	231	$ 3,465.00	1728	$ 25,920.00	768	$ 11,520.00	672	$ 10,080.00	231	$ 3,465.00		$ -	3630	$ 54,450.00
5-CY supersacks with liners	$ 335.00	each		$ -	5507	$ 1,844,845.00		$ -		$ -		$ -		$ -	5507	$ 1,844,845.00
Gasoline	$ 4.00	gal	175	$ 700.00	1440	$ 5,760.00		$ -	960	$ 3,840.00	175	$ 700.00		$ -	2750	$ 11,000.00
Diesel	$ 3.75	gal	7262.5	$ 27,234.38	43800.0	$ 164,250.00	43000.0	$ 161,250.00	12800.0	$ 48,000.00	7262.5	$ 27,234.38	3456	$ 12,960.00	117581	$ 440,928.75
Maintenance supplies	$ 10.00	equip-day	147	$ 1,470.00	816	$ 8,160.00	912	$ 9,120.00	288	$ 2,880.00	147	$ 1,470.00		$ -	2310	$ 23,100.00
Supplies Subtotal			**7815.5**	**$ 32,869.38**	**53294.0**	**$ 2,093,922.40**	**44680.0**	**$ 181,890.00**	**14720.0**	**$ 64,800.00**	**7815.5**	**$ 32,869.38**	**3456**	**$ 12,960.00**	**131781**	**$ 2,419,311.15**
Equipment																
4 350 Excavator	$ 10,900.00	month	0.9	$ 10,173.33	9.6	$ 104,640.00	3.2	$ 34,880.00		$ -	0.9	$ 10,173.33		$ -	14.7	$ 159,866.67
3 960 Loader	$ 7,900.00	month	0.7	$ 5,530.00	3.2	$ 25,280.00	3.2	$ 25,280.00	3.2	$ 25,280.00	0.7	$ 5,530.00		$ -	11.0	$ 86,900.00
6 15-yard Rock Truck	$ 12,900.00	month	1.4	$ 18,060.00	9.6	$ 123,840.00	9.6	$ 123,840.00		$ -	1.4	$ 18,060.00		$ -	22.0	$ 283,800.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	9.6	$ 32,256.00		$ -	6.4	$ 21,504.00	1.2	$ 3,920.00		$ -	18.3	$ 61,600.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	3.2	$ 11,680.00	0.2	$ 851.67		$ -	3.7	$ 13,383.33
3 750 Dozer	$ 7,900.00	month	0.7	$ 5,530.00		$ -	9.6	$ 75,840.00		$ -	0.7	$ 5,530.00		$ -	11.0	$ 86,900.00
3 Rentals	$ 17,336.00	month	0.7	$ 12,135.20	9.6	$ 166,425.60		$ -		$ -	0.7	$ 12,135.20		$ -	11.0	$ 190,696.00
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	3.2	$ 23,680.00	0.2	$ 1,726.67		$ -	3.7	$ 27,133.33
21 Shipping Container	$ 15.00	day	147	$ 2,205.00		$ -		$ -	2016.0	$ 30,240.00	147.0	$ 2,205.00		$ -	2310.0	$ 34,650.00
3 Marooka	$ 9,900.00	month	0.7	$ 6,930.00	4.8	$ 47,520.00	4.8	$ 47,520.00		$ -	0.7	$ 6,930.00		$ -	11.0	$ 108,900.00
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	3.2	$ 1,600.00	0.2	$ 116.67		$ -	3.7	$ 1,833.33
1 Tundra Mats (75)	$ 675.00	day	7.0	$ 4,725.00	48	$ 32,400.00	48	$ 32,400.00		$ -	7.0	$ 4,725.00		$ -	110.0	$ 74,250.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	3.2	$ 10,400.00	0.2	$ 758.33		$ -	3.7	$ 11,916.67
Equipment Subtotal			**161.23333**	**$ 72,661.87**	**94.4**	**$ 532,361.60**	**78.4**	**$ 339,760.00**	**2038.4**	**$ 124,384.00**	**161.2**	**$ 72,661.87**	**0**	**$ -**	**2533.7**	**$ 1,141,829.33**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	107	$ 10,700.00		$ -		$ -		$ -		$ -	107.0	$ 10,700.00
Drum Disposal	$ 312,005.00	LS		$ -	1	$ 312,005.00		$ -		$ -		$ -		$ -	1.0	$ 312,005.00
Lift Frame - 6'x4'x4'	$ 5,355.00	each		$ -	3	$ 16,065.00		$ -		$ -		$ -		$ -	3.0	$ 16,065.00
Load Frame - 6'x4'x4'	$ 4,335.00	each		$ -	3	$ 13,005.00		$ -		$ -		$ -		$ -	3.0	$ 13,005.00
Site Communications (internet/radios) setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1.0	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	3.2	$ 40,960.00		$ -		$ -	3.2	$ 40,960.00
2,000-gal AST	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -		$ -	2.0	$ 2,000.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**114**	**$ 351,775.00**	**0**	**$ -**	**5.2**	**$ 42,960.00**	**0**	**$ -**	**0**	**$ -**	**120.2**	**$ 402,504.00**
Subcontractors/Vendors																
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	96	$ 62,400.00	7	$ 4,550.00	36	$ 23,400.00	146.0	$ 94,900.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	14	$ 245,000.00		$ -	3	$ 52,500.00	17.0	$ 297,500.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	96	$ 80,160.00	7	$ 5,845.00		$ -	110.0	$ 91,850.00
Analytical Laboratory (confirmation samples)	$ 526,850.75	LS		$ -	1	$ 526,850.75		$ -		$ -		$ -		$ -	1.0	$ 526,850.75
Analytical Laboratory (waste charac samples)	$ 232,606.00	LS		$ -	1	$ 232,606.00		$ -		$ -		$ -		$ -	1.0	$ 232,606.00
Waste Disposal	$ 10,444,472.97	LS		$ -	1	$ 10,444,472.97		$ -		$ -		$ -		$ -	1.0	$ 10,444,472.97
10-Man Camp	$ 37,200.00	month	0.2	$ 8,680.00		$ -		$ -		$ -	0.2	$ 8,680.00	3.2	$ 119,040.00	3.7	$ 136,400.00
Analytical Laboratory (pre-excavation sampling)	$ 59,052.50	LS		$ -	1	$ 59,052.50		$ -		$ -		$ -		$ -	1.0	$ 59,052.50
Subcontractors/Vendors Subtotal			**14.233333**	**$ 19,075.00**	**4**	**$ 11,262,982.22**	**0**	**$ -**	**206**	**$ 387,560.00**	**14.2**	**$ 19,075.00**	**42.2**	**$ 194,940.00**	**280.7**	**$ 11,883,632.22**

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Waste Barge Loading		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	231	$ 26,103.00	1728	$ 195,264.00	768	$ 86,784.00	672	$ 75,936.00	231	$ 26,103.00	180	$ 20,340.00	3810.0	$ 430,530.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	96	$ 288,000.00	7	$ 21,000.00		$ -	110.0	$ 330,000.00
Fort Glenn Cabin #1	$ 300.00	day	7	$ 2,100.00		$ -		$ -	96	$ 28,800.00	7	$ 2,100.00		$ -	110.0	$ 33,000.00
Fort Glenn Cabin #2	$ 300.00	day	7	$ 2,100.00		$ -		$ -	96	$ 28,800.00	7	$ 2,100.00		$ -	110.0	$ 33,000.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -		$ -		$ -		$ -		$ -	36	$ 3,051.00	36.0	$ 3,051.00
Travel Subtotal			**252**	**$ 51,303.00**	**1728**	**$ 195,264.00**	**768**	**$ 86,784.00**	**960**	**$ 421,536.00**	**252**	**$ 51,303.00**	**216**	**$ 23,391.00**	**4176**	**$ 829,581.00**
Task Totals				$ 555,475.99		$ 17,455,494.84		$ 1,825,849.17		$ 1,903,575.74		$ 547,706.99		$ 532,601.25	$ 22,820,703.98	$ 22,820,703.98
Running Total by Task				$ 555,475.99		$ 18,010,970.83		$ 19,836,819.99		$ 21,740,395.74		$ 22,288,102.73		$ 22,820,703.98	**GRAND TOTAL**	**$ 22,820,703.98**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production). All crew (33 people) and equipment used during this period
3 Task 5.2 includes removal of drums, pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assume a duration of 96 days for Excavation Teams. Soils will be loaded into 5-cy supersacks. Another operator will be using a loader to stage supersacks at the barge landin
4 Task 5.2 includes survey collection of all sample locations, excavation boundaries, and all other pertinent site features. The surveyor and surveyor assistant will be on-island the entire time.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum and composite samples will be collected from each drum area and drum dum
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the backfill of excavated areas once confirmation sample results have been received. This task assumes a local, clean borrow source accessible by road, and last as long as excavation activities. Each backfill team will consist of two operators and a truck driver. An additional operator will be at the borrow source loading backfill int trucks/marookas.
8 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report
9 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observe
10 Task 5.4 includes all site management activities to include management of subcontractors, schedule, cost, and safety. Assumes a duration of 96 days for field team lead, superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT
11 There is a drinking water source on island, which is assumed sufficient for drinking, washing, and bathing needs.
12 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment and resupply.
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed
14 Task 5.5 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (33 people) and equipment are used during this period
15 Supersacks for disposal will be staged near the barge landing area as part of Task 5.2. Waste is assumed to be contaminated but non-hazardous
16 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge
17 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
18 Assume an excavation production rate of 80 cy/day per Excavation Team; this determines overall field duration
19 A separate waste barge to take supersacks to the disposal area is required for every 15,000 tons of excavated material
20 Task 5.6 includes loading the waste barge, which takes 10 days for 4 laborers and 1 operator. It is assumed mobilization takes 1 day each way for each of these people. Mobilization will be on weekly resupply flights, and demobilization will be on a separate charter fligh
21 Task 5.6 personnel stay in the mobile camp, and a cook will mobilize with them. The mobile camp is not used otherwise
22 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
23 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed

TASK 6 - Reporting			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5		Task 6.6		Task 6.7		Task 6.8		Task 6.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																						
Project Manager	$ 184.68	200.63542	50	$ 9,234.18	10	$ 1,846.84	13	$ 2,400.89	7	$ 1,292.79	7	$ 1,292.79	2	$ 369.37	2	$ 369.37	2	$ 369.37		$ -	93	$ 17,175.57
Geospatial Specialist	$ 108.64	118.02084	184	$ 19,989.28	37	$ 4,019.58	46	$ 4,997.32	23	$ 2,498.66	23	$ 2,498.66	4	$ 434.55	4	$ 434.55		$ -		$ -	321	$ 34,872.60
Engineer	$ 141.23	153.42709	136	$ 19,207.09	28	$ 3,954.40	34	$ 4,801.77	17	$ 2,400.89	17	$ 2,400.89		$ -		$ -		$ -		$ -	232	$ 32,765.04
Scientist	$ 141.23	153.42709	204	$ 28,810.64	41	$ 5,790.37	51	$ 7,202.66	26	$ 3,671.94	26	$ 3,671.94		$ -		$ -		$ -		$ -	348	$ 49,147.56
Project Chemist	$ 108.64	118.02084	156	$ 16,947.43	32	$ 3,476.40	39	$ 4,236.86	20	$ 2,172.75	20	$ 2,172.75		$ -		$ -		$ -		$ -	267	$ 29,006.18
Tech Editor	$ 152.09	165.22917	48	$ 7,300.43		$ -	28	$ 4,258.59		$ -	28	$ 4,258.59		$ -	60	$ 9,125.54		$ -		$ -	164	$ 24,943.15
Archaeologist	$ 228.14	247.84376	148	$ 33,764.50	30	$ 6,844.16	37	$ 8,441.13	19	$ 4,334.63	19	$ 4,334.63	120	$ 27,376.62	120	$ 27,376.62	16	$ 3,650.22	24	$ 5,475.32	533	$ 121,597.84
Professional Labor Subtotal			**926**	**$ 135,253.56**	**178**	**$ 25,931.75**	**248**	**$ 36,339.21**	**112**	**$ 16,371.66**	**140**	**$ 20,630.24**	**126**	**$ 28,180.54**	**186**	**$ 37,306.08**	**18**	**$ 4,019.58**	**24**	**$ 5,475.32**	**1958**	**$ 309,507.94**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 135,293.56		$ 25,931.75		$ 36,399.21		$ 16,371.66		$ 20,690.24		$ 28,180.54		$ 37,306.08		$ 14,019.58		$ 6,475.32	$ 320,667.94	$ 320,667.94
Running Total by Task				$ 135,293.56		$ 161,225.30		$ 197,624.51		$ 213,996.17		$ 234,686.41		$ 262,866.95		$ 300,173.03		$ 314,192.61		$ 320,667.94	**GRAND TOTAL**	**$ 320,667.94**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - Middle Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	38	2	4	2	48	$199.50	$8,778.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	38	2	4	0	46	$236.25	$9,922.50	
Pesticides	SW8081	Confirmation	SO	24 hr	38	2	4	0	46	$231.00	$9,702.00	
GRO	AK101	Confirmation	SO	24 hr	38	2	4	2	48	$115.50	$5,082.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	38	2	4	0	46	$136.50	$5,733.00	
PCBs	SW8082	Confirmation	SO	24 hr	38	2	4	0	46	$147.00	$6,174.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	38	2	4	0	46	$220.50	$9,261.00	
									SUBTOTAL =		$54,652.50	$54,652.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$4,400.00	$4,400.00
									TOTAL =		$59,052.50	$59,052.50
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	593	30	60	30	743	$199.50	$136,258.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	593	30	60	0	713	$236.25	$154,271.25	
GRO	AK101	Confirmation	SO	24 hr	593	30	60	30	743	$115.50	$78,886.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	593	30	60	0	713	$136.50	$89,134.50	
									SUBTOTAL =		$458,550.75	$458,550.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$68,300.00	$68,300.00
									TOTAL =		$526,850.75	$526,850.75
Waste Characterization												
GRO	AK101	Waste characterization	SO	Standard	257	0	0	13	270	$45.00	$12,150.00	**Waste Characterization**
DRO/RRO	AK102/AK103	Waste characterization	SO	Standard	257	0	0	0	257	$45.00	$11,565.00	
VOCs	SW8260D/SW8260DSIM	Waste characterization	SO	Standard	257	0	0	13	270	$95.00	$25,650.00	
SVOC	SW8270D	Waste characterization	SO	Standard	257	0	0	0	257	$130.00	$33,410.00	
PAH	SW8270DSIM	Waste characterization	SO	Standard	257	0	0	0	257	$58.00	$14,906.00	
PCB	SW8082A	Waste characterization	SO	Standard	257	0	0	0	257	$60.00	$15,420.00	
Pesticides	SW8081A	Waste characterization	SO	Standard	257	0	0	0	257	$95.00	$24,415.00	
Herbicides	SW8151A	Waste characterization	SO	Standard	257	0	0	0	257	$140.00	$35,980.00	
TCLP RCRA Metals	SW1311/SW6020B	Waste characterization	SO	Standard	257	0	0	0	257	$180.00	$46,260.00	
									SUBTOTAL =		$219,756.00	$219,756.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$12,850.00	$12,850.00
									TOTAL =		$232,606.00	$232,606.00
									GRAND TOTAL =		$818,509.25	$818,509.25

Notes:
Assume no equipment blanks will be required for this project.
Assume waste characterization samples are collected one per feature. If more than 100 cy is removed from one feature, samples will be collected at a frequency of 1 per 100 cy.
Assume no field QC samples collected for waste characterization samples.
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
EMax - 5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

Shipping/courier fees not included in laboratory pricing.

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Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 124 days

Equipment	Rate	Number	Unit	Total
Open-top containers	$ 15.00	9	day	$ 16,740.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	**$ 312,005.00**

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Rentals

Item	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00
Scale, 320g	$ 8.00	$ 24.00	$ 72.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00
Drone	$ 650.00	$ 3,000.00	$ 9,000.00
Totals	**$ 1,577.00**	**$ 5,792.00**	**$ 17,336.00**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Setup	$5,800.00	
Travel Costs for Setup Crew	$500.00	
Food Costs for Setup Crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/25	110	80	8,800	Excavation operations
8/26	9/1	7	0	0	Teardown and site restoration

Max excavation/backfill per year per team	8,800
Middle volume estimate of soil (cy)	22,942
Excavation/Backfill Teams required	3
Waste barges required	3

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team.
Each waste barge can handle up to 15,000 tons; requires 4 laborers and one operator in a loader 10 days to load barge. Overall price aside from equipment and labor is $303.50 per ton

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting 1 May to 19 August with 1 week setup, 10-day teardown.
2023	Project reporting

Total duration 36 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	8/11/22	96	240	23,040	Excavation operations
8/12/22	8/18/22	7	0	0	Teardown and site restoration

Total treated volume	22,942
Total field duration	110
Number of resupply flights	14

Personnel

9	Operators	
6	Truck drivers	
3	Arch	
4	Laborer	Includes housekeeper
3	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate

Excavation Teams	16	people
Backfill Teams	8	people
Support Team	7	people
Survey Team	2	people
Total Crew	33	people

Soil fluff factor	0.2
Cubic yards for shipment	27,531
Supersacks needed	5,507
Supersacks per pallet	30
Pallets per shipping container	20
Shipping containers needed	10

All personnel will stay in Fort Glenn Lodge

Excavation Team

Equipment	Personnel
350 Excavator	Operator
15-yard Rock Truck	Truck driver
UTV	Arch
	Scientist
	Laborer

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Backfill Team

Equipment	Personnel
Dozer	Operator
Rock truck	Driver

Staging Area

Equipment	Personnel
Loader	Operator

Marooka used by both Excavation and Backfill Teams as needed (1 per pair)

Waste loading crew

4	Laborers
1	Operator
1	Cook

Survey Team

Equipment	Personnel
	Surveyor
	Assistant surveyor

Borrow Pit

Equipment	Personnel
Excavator	Operator
Loader	Operator

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Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge
Mobile Camp	96	
Total gal/day	1,038	Not including mobile camp
Total gal	117,581	All inclusive

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total	
UTV (excavation)	5	5	25	
		Total gal	2,750	2x 2,000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	Notes
15000-gal AST at Lodge	15,000	1	15,000	
25,000-gal AST rental	25,000	2	50,000	onsite for excavation and backfill only
		Total volume	65,000	
		Number fueling trips required 2022	1	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully

ALTERNATIVE 4
PROJECT 02 EXCAVATION AND OFFSITE DISPOSAL – HIGH ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 64,568.68	$ 64,568.68	2021	$ 64,569
Task 2	Planning Documents	1	Job	$ 153,352.56	$ 153,352.56	2021	$ 153,353
Task 3	Site Visit	1	Job	$ 48,765.20	$ 48,765.20	2021	$ 48,765
Task 4	Mobilization/Demobilization	1	Job	$ 1,165,031.33	$ 1,165,031.33	2022	$ 1,133,299
Task 5	Field Effort	1	Job	$ 24,173,700.78	$ 24,173,700.78	2022	$ 23,515,273
Task 6	Reporting	1	Job	$ 345,991.32	$ 345,991.32	2023	$ 327,400
				TOTAL	**$ 25,951,410**	**Total Net Present Worth Cost**	**$ 25,242,659**
				Total per CY	**$ 1,077**	**Total per CY**	**$ 1,047**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate		2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor										
	Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
	Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
	Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
	Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
	Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
	Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
	Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
	Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
	Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
	Professional Labor Subtotal									
Craft Labor										
	Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	18	$ 3,885.84	18	$ 3,885.84	0	$ -	36	$ 7,771.68
Project Manager	$ 174.76	hour	84	$ 14,679.84	36	$ 6,291.36	9	$ 1,572.84	129	$ 22,544.04
Contract Manager	$ 143.92	hour	0	$ -	36	$ 5,181.12		$ -	36	$ 5,181.12
Project Controls	$ 195.32	hour	0	$ -	72	$ 14,063.04	9	$ 1,757.88	81	$ 15,820.92
Administrative Assistant	$ 92.52	hour	0	$ -	36	$ 3,330.72	9	$ 832.68	45	$ 4,163.40
Engineer	$ 133.64	hour	68	$ 9,087.52	0	$ -	0	$ -	68	$ 9,087.52
Professional Labor Subtotal			**170**	**$ 27,653.20**	**198**	**$ 32,752.08**	**27**	**$ 4,163.40**	**395**	**$ 64,568.68**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 27,653.20		$ 32,752.08		$ 4,163.40	$ 64,568.68	$ 64,568.68
Running Total by Task				$ 27,653.20		$ 60,405.28		$ 64,568.68	**GRAND TOTAL**	**$ 64,568.68**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 3 reports total
4 PoP=36 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	200.63542	12	$ 2,097.12	60	$ 10,485.60	12	$ 2,097.12	15	$ 2,621.40	8	$ 1,398.08	8	$ 1,398.08	115	$ 20,097.40
Project Controls	$ 195.32	224.23959	12	$ 2,343.84		$ -		$ -		$ -		$ -		$ -	12	$ 2,343.84
Geospatial Specialist	$ 102.80	118.02084		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Engineer	$ 133.64	153.42709		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Scientist	$ 133.64	153.42709		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Regulatory Specialist	$ 215.88	247.84376		$ -	48	$ 10,362.24	10	$ 2,158.80	12	$ 2,590.56	6	$ 1,295.28	6	$ 1,295.28	82	$ 17,702.16
Project Chemist	$ 102.80	118.02084		$ -	88	$ 9,046.40	18	$ 1,850.40	22	$ 2,261.60	11	$ 1,130.80	11	$ 1,130.80	150	$ 15,420.00
Tech Editor	$ 143.92	165.22917		$ -	40	$ 5,756.80		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	80	$ 11,513.60
Archaeologist	$ 215.88	247.84376		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Safety Officer	$ 154.20	177.03125		$ -	24	$ 3,700.80	5	$ 771.00	6	$ 925.20	3	$ 462.60	3	$ 462.60	41	$ 6,322.20
Professional Labor Subtotal			**24**	**$ 4,440.96**	**600**	**$ 86,228.64**	**113**	**$ 16,252.68**	**160**	**$ 22,996.36**	**71**	**$ 10,197.76**	**91**	**$ 13,076.16**	**1059**	**$ 153,192.56**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 4,440.96		$ 86,268.64		$ 16,252.68		$ 23,056.36		$ 10,197.76		$ 13,136.16	$ 153,352.56	$ 153,352.56
Running Total by Task				$ 4,440.96		$ 90,709.60		$ 106,962.28		$ 130,018.64		$ 140,216.40		$ 153,352.56	**GRAND TOTAL**	**$ 153,352.56**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	165.22917	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	247.84376	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	153.42709	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	177.03125	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios (3 each)	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractor/Vendor Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes 2-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	72	$ 9,891.50	72	$ 9,891.50	20	$ 2,747.64	204	$ 28,025.91
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archaeologist	$ 221.92	hour		$ -	72	$ 15,978.57	72	$ 15,978.57		$ -	144	$ 31,957.15
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**224**	**$ 37,959.68**	**224**	**$ 37,959.68**	**100**	**$ 13,611.38**	**748**	**$ 116,753.50**
Craft Labor												
Operator	$ 147.95	hour		$ -	216	$ 31,957.15	216	$ 31,957.15		$ -	432	$ 63,914.30
Laborer	$ 137.38	hour		$ -	96	$ 13,188.66	96	$ 13,188.66		$ -	192	$ 26,377.33
Truck Driver	$ 105.68	hour		$ -	144	$ 15,217.69	144	$ 15,217.69		$ -	288	$ 30,435.38
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**480**	**$ 63,660.67**	**480**	**$ 63,660.67**	**0**	**$ -**	**960**	**$ 127,321.34**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	62	$ 930.00	62	$ 930.00		$ -	124	$ 1,860.00
Supplies Subtotal			**0**	**$ -**	**62**	**$ 930.00**	**62**	**$ 930.00**	**0**	**$ -**	**124**	**$ 1,860.00**
Equipment												
4 350 Excavator	$ 2,725.00	week		$ -	4	$ 10,900.00	4	$ 10,900.00		$ -	8	$ 21,800.00
3 960 Loader	$ 1,975.00	week		$ -	3	$ 5,925.00	3	$ 5,925.00		$ -	6	$ 11,850.00
6 15-yard Rock Truck	$ 3,225.00	week		$ -	6	$ 19,350.00	6	$ 19,350.00		$ -	12	$ 38,700.00
5 UTV	$ 840.00	week		$ -	5	$ 4,200.00	5	$ 4,200.00		$ -	10	$ 8,400.00
1 Tracked Skidsteer	$ 912.50	week		$ -	1	$ 912.50	1	$ 912.50		$ -	2	$ 1,825.00
3 750 Dozer	$ 1,975.00	week		$ -	3	$ 5,925.00	3	$ 5,925.00		$ -	6	$ 11,850.00
3 Rentals (1 wk rental to cover mob/demob)	$ 5,792.00	LS		$ -	3	$ 17,376.00	3	$ 17,376.00		$ -	6	$ 34,752.00
1 Fuel Truck	$ 1,850.00	week		$ -	1	$ 1,850.00	1	$ 1,850.00		$ -	2	$ 3,700.00
21 Shipping Container	$ 105.00	week		$ -	21	$ 2,205.00	21	$ 2,205.00		$ -	42	$ 4,410.00
3 Marooka	$ 9,900.00	week		$ -	3	$ 29,700.00	3	$ 29,700.00		$ -	6	$ 59,400.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
1 Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
Equipment Subtotal			**0**	**$ -**	**51**	**$ 104,381.00**	**51**	**$ 104,381.00**	**0**	**$ -**	**102**	**$ 208,762.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	21	$ 6,300.00	21	$ 6,300.00		$ -	42	$ 12,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Mobile Camp Mob/Demob	$ 8,750.00	LS		$ -	1	$ 8,750.00	1	$ 8,750.00		$ -	2	$ 17,500.00
Other Direct Costs Subtotal			**0**	**$ -**	**24**	**$ 22,800.00**	**24**	**$ 22,800.00**	**0**	**$ -**	**48**	**$ 45,600.00**

TASK 4 - Mobilization/Demobilization			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors												
Camp Cook	$ 650.00	day		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	each		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	each		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	5	$ 22,500.00	5	$ 22,500.00		$ -	10	$ 45,000.00
10-Man Camp	$ 37,200.00	month		$ -	0.2	$ 8,680.00	0.2	$ 8,680.00		$ -	0.5	$ 17,360.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**12.2**	**$ 311,140.00**	**12.2**	**$ 311,140.00**	**0**	**$ -**	**24.5**	**$ 622,280.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	31	$ 3,503.00	31	$ 3,503.00		$ -	62	$ 7,006.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	15.5	$ 10,075.00	15.5	$ 10,075.00		$ -	31	$ 20,150.00
Hotel DUT	$ 150.00	day		$ -	31	$ 4,650.00	31	$ 4,650.00		$ -	62	$ 9,300.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	31	$ 2,999.25	31	$ 2,999.25		$ -	62	$ 5,998.50
Travel Subtotal			**0**	**$ -**	**108.5**	**$ 21,227.25**	**108.5**	**$ 21,227.25**	**0**	**$ -**	**217**	**$ 42,454.50**
Task Totals				$ 27,222.76		$ 562,098.60		$ 562,098.60		$ 13,611.38	$ 1,165,031.33	$ 1,165,031.33
Running Total by Task				$ 27,222.76		$ 589,321.36		$ 1,151,419.95		$ 1,165,031.33	**GRAND TOTAL**	**$ 1,165,031.33**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 19 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12 hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Waste Barge Loading		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 179.65	hour	14	$ 2,515.15		$ -		$ -	202	$ 36,289.96	14	$ 2,515.15		$ -	230	$ 41,320.25
Geospatial Specialist	$ 105.68	hour	84	$ 8,876.99	1212	$ 128,082.22		$ -		$ -	84	$ 8,876.99		$ -	1380	$ 145,836.19
Engineer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1212	$ 166,506.89	84	$ 11,540.08		$ -	1380	$ 189,587.05
Scientist	$ 137.38	hour	252	$ 34,620.24	3636	$ 499,520.66		$ -		$ -	252	$ 34,620.24		$ -	4140	$ 568,761.15
Professional Land Surveyor	$ 116.25	hour	84	$ 9,764.68	1212	$ 140,890.44		$ -		$ -	84	$ 9,764.68		$ -	1380	$ 160,419.81
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	1212	$ 179,315.11	84	$ 12,427.78		$ -	1380	$ 204,170.67
Archaeologist	$ 221.92	hour	252	$ 55,925.01	3636	$ 806,917.99		$ -		$ -	252	$ 55,925.01		$ -	4140	$ 918,768.01
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	1212	$ 192,123.33	84	$ 13,315.48		$ -	1380	$ 218,754.29
Professional Labor Subtotal				**$ 148,985.41**	**9696**	**$ 1,575,411.32**	**0**	**$ -**	**3838**	**$ 574,235.29**	**938**	**$ 148,985.41**	**0**	**$ -**	**15410**	**$ 2,447,617.42**
Craft Labor																
Operator	$ 147.95	hour	756	$ 111,850.02	4848	$ 717,260.44	6060	$ 896,575.55		$ -	756	$ 111,850.02	432	$ 63,914.30	12852	$ 1,901,450.32
Laborer	$ 137.38	hour	336	$ 46,160.33	3636	$ 499,520.66		$ -	1212	$ 166,506.89	336	$ 46,160.33	1728	$ 237,395.96	7248	$ 995,744.16
Truck Driver	$ 105.68	hour	504	$ 53,261.91	3636	$ 384,246.66	3636	$ 384,246.66		$ -	504	$ 53,261.91		$ -	8280	$ 875,017.15
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1212	$ 166,506.89	84	$ 11,540.08		$ -	1380	$ 189,587.05
Craft Labor Subtotal				**$ 222,812.34**	**12120**	**$ 1,601,027.76**	**9696**	**$ 1,280,822.21**	**2424**	**$ 333,013.77**	**1680**	**$ 222,812.34**	**2160**	**$ 301,310.25**	**29760**	**$ 3,961,798.67**
Materials																
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
EPL	$ 14,995.80	LS		$ -	3	$ 44,987.40		$ -		$ -		$ -		$ -	3	$ 44,987.40
Health and Safety/PPE	$ 15.00	man-day	231	$ 3,465.00	1818	$ 27,270.00	808	$ 12,120.00	707	$ 10,605.00	231	$ 3,465.00		$ -	3795	$ 56,925.00
5-CY supersacks with liners	$ 335.00	each		$ -	5786	$ 1,938,310.00		$ -		$ -		$ -		$ -	5786	$ 1,938,310.00
Gasoline	$ 4.00	gal	175	$ 700.00	1515	$ 6,060.00		$ -	1010	$ 4,040.00	175	$ 700.00		$ -	2875	$ 11,500.00
Diesel	$ 3.75	gal	7262.5	$ 27,234.38	46081.25	$ 172,804.69	45239.6	$ 169,648.44	13466.7	$ 50,500.00	7262.5	$ 27,234.38	3456	$ 12,960.00	122768.5	$ 460,381.88
Maintenance supplies	$ 10.00	equip-day	147	$ 1,470.00	858.5	$ 8,585.00	959.5	$ 9,595.00	303.0	$ 3,030.00	147.0	$ 1,470.00		$ -	2415.0	$ 24,150.00
Supplies Subtotal				**$ 32,869.38**	**56061.8**	**$ 2,198,017.09**	**47007.1**	**$ 191,363.44**	**15486.7**	**$ 68,175.00**	**7815.5**	**$ 32,869.38**	**3456.0**	**$ 12,960.00**	**137643**	**$ 2,536,254.28**
Equipment																
4 350 Excavator	$ 10,900.00	month	0.9	$ 10,173.33	10.1	$ 110,090.00	3.4	$ 36,696.67		$ -	0.9	$ 10,173.33		$ -	15.3	$ 167,133.33
3 960 Loader	$ 7,900.00	month	0.7	$ 5,530.00	3.4	$ 26,596.67	3.4	$ 26,596.67	3.4	$ 26,596.67	0.7	$ 5,530.00		$ -	11.5	$ 90,850.00
6 15-yard Rock Truck	$ 12,900.00	month	1.4	$ 18,060.00	10.1	$ 130,290.00	10.1	$ 130,290.00		$ -	1.4	$ 18,060.00		$ -	23.0	$ 296,700.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	10.1	$ 33,936.00		$ -	6.7	$ 22,624.00	1.2	$ 3,920.00		$ -	19.2	$ 64,400.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	3.4	$ 12,288.33	0.2	$ 851.67		$ -	3.8	$ 13,991.67
3 750 Dozer	$ 7,900.00	month	0.7	$ 5,530.00		$ -	10.1	$ 79,790.00		$ -	0.7	$ 5,530.00		$ -	11.5	$ 90,850.00
3 Rentals	$ 17,336.00	month	0.7	$ 12,135.20	10.1	$ 175,093.60		$ -		$ -	0.7	$ 12,135.20		$ -	11.5	$ 199,364.00
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	3.4	$ 24,913.33	0.2	$ 1,726.67		$ -	3.8	$ 28,366.67
21 Shipping Container	$ 15.00	day	147	$ 2,205.00		$ -		$ -	2121.0	$ 31,815.00	147.0	$ 2,205.00		$ -	2415.0	$ 36,225.00
3 Marooka	$ 9,900.00	month	0.7	$ 6,930.00	5.1	$ 49,995.00	5.05	$ 49,995.00		$ -	0.7	$ 6,930.00		$ -	11.5	$ 113,850.00
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	3.4	$ 1,683.33	0.2	$ 116.67		$ -	3.8	$ 1,916.67
1 Tundra Mats (75)	$ 675.00	day	7.0	$ 4,725.00	50.5	$ 34,087.50	50.5	$ 34,087.50		$ -	7.0	$ 4,725.00		$ -	115.0	$ 77,625.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	3.4	$ 10,941.67	0.2	$ 758.33		$ -	3.8	$ 12,458.33
Equipment Subtotal			**161.2**	**$ 72,661.87**	**99.3**	**$ 560,088.77**	**82.5**	**$ 357,455.83**	**2144.6**	**$ 130,862.33**	**161.2**	**$ 72,661.87**	**0**	**$ -**	**2648.83**	**$ 1,193,730.67**
Other Direct Costs																
Sample shipping, per cooler	$ 100.00	each		$ -	147	$ 14,700.00		$ -		$ -		$ -		$ -	147	$ 14,700.00
Drum Disposal	$ 312,680.00	LS		$ -	1	$ 312,680.00		$ -		$ -		$ -		$ -	1	$ 312,680.00
Lift Frame - 6'x4'x4'	$ 5,355.00	each		$ -	3	$ 16,065.00		$ -		$ -		$ -		$ -	3	$ 16,065.00
Load Frame - 6'x4'x4'	$ 4,335.00	each		$ -	3	$ 13,005.00		$ -		$ -		$ -		$ -	3	$ 13,005.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	3.37	$ 43,093.33		$ -		$ -	3.4	$ 43,093.33
2,000-gal AST	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**154**	**$ 356,450.00**	**0**	**$ -**	**5.37**	**$ 45,093.33**	**0**	**$ -**	**0**	**$ -**	**160.4**	**$ 409,312.33**
Subcontractors/Vendors																
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	101	$ 65,650.00	7	$ 4,550.00	36	$ 23,400.00	151	$ 98,150.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	15	$ 262,500.00		$ -	3	$ 52,500.00	18	$ 315,000.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	101	$ 84,335.00	7	$ 5,845.00		$ -	115	$ 96,025.00
Analytical Laboratory (confirmation samples)	$ 760,693.25	LS		$ -	1	$ 760,693.25		$ -		$ -		$ -		$ -	1	$ 760,693.25
Analytical Laboratory (waste charac samples)	$ 266,112.00	LS		$ -	1	$ 266,112.00		$ -		$ -		$ -		$ -	1	$ 266,112.00
Waste Disposal	$ 10,974,552.41	LS		$ -	1	$ 10,974,552.41		$ -		$ -		$ -		$ -	1	$ 10,974,552.41
10-Man Camp	$ 37,200.00	month	0.2	$ 8,680.00		$ -		$ -		$ -	0.2	$ 8,680.00	3.4	$ 125,240.00	3.8	$ 142,600.00
Analytical Laboratory (pre-excavation sampling)	$ 105,628.75	LS		$ -	1	$ 105,628.75		$ -		$ -		$ -		$ -	1	$ 105,628.75
Subcontractor/Vendors Subtotal			**14.2**	**$ 19,075.00**	**4**	**$ 12,106,986.41**	**0**	**$ -**	**217**	**$ 412,485.00**	**14.2**	**$ 19,075.00**	**42.4**	**$ 201,140.00**	**291.8**	**$ 12,758,761.41**

TASK 5 - Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		Task 5.6			
			Site setup		Excavation and Sampling Activities		Backfill and Site Restoration		Site Management Activities		Site Teardown Activities		Waste Barge Loading		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel																
Meals / Incidentals	$ 113.00	day	231	$ 26,103.00	1818	$ 205,434.00	808	$ 91,304.00	707	$ 79,891.00	231	$ 26,103.00	180	$ 20,340.00	3975	$ 449,175.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	101	$ 303,000.00	7	$ 21,000.00		$ -	115	$ 345,000.00
Fort Glenn Cabin #1	$ 300.00	day	7	$ 2,100.00		$ -		$ -	101	$ 30,300.00	7	$ 2,100.00		$ -	115	$ 34,500.00
Fort Glenn Cabin #2	$ 300.00	day	7	$ 2,100.00		$ -		$ -	101	$ 30,300.00	7	$ 2,100.00		$ -	115	$ 34,500.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -		$ -		$ -		$ -		$ -	36	$ 3,051.00	36	$ 3,051.00
Travel Subtotal			**252**	**$ 51,303.00**	**1818**	**$ 205,434.00**	**808**	**$ 91,304.00**	**1010**	**$ 443,491.00**	**252**	**$ 51,303.00**	**216**	**$ 23,391.00**	**4356**	**$ 866,226.00**
Task Totals				$ 555,475.99		$ 18,603,415.34		$ 1,920,945.48		$ 2,007,355.73		$ 547,706.99		$ 538,801.25	$ 24,173,700.78	$ 24,173,700.78
Running Total by Task				$ 555,475.99		$ 19,158,891.33		$ 21,079,836.81		$ 23,087,192.54		$ 23,634,899.53		$ 24,173,700.78	**GRAND TOTAL**	**$ 24,173,700.78**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup and treatment startup. Site setup takes 7 days (no treatment production). All crew (33 people) and equipment used during this period
3 Task 5.2 includes removal of drums, pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assume a duration of 101 days for three teams of one scientist, one archaeologist, one operator, one truck driver, and one laborer. Soils will be loaded into 5-cy supersacks. Another operatc will be using the skid steer to stage supersacks at the barge landing.
4 Task 5.2 includes survey collection of all sample locations, excavation boundaries, and all other pertinent site features. The surveyor and surveyor assistant will be on-island the entire time.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum and composite samples will be collected from each drum area and drum dum
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the backfill of excavated areas once confirmation sample results have been received. This task assumes a local, clean borrow source accessible by road, and last as long as excavation activities. Each backfill team will consist of two operators and a truck driver. An additional operator will be at the borrow source loading backfill int trucks/marookas.
8 Assume drum contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report
9 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observec
10 Task 5.4 includes all site management activities to include management of subcontractors, schedule, cost, and safety. Assumes a duration of 101 days for field team lead, superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT
11 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, and bathing needs
12 Assume weekly charter flights from Anchorage to Fort Glen for sample shipment and resupply.
13 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen are observed
14 Task 5.5 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (33 people) and equipment are used during this period
15 Supersacks for disposal will be staged near the barge landing area as part of Task 5.2. Waste is assumed to be contaminated but non-hazardous
16 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge
17 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
18 Assume an excavation production rate of 80 cy/day per Excavation Team; this determines overall field duration
19 A separate waste barge to take supersacks to the disposal area is required for every 15,000 tons of excavated material
20 Task 5.6 includes loading the waste barge, which takes 10 days for 4 laborers and 1 operator. It is assumed mobilization takes 1 day each way for each of these people. Mobilization will be on weekly resupply flights, and demobilization will be on a separate charter fligh
21 Task 5.6 personnel stay in the mobile camp, and a cook mobilizes with them. The mobile camp is not used otherwise
22 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
23 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed

TASK 6 - Reporting			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5		Task 6.6		Task 6.7		Task 6.8		Task 6.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																						
Project Manager	$ 184.68	200.63542	60	$ 11,081.01	12	$ 2,216.20	15	$ 2,770.25	8	$ 1,477.47	8	$ 1,477.47	2	$ 369.37	2	$ 369.37	2	$ 369.37		$ -	109	$ 20,130.51
Geospatial Specialist	$ 108.64	118.02084	200	$ 21,727.48	40	$ 4,345.50	50	$ 5,431.87	25	$ 2,715.93	25	$ 2,715.93	4	$ 434.55	4	$ 434.55		$ -		$ -	348	$ 37,805.81
Engineer	$ 141.23	153.42709	160	$ 22,596.58	32	$ 4,519.32	40	$ 5,649.14	20	$ 2,824.57	20	$ 2,824.57		$ -		$ -		$ -		$ -	272	$ 38,414.18
Scientist	$ 141.23	153.42709	220	$ 31,070.30	44	$ 6,214.06	55	$ 7,767.57	28	$ 3,954.40	28	$ 3,954.40		$ -		$ -		$ -		$ -	375	$ 52,960.73
Project Chemist	$ 108.64	118.02084	180	$ 19,554.73	36	$ 3,910.95	45	$ 4,888.68	23	$ 2,498.66	23	$ 2,498.66		$ -		$ -		$ -		$ -	307	$ 33,351.68
Tech Editor	$ 152.09	165.22917	56	$ 8,517.17		$ -	32	$ 4,866.96		$ -	32	$ 4,866.96		$ -	60	$ 9,125.54		$ -		$ -	180	$ 27,376.62
Archaeologist	$ 228.14	247.84376	156	$ 35,589.61	32	$ 7,300.43	39	$ 8,897.40	20	$ 4,562.77	20	$ 4,562.77	120	$ 27,376.62	120	$ 27,376.62	16	$ 3,650.22	24	$ 5,475.32	547	$ 124,791.78
Professional Labor Subtotal			**1032**	**$ 150,136.88**	**196**	**$ 28,506.45**	**276**	**$ 40,271.88**	**124**	**$ 18,033.81**	**156**	**$ 22,900.76**	**126**	**$ 28,180.54**	**186**	**$ 37,306.08**	**18**	**$ 4,019.58**	**24**	**$ 5,475.32**	**2138**	**$ 334,831.32**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 150,176.88		$ 28,506.45		$ 40,331.88		$ 18,033.81		$ 22,960.76		$ 28,180.54		$ 37,306.08		$ 14,019.58		$ 6,475.32	$ 345,991.32	$ 345,991.32
Running Total by Task				$ 150,176.88		$ 178,683.33		$ 219,015.22		$ 237,049.02		$ 260,009.79		$ 288,190.33		$ 325,496.41		$ 339,515.99		$ 345,991.32	**GRAND TOTAL**	**$ 345,991.32**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Excavation and Offsite Disposal - High Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	68	4	7	4	87	$199.50	$15,760.50	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	68	4	7	0	83	$236.25	$17,718.75	
Pesticides	SW8081	Confirmation	SO	24 hr	68	4	7	0	83	$231.00	$17,325.00	
GRO	AK101	Confirmation	SO	24 hr	68	4	7	4	87	$115.50	$9,124.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	68	4	7	0	83	$136.50	$10,237.50	
PCBs	SW8082	Confirmation	SO	24 hr	68	4	7	0	83	$147.00	$11,025.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	68	4	7	0	83	$220.50	$16,537.50	
									SUBTOTAL =		$97,728.75	$97,728.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$7,900.00	$7,900.00
									TOTAL =		$105,628.75	$105,628.75
CONFIRMATION SAMPLES												
VOCs	SW8260D	Confirmation	SO	24 hr	857	43	86	43	1072	$199.50	$196,707.00	**CONFIRMATION SAMPLES**
PAH	SW8270C	Confirmation	SO	24 hr	857	43	86	0	1029	$236.25	$222,783.75	
GRO	AK101	Confirmation	SO	24 hr	857	43	86	43	1072	$115.50	$113,883.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	857	43	86	0	1029	$136.50	$128,719.50	
									SUBTOTAL =		$662,093.25	$662,093.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$98,600.00	$98,600.00
									TOTAL =		$760,693.25	$760,693.25
WASTE CHARACTERIZATION												
GRO	AK101	Waste characterization	SO	Standard	294	0	0	15	309	$45.00	$13,905.00	**WASTE CHARACTERIZATION**
DRO/RRO	AK102/AK103	Waste characterization	SO	Standard	294	0	0	0	294	$45.00	$13,230.00	
VOCs	SW8260D/SW8260DSIM	Waste characterization	SO	Standard	294	0	0	15	309	$95.00	$29,355.00	
SVOC	SW8270D	Waste characterization	SO	Standard	294	0	0	0	294	$130.00	$38,220.00	
PAH	SW8270DSIM	Waste characterization	SO	Standard	294	0	0	0	294	$58.00	$17,052.00	
PCB	SW8082A	Waste characterization	SO	Standard	294	0	0	0	294	$60.00	$17,640.00	
Pesticides	SW8081A	Waste characterization	SO	Standard	294	0	0	0	294	$95.00	$27,930.00	
Herbicides	SW8151A	Waste characterization	SO	Standard	294	0	0	0	294	$140.00	$41,160.00	
TCLP RCRA Metals	SW1311/SW6020B	Waste characterization	SO	Standard	294	0	0	0	294	$180.00	$52,920.00	
									SUBTOTAL =		$251,412.00	$251,412.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$14,700.00	$14,700.00
									TOTAL =		$266,112.00	$266,112.00
									GRAND TOTAL =		$1,132,434.00	$1,132,434.00

Notes:
Assume no equipment blanks will be required for this project.
Assume waste characterization samples are collected one per feature. If more than 100 CY is removed from one feature, samples will be collected at a frequency of 1 per 100 CY.
Assume no field QC samples collected for waste characterization samples.
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
EMax - 5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

Shipping/courier fees not included in laboratory pricing.

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Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 129 days

Equipment	Rate	Number	Unit	Total
Open-top containers	$ 15.00	9	day	$ 17,415.00
Overpacks	$ 175.00	15	each	$ 2,625.00
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00
Container Transport Cost	$ 300.00	9	each	$ 2,700.00
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00
			Total	**$ 312,680.00**

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Rentals

Item	Daily	Weekly	Monthly
Magnetometer	$ 20.00	$ 60.00	$ 180.00
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00
Scale, 320g	$ 8.00	$ 24.00	$ 72.00
Satellite Phone	$ 60.00	$ 180.00	$ 545.00
Garmin InReach	$ 18.00	$ 50.00	$ 110.00
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00
Drone	$ 650.00	$ 3,000.00	$ 9,000.00
Totals	**$ 1,577.00**	**$ 5,792.00**	**$ 17,336.00**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and setup	$5,800.00	
Travel Costs for Setup Crew	$500.00	
Food Costs for Setup Crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/25	110	80	8,800	Excavation operations
8/26	9/1	7	0	0	Teardown and site restoration

Max excavation/backfill per year per team	8,800
High volume estimate of soil (cy)	24,107
Excavation/Backfill Teams required	3
Waste barges required	3

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team.
Each waste barge can handle up to 15,000 tons; requires 4 laborers and one operator in a loader 10 days to load barge.
Overall price aside from equipment and labor is $303.50 per ton.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting 1 May to 31 August with 1 week setup, 10-day teardown
2023	Project reporting

Total duration 36 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (c	Total Production (cys)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	8/16/22	101	240	24,240	Excavation operations
8/17/22	8/23/22	7	0	0	Teardown and site restoration

Total treated volume	24,107
Total field duration	115
Number of resupply flights	15

Personnel		
9	Operators	
6	Truck drivers	
3	Arch	
4	Laborer	Includes housekeeper
3	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate

Excavation Teams	16	people
Backfill Teams	8	people
Support Team	7	people
Survey Team	2	people
Total Crew	33	people

Soil fluff factor	0.2
Cubic yards for shipment	28,928
Supersacks needed	5,786
Supersacks per pallet	30
Pallets per shipping container	20
Shipping containers needed	10

All personnel will stay in Fort Glenn Lodge

Marooka - used by both Excavation and Backfill Teams as needed (1 per pair)

Excavation Team

Equipment	Personnel
350 Excavator	Operator
15-yard Rock Truck	Truck driver
UTV	Arch
	Scientist
	Laborer

Survey Team

Equipment	Personnel
	Surveyor
	Assistant surveyor

Borrow Pit

Equipment	Personnel
Excavator	Operator
Loader	Operator

Staging Area

Equipment	Personnel
Loader	Operator

Backfill Team

Equipment	Personnel
Dozer	Operator
Rock truck	Driver

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Waste loading crew

4	Laborers
1	Operator
1	Cook

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Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
Water Truck (4,000-gal)	$ 6,000.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Light Plant	$ 525.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ -	month	included in incineration costs
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge
Mobile Camp	96	

Total gal/day	1037.5	Not including mobile camp
Total gal	122768.5	All inclusive

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total
UTV (excavation)	5	5	25
		Total gal	2875

2x 2000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	Notes
15000-gal AST at Lodge	15000	1	15000	
25,000-gal AST rental	25000	2	50000	onsite for excavation and backfill only
		Total volume	65000	
		Number fueling trips required 2022	1	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully.

ALTERNATIVE 5
PROJECT 02 LANDFARMING – LOW ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 142,861	$ 142,861	2021	$ 142,861
Task 2	Planning Documents	1	Job	$ 104,050	$ 104,050	2021	$ 104,050
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization #1	1	Job	$ 1,389,872	$ 1,389,872	2022	$ 1,352,016
Task 5	Excavation Field Effort	1	Job	$ 4,825,243	$ 4,825,243	2022	$ 4,693,816
Task 6A	Tilling Field Effort	1	Job	$ 712,859	$ 712,859	2023	$ 674,555
Task 7A	Technical Memorandum	1	Job	$ 38,631	$ 38,631	2023	$ 36,556
Task 6B	Tilling Field Effort	1	Job	$ 732,819	$ 732,819	2024	$ 674,555
Task 7B	Technical Memorandum	1	Job	$ 39,713	$ 39,713	2024	$ 36,556
Task 6C	Tilling Field Effort	1	Job	$ 753,338	$ 753,338	2025	$ 674,555
Task 7C	Technical Memorandum	1	Job	$ 40,825	$ 40,825	2025	$ 36,556
Task 8	Mobilization/Demobilization #2	1	Job	$ 923,966	$ 923,966	2026	$ 804,804
Task 9	Backfilling Field Effort	1	Job	$ 3,403,968	$ 3,403,968	2026	$ 2,964,968
Task 10	Reporting	1	Job	$ 327,358	$ 327,358	2027	$ 277,373
				TOTAL	**$ 13,484,270**	**Total Net Present Worth Cost**	**$ 12,521,986**
				Total per Cubic Yard	**$ 1,377**	**Total per Cubic Yard**	**$ 1,279**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate			Task 1.1 Coordination and Communication		Task 1.2 Monthly Status Reports		Task 1.3 Contractor Manpower Reporting		Total Units	Subtotal
	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost		
Professional Labor										
Program Manager	$ 215.88	hour	42	$ 9,066.96	42	$ 9,066.96		$ -	84	$ 18,133.92
Project Manager	$ 174.76	hour	184	$ 32,155.84	84	$ 14,679.84	21	$ 3,669.96	289	$ 50,505.64
Contract Manager	$ 143.92	hour		$ -	84	$ 12,089.28		$ -	84	$ 12,089.28
Project Controls	$ 195.32	hour		$ -	168	$ 32,813.76	21	$ 4,101.72	189	$ 36,915.48
Administrative Assistant	$ 92.52	hour		$ -	84	$ 7,771.68	21	$ 1,942.92	105	$ 9,714.60
Engineer	$ 133.64	hour	116	$ 15,502.24		$ -		$ -	116	$ 15,502.24
Professional Labor Subtotal			**342**	**$ 56,725.04**	**462**	**$ 76,421.52**	**63**	**$ 9,714.60**	**867**	**$ 142,861.16**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 56,725.04		$ 76,421.52		$ 9,714.60	$ 142,861.16	$ 142,861.16
Running Total by Task				$ 56,725.04		$ 133,146.56		$ 142,861.16	**GRAND TOTAL**	**$ 142,861.16**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mic
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 7 reports total
4 PoP=84 months

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TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	hour	4	$ 699.04	32	$ 5,592.32	7	$ 1,223.32	8	$ 1,398.08	4	$ 699.04	4	$ 699.04	59	$ 10,310.84
Project Controls	$ 195.32	hour	4	$ 781.28		$ -		$ -		$ -		$ -		$ -	4	$ 781.28
Geospatial Specialist	$ 102.80	hour		$ -	40	$ 4,112.00	8	$ 822.40	10	$ 1,028.00	5	$ 514.00	5	$ 514.00	68	$ 6,990.40
Engineer	$ 133.64	hour		$ -	80	$ 10,691.20	16	$ 2,138.24	20	$ 2,672.80	10	$ 1,336.40	10	$ 1,336.40	136	$ 18,175.04
Scientist	$ 133.64	hour		$ -	100	$ 13,364.00	20	$ 2,672.80	25	$ 3,341.00	13	$ 1,737.32	13	$ 1,737.32	171	$ 22,852.44
Regulatory Specialist	$ 215.88	hour		$ -	36	$ 7,771.68	8	$ 1,727.04	9	$ 1,942.92	5	$ 1,079.40	5	$ 1,079.40	63	$ 13,600.44
Project Chemist	$ 102.80	hour		$ -	56	$ 5,756.80	12	$ 1,233.60	14	$ 1,439.20	7	$ 719.60	7	$ 719.60	96	$ 9,868.80
Tech Editor	$ 143.92	hour		$ -	24	$ 3,454.08		$ -	15	$ 2,158.80		$ -	15	$ 2,158.80	54	$ 7,771.68
Archaeologist	$ 215.88	hour		$ -	26	$ 5,612.88	6	$ 1,295.28	7	$ 1,511.16	4	$ 863.52	4	$ 863.52	47	$ 10,146.36
Safety Officer	$ 154.20	hour		$ -	12	$ 1,850.40	3	$ 462.60	3	$ 462.60	2	$ 308.40	2	$ 308.40	22	$ 3,392.40
Professional Labor Subtotal			**8**	**$ 1,480.32**	**406**	**$ 58,205.36**	**80**	**$ 11,575.28**	**111**	**$ 15,954.56**	**50**	**$ 7,257.68**	**65**	**$ 9,416.48**	**720**	**$ 103,889.68**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 1,480.32		$ 58,245.36		$ 11,575.28		$ 16,014.56		$ 7,257.68		$ 9,476.48	$ 104,049.68	$ 104,049.68
Running Total by Task				$ 1,480.32		$ 59,725.68		$ 71,300.96		$ 87,315.52		$ 94,573.20		$ 104,049.68	**GRAND TOTAL**	**$ 104,049.68**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00			2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**		**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes two-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization #1				Task 4.1		Task 4.2		Task 4.3		Task 4.4			
				Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate		2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor													
	Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
	Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
	Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
	Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
	Scientist	$ 137.38	hour	40	$ 5,495.28	24	$ 3,297.17	24	$ 3,297.17	20	$ 2,747.64	108	$ 14,837.25
	Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
	Archaeologist	$ 221.92	hour		$ -	24	$ 5,326.19	24	$ 5,326.19		$ -	48	$ 10,652.38
	Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
	Professional Labor Subtotal			**200**	**$ 27,222.76**	**128**	**$ 20,712.97**	**128**	**$ 20,712.97**	**100**	**$ 13,611.38**	**556**	**$ 82,260.07**
Craft Labor													
	Operator	$ 147.95	hour		$ -	72	$ 10,652.38	72	$ 10,652.38		$ -	144	$ 21,304.77
	Laborer	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
	Truck Driver	$ 105.68	hour		$ -	24	$ 2,536.28	24	$ 2,536.28		$ -	48	$ 5,072.56
	Mechanic	$ 137.38	hour		$ -	48	$ 6,594.33	48	$ 6,594.33		$ -	96	$ 13,188.66
	Craft Labor Subtotal			**0**	**$ -**	**168**	**$ 23,080.16**	**168**	**$ 23,080.16**	**0**	**$ -**	**336**	**$ 46,160.33**
Materials													
	Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies													
	Health and Safety/PPE	$ 15.00	man-day		$ -	28	$ 420.00	28	$ 420.00		$ -	56	$ 840.00
	Supplies Subtotal			**0**	**$ -**	**28**	**$ 420.00**	**28**	**$ 420.00**	**0**	**$ -**	**56**	**$ 840.00**
Equipment													
2	350 Excavator	$ 10,900.00	week		$ -	2	$ 21,800.00	2	$ 21,800.00		$ -	4	$ 43,600.00
1	960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
1	15-yard Rock Truck	$ 12,900.00	week		$ -	1	$ 12,900.00	1	$ 12,900.00		$ -	2	$ 25,800.00
4	UTV	$ 3,360.00	week		$ -	4	$ 13,440.00	4	$ 13,440.00		$ -	8	$ 26,880.00
1	Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1	2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1	Rentals (1 wk rental to cover mob/demob)	$ 7,802.00	LS		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
1	Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11	Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1	Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
	Maintenance tools	$ 812.50	week			1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
	Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
	Equipment Subtotal			**0**	**$ -**	**26**	**$ 91,984.50**	**26**	**$ 91,984.50**	**0**	**$ -**	**52**	**$ 183,969.00**
Other Direct Costs													
1	Dozer with Tilling Equipment	$ 457,450.00	LS	1	$ 457,450.00		$ -		$ -		$ -	1	$ 457,450.00
	Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
	Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
	Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
	Other Direct Costs Subtotal			**1**	**$ 457,450.00**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**27**	**$ 479,550.00**
Subcontractors/Vendors													
	Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
	Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
	Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
	EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
	Charter Flights	$ 4,500.00	each		$ -	2	$ 9,000.00	2	$ 9,000.00		$ -	4	$ 18,000.00
	Subcontractors/Vendors Subtotal			**0**	**$ -**	**9**	**$ 288,960.00**	**9**	**$ 288,960.00**	**0**	**$ -**	**18**	**$ 577,920.00**

TASK 4 - Mobilization/Demobilization #1			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel												
Meals / Incidentals	$ 113.00	day		$ -	14	$ 1,582.00	14	$ 1,582.00		$ -	28	$ 3,164.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	7	$ 4,550.00	7	$ 4,550.00		$ -	14	$ 9,100.00
Hotel DUT	$ 150.00	day		$ -	14	$ 2,100.00	14	$ 2,100.00		$ -	28	$ 4,200.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	14	$ 1,354.50	14	$ 1,354.50		$ -	28	$ 2,709.00
Travel Subtotal			**0**	**$ -**	**49**	**$ 9,586.50**	**49**	**$ 9,586.50**	**0**	**$ -**	**98**	**$ 19,173.00**
Task Totals				$ 484,672.76		$ 445,794.13		$ 445,794.13		$ 13,611.38	$ 1,389,872.39	$ 1,389,872.39
Running Total by Task				$ 484,672.76		$ 930,466.88		$ 1,376,261.01		$ 1,389,872.39	**GRAND TOTAL**	**$ 1,389,872.39**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 14 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		
			Site Set Up		Excavation and Sampling Activities		Landfarm Set Up and Tilling Activities		Site Management Activities		Site Breakdown and Restoration Activities	Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units		
Professional Labor													
Project Manager	$ 179.65	hour	14	$ 2,515.15	65.3	$ 11,737.35	65.3	$ 11,737.35	65.3	$ 11,737.35	14	224	$ 40,242.33
Geospatial Specialist	$ 105.68	hour		$ -	588	$ 62,138.90		$ -		$ -		588	$ 62,138.90
Engineer	$ 137.38	hour	84	$ 11,540.08	1176	$ 161,561.14		$ -		$ -	84	1344	$ 184,641.30
Scientist	$ 137.38	hour	84	$ 11,540.08	1176	$ 161,561.14		$ -		$ -	84	1344	$ 184,641.30
Professional Land Surveyor	$ 116.25	hour		$ -	588	$ 68,352.79		$ -		$ -		588	$ 68,352.79
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	1176	$ 173,988.92	84	1344	$ 198,844.48
Archaeologist	$ 221.92	hour	84	$ 18,641.67	1176	$ 260,983.38		$ -		$ -	84	1344	$ 298,266.72
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	1176	$ 186,416.70	84	1344	$ 213,047.65
Professional Labor Subtotal			**434**	**$ 69,980.24**	**4,769.3**	**$ 726,334.69**	**65.3**	**$ 11,737.35**	**2,417**	**$ 372,142.96**	**434**	**8,120**	**$ 1,250,175.47**
Craft Labor													
Operator	$ 147.95	hour	252	$ 37,283.34	1176	$ 173,988.92	2352	$ 347,977.84		$ -	252	4032	$ 596,533.43
Laborer	$ 137.38	hour	168	$ 23,080.16	1176	$ 161,561.14		$ -	1176	$ 161,561.14	168	2688	$ 369,282.60
Truck Driver	$ 105.68	hour	84	$ 8,876.99	1176	$ 124,277.80		$ -		$ -	84	1344	$ 142,031.77
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1176	$ 161,561.14	84	1344	$ 184,641.30
Craft Labor Subtotal			**588**	**$ 80,780.57**	**3,528**	**$ 459,827.85**	**2,352**	**$ 347,977.84**	**2,352**	**$ 323,122.28**	**588**	**9,408**	**$ 1,292,489.10**
Materials													
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**0**	**$ -**
Supplies													
EPL	$ 14,995.80	LS		$ -	1	$ 14,995.80		$ -		$ -		1	$ 14,995.80
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	10	$ 1,000.00		$ -		10	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day	98	$ 1,470.00	686	$ 10,290.00	196	$ 2,940.00	588	$ 8,820.00	98	1666	$ 24,990.00
Gasoline	$ 4.00	gal	140	$ 560.00	980	$ 3,920.00	490	$ 1,960.00	490	$ 1,960.00	140	2240	$ 8,960.00
Diesel	$ 3.75	gal	2479.2	$ 9,296.88	15108.3	$ 56,656.25	6533.3	$ 24,500.00	13066.7	$ 49,000.00	2479.2	39666.7	$ 148,750.00
Maintenance supplies	$ 10.00	equip-day	56	$ 560.00	294	$ 2,940.00	196	$ 1,960.00	294	$ 2,940.00	56	896	$ 8,960.00
Supplies Subtotal			**2,773.2**	**$ 11,886.88**	**17,069.3**	**$ 88,802.05**	**7,425.3**	**$ 32,360.00**	**14438.7**	**$ 62,720.00**	**2,773.2**	**44,479.7**	**$ 207,655.80**
Equipment													
2 350 Excavator	$ 10,900.00	month	0.5	$ 5,086.67	3.3	$ 35,606.67	3.3	$ 35,606.67		$ -	0.5	7.5	$ 81,386.67
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33		$ -		$ -	3.3	$ 25,806.67	0.2	3.7	$ 29,493.33
1 15-yard Rock Truck	$ 12,900.00	month	0.2	$ 3,010.00	3.3	$ 42,140.00		$ -		$ -	0.2	3.7	$ 48,160.00
4 UTV	$ 3,360.00	month	0.9	$ 3,136.00	6.5	$ 21,952.00	3.3	$ 10,976.00	3.3	$ 10,976.00	0.9	14.9	$ 50,176.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	3.3	$ 11,923.33	0.2	3.7	$ 13,626.67
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	3.3	$ 1,633.33	0.2	3.7	$ 1,866.67
Rentals	$ 23,371.00	month	0.2	$ 5,453.23	3.3	$ 76,345.27		$ -		$ -	0.2	3.7	$ 87,251.73
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	3.3	$ 24,173.33	0.2	3.7	$ 27,626.67
11 Shipping Container	$ 450.00	month	2.6	$ 1,155.00		$ -		$ -	35.9	$ 16,170.00	2.6	41.1	$ 18,480.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	3.3	$ 32,340.00		$ -		$ -	0.2	3.7	$ 36,960.00
Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	3.3	$ 66,150.00		$ -		$ -	0.2	3.7	$ 75,600.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		2	$ 2,000.00
Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	3.3	$ 10,616.67	0.2	3.7	$ 12,133.33
Equipment Subtotal			**6.1**	**$ 30,172.57**	**22.9**	**$ 274,533.93**	**6.5**	**$ 46,582.67**	**57.5**	**$ 103,299.33**	**6.1**	**99.1**	**$ 484,761.07**
Other Direct Costs													
Sample shipping, per cooler	$ 100.00	each		$ -	39	$ 3,900.00	3	$ 300.00		$ -		42	$ 4,200.00
Drum Disposal	$ 312,275.00	LS		$ -	1	$ 312,275.00		$ -		$ -		1	$ 312,275.00
Site Communications (internet/radios) set up	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	3.3	$ 41,813.33		3.3	$ 41,813.33
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**40**	**$ 316,175.00**	**3**	**$ 300.00**	**3.3**	**$ 41,813.33**	**0**	**47.3**	**$ 366,057.33**

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5		
			Site Set Up		Excavation and Sampling Activities		Landfarm Set Up and Tilling Activities		Site Management Activities		Site Breakdown and Restoration Activities	Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**		
Subcontractors/Vendors													
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	98	$ 63,700.00	7	112	$ 72,800.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	14	$ 245,000.00		14	$ 245,000.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	98	$ 81,830.00	7	112	$ 93,520.00
Analytical Laboratory (confirmation samples)	$ 255,154.00	LS		$ -	1	$ 255,154.00		$ -		$ -		1	$ 255,154.00
Analytical Laboratory (Landfarm ISM samples)	$ 8,074.50	LS		$ -		$ -	1	$ 8,074.50		$ -		1	$ 8,074.50
Analytical Laboratory (Baseline ISM samples)	$ 2,898.50	LS		$ -		$ -	1	$ 2,898.50		$ -		1	$ 2,898.50
Analytical Laboratory (pre-excavation sampling)	$ 23,981.25	LS		$ -	1	$ 23,981.25		$ -		$ -		1	$ 23,981.25
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**2**	**$ 279,135.25**	**2**	**$ 10,973.00**	**210**	**$ 390,530.00**	**14**	**242**	**$ 701,428.25**
Travel													
Meals / Incidentals	$ 113.00	day	98	$ 11,074.00	630	$ 71,190.00	196	$ 22,148.00	588	$ 66,444.00	98	1610	$ 181,930.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	98	$ 294,000.00	7	112	$ 336,000.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -	56	$ 4,746.00		$ -		$ -		56	$ 4,746.00
Travel Subtotal			**105**	**$ 32,074.00**	**686**	**$ 75,936.00**	**196**	**$ 22,148.00**	**686**	**$ 360,444.00**	**105**	**1778**	**$ 522,676.00**
Task Totals				$ 243,058.25		$ 2,220,744.78		$ 472,078.85		$ 1,654,071.91		$ 4,825,243.03	$ 4,825,243.03
Running Total by Task				$ 243,058.25		$ 2,463,803.02		$ 2,935,881.87		$ 4,589,953.78		**GRAND TOTAL**	**$ 4,825,243.03**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup. Site setup takes 7 days. All crew (14 people) and equipment used during this period.
3 Task 5.2 includes pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 98 days for one scientist, one archaeologist, one operator, one truck driver, and one laborer, overseen by field team lead.
4 Task 5.2 also includes grading and contouring of excavations along the way to minimize risk to animals and people in the area.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump feature.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the setup of the landspread area or areas, including baseline ISM sampling. This also includes management and operation of the landfarm while soils are being added to it. Assume a duration of 98 days for two operators.
8 Task 5.4 includes site and camp management activities. Assumes a duration of 98 days for superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
9 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
10 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
11 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (14 people) and equipment are used during this period.
12 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen is observed.
13 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
14 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
15 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
16 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observed.
17 Assume no liner will be placed below or on top of the landfarm.
18 Assume material used to build berms around the landfarm are from a local, clean source accessible by road.
19 Assume landfarm will be constructed to a depth of 2 feet and the tilling equipment can reach the full depth of the landfarm with each pass.
20 Assume moisture, pH, and C:N:P ratio are all within the limits amenable to biodegradation and no amendments are necessary.
21 Overall duration determined by excavation rate after startup, which is 100 cy per day.
22 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
23 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 6 - Tilling Field Effort

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2023 Rate	Unit	Task 6.1 Mobilization Units	Task 6.1 Mobilization Cost	Task 6.2 Landspread Amendments and Tilling Activities Units	Task 6.2 Cost	Task 6.3 ISM Sampling Activities Units	Task 6.3 Cost	Task 6.4 Maintenance and Survey Activities Units	Task 6.4 Cost	Task 6.5 Demobilization Units	Task 6.5 Cost	Total Units	Subtotal
Professional Labor														
Project Manager	$ 184.68	hour	4	$ 738.73	248	$ 45,801.53		$ -		$ -	4	$ 738.73	256	$ 47,278.99
Geospatial Specialist	$ 108.64	hour		$ -		$ -		$ -	84	$ 9,125.54	24	$ 2,607.30	108	$ 11,732.84
Scientist	$ 141.23	hour	48	$ 6,778.97		$ -	240	$ 33,894.87		$ -	48	$ 6,778.97	336	$ 47,452.81
Professional Land Surveyor	$ 119.50	hour		$ -		$ -		$ -	84	$ 10,038.10	24	$ 2,868.03	108	$ 12,906.12
Professional Labor Subtotal			**52**	**$ 7,517.71**	**248**	**$ 45,801.53**	**240**	**$ 33,894.87**	**168**	**$ 19,163.64**	**100**	**$ 12,993.03**	**808**	**$ 119,370.77**
Craft Labor														
Operator	$ 152.09	hour	24	$ 3,650.22	744	$ 113,156.71		$ -	72	$ 10,950.65	24	$ 3,650.22	864	$ 131,407.79
Laborer	$ 141.23	hour	24	$ 3,389.49	744	$ 105,074.09		$ -		$ -	24	$ 3,389.49	792	$ 111,853.06
Mechanic	$ 141.23	hour		$ -		$ -		$ -	84	$ 11,863.20	24	$ 3,389.49	108	$ 15,252.69
Craft Labor Subtotal			**48**	**$ 7,039.70**	**1488**	**$ 218,230.80**	**0**	**$ -**	**156**	**$ 22,813.85**	**72**	**$ 10,429.19**	**1764**	**$ 258,513.55**
Materials														
Material Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	10	$ 1,000.00		$ -		$ -	10	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day	10	$ 150.00	186	$ 2,790.00	20	$ 300.00	27	$ 405.00	16	$ 240.00	259	$ 3,885.00
EPL	$ 14,995.80	LS		$ -		$ -	1	$ 14,995.80		$ -		$ -	1	$ 14,995.80
Diesel	$ 3.75	gal	105.0	$ 393.75	7750.0	$ 29,062.50	50.0	$ 187.50	35.0	$ 131.25	105.0	$ 393.75	8045.0	$ 30,168.75
Maintenance supplies	$ 10.00	equip-day		$ -	124	$ 1,240.00		$ -		$ -		$ -	124	$ 1,240.00
Supplies Subtotal			**115.0**	**$ 543.75**	**8060.0**	**$ 33,092.50**	**81.0**	**$ 16,483.30**	**62.0**	**$ 536.25**	**121.0**	**$ 633.75**	**8439.0**	**$ 51,289.55**
Equipment														
Truck	$ 300.00	day	1	$ 300.00		$ -	10	$ 3,000.00	7	$ 2,100.00	1	$ 300.00	19	$ 5,700.00
Rentals	$ 6,902.00	week	0.6	$ 3,944.00		$ -	2.9	$ 19,720.00		$ -	0.6	$ 3,944.00	4.0	$ 27,608.00
Electric Bikes	$ 1,350.00	month		$ -	3	$ 4,050.00		$ -		$ -		$ -	3	$ 4,050.00
Equipment Subtotal			**1.6**	**$ 4,244.00**	**3**	**$ 4,050.00**	**12.9**	**$ 22,720.00**	**7**	**$ 2,100.00**	**1.6**	**$ 4,244.00**	**26.0**	**$ 37,358.00**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	2	$ 200.00		$ -		$ -	2	$ 200.00
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**2**	**$ 200.00**	**0**	**$ -**	**0**	**$ -**	**2**	**$ 200.00**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	2	$ 1,300.00	62	$ 40,300.00		$ -		$ -	2	$ 1,300.00	66	$ 42,900.00
Charter Flights (from Anchorage)	$ 17,500.00	LS		$ -	4	$ 70,000.00	1	$ 17,500.00	1	$ 17,500.00		$ -	6	$ 105,000.00
Analytical Laboratory (Post-Tilling ISM samples)	$ 8,074.50	each		$ -		$ -	1	$ 8,074.50		$ -		$ -	1	$ 8,074.50
Charter Flights (from Dutch Harbor)	$ 4,500.00	each	1	$ 4,500.00		$ -		$ -		$ -	1	$ 4,500.00	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**3**	**$ 5,800.00**	**66**	**$ 110,300.00**	**2**	**$ 25,574.50**	**1**	**$ 17,500.00**	**3**	**$ 5,800.00**	**75**	**$ 164,974.50**
Travel														
Meals / Incidentals	$ 113.00	day	5	$ 565.00	162	$ 18,306.00	20	$ 2,260.00	27	$ 3,051.00	8	$ 904.00	222	$ 25,086.00
Air Transport ANC-DUT	$ 650.00	RT	2.5	$ 1,625.00		$ -		$ -		$ -	4	$ 2,600.00	6.5	$ 4,225.00
Hotel DUT	$ 150.00	day	5	$ 750.00		$ -		$ -		$ -	8	$ 1,200.00	13	$ 1,950.00
Travel Per Diem DUT (75%)	$ 96.75	day	5	$ 483.75		$ -		$ -		$ -	8	$ 774.00	13	$ 1,257.75
Fort Glenn Lodge	$ 200.00	day		$ -	186	$ 37,200.00	20	$ 4,000.00	27	$ 5,400.00		$ -	233	$ 46,600.00
Travel Per Diem Fort Glenn (75%)	$ 84.75			$ -	24	$ 2,034.00		$ -		$ -		$ -	24	$ 2,034.00
Travel Subtotal			**17.5**	**$ 3,423.75**	**372**	**$ 57,540.00**	**40**	**$ 6,260.00**	**54**	**$ 8,451.00**	**28**	**$ 5,478.00**	**511.5**	**$ 81,152.75**
Task Totals				$ 28,568.91		$ 469,014.83		$ 105,132.67		$ 70,564.74		$ 39,577.97	$ 712,859.12	$ 712,859.12
Running Total by Task				$ 28,568.91		$ 497,583.74		$ 602,716.40		$ 673,281.14		$ 712,859.12	**GRAND TOTAL**	**$ 712,859.12**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours
2 Task 6.1 includes mobilization of one operator, one laborer, and one subcontracted cook. Includes setup of any necessary field equipment
3 Task 6.2 adding nutrients and amendments to the landfarm and conducting tilling activities to mix and aerate the soil. This will require one operator and one laborer
4 Task 6.2 will rotate out every month, so tilling occurs every other month. Soil will be turned over approximately 620 times every season with this schedule
5 Task 6.3 includes the collection of ISM samples from the landfarmed soil. This will require two technical staff. Assume one ISM sample per 1,000 cy of soil as well as the appropriate QC sampling
6 Crew for Task 6.4 will mobilize out at the beginning of the season, and mobilize out 10 days later with analytical samples. They will mobilize out again 10 days before demob, and recollect samples to measure progress; they will demobilize with the rest of the crew
7 Task 6.4 includes the teardown of any field gear and maintenance, site restoration activities as necessary and survey activities of landfarm boundaries, ISM sample locations, and any other pertinent site features
8 Survey team and mechanic onsite during Task 6.4 for 1 week prior to demob, and leave with the rest of the crew
9 Task 6.5 includes the demobilization of all field personnel and equipment from the site, with the exception of the dozer/tiller, which will remain on-island
10 Assume monthly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, and resupply

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TASK 7 - Technical Memorandum			Task 7.1			
			Annual Tech Memo		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**		
Professional Labor						
Project Manager	$ 184.68	hour	16	$ 2,954.94	16	$ 2,954.94
Geospatial Specialist	$ 108.64	hour	68	$ 7,387.34	68	$ 7,387.34
Engineer	$ 141.23	hour	48	$ 6,778.97	48	$ 6,778.97
Scientist	$ 141.23	hour	68	$ 9,603.55	68	$ 9,603.55
Project Chemist	$ 108.64	hour	48	$ 5,214.59	48	$ 5,214.59
Tech Editor	$ 152.09	hour	20	$ 3,041.85	20	$ 3,041.85
Archaeologist	$ 228.14	hour	16	$ 3,650.22	16	$ 3,650.22
Professional Labor Subtotal			**284**	**$ 38,631.46**	**284**	**$ 38,631.46**
Craft Labor						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**
Materials						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**
Supplies						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**
Equipment						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**
Other Direct Costs						
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**
Travel						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**
Task Totals				$ 38,631.46	$ 38,631.46	$ 38,631.46
Running Total by Task				$ 38,631.46	**GRAND TOTAL**	**$ 38,631.46**

Basis of Estimate:

1 This is a technical memorandum that will be written at the end of each interim field season to document the tasks that were completed and summarize the remaining work. It will be submitted as a PDF only.

2 Level of effort based on USACE-AK District and stakeholder review.

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TASK 8 - Mobilization/Demobilization #2			Task 8.1		Task 8.2		Task 8.3		Task 8.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2026 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor												
Project Manager	$ 200.64	hour	40	$ 8,025.42	8	$ 1,605.08	8	$ 1,605.08	20	$ 4,012.71	76	$ 15,248.29
Contract Manager	$ 165.23	hour	16	$ 2,643.67		$ -		$ -	8	$ 1,321.83	24	$ 3,965.50
Material Expeditor	$ 82.61	hour	40	$ 3,304.58		$ -		$ -	20	$ 1,652.29	60	$ 4,956.88
Engineer	$ 153.43	hour	24	$ 3,682.25	24	$ 3,682.25	24	$ 3,682.25	12	$ 1,841.13	84	$ 12,887.88
Scientist	$ 153.43	hour	40	$ 6,137.08		$ -		$ -	20	$ 3,068.54	60	$ 9,205.63
Construction Manager	$ 165.23	hour	40	$ 6,609.17	24	$ 3,965.50	24	$ 3,965.50	20	$ 3,304.58	108	$ 17,844.75
Superintendent	$ 177.03	hour		$ -	24	$ 4,248.75	24	$ 4,248.75		$ -	48	$ 8,497.50
Professional Labor Subtotal			**200**	**$ 30,402.17**	**80**	**$ 13,501.58**	**80**	**$ 13,501.58**	**100**	**$ 15,201.08**	**460**	**$ 72,606.42**
Craft Labor												
Operator	$ 147.95	hour		$ -	72	$ 10,652.38	72	$ 10,652.38		$ -	144	$ 21,304.77
Laborer	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Truck Driver	$ 105.68	hour		$ -	24	$ 2,536.28	24	$ 2,536.28		$ -	48	$ 5,072.56
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**144**	**$ 19,783.00**	**144**	**$ 19,783.00**	**0**	**$ -**	**288**	**$ 39,565.99**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	22	$ 330.00	22	$ 330.00		$ -	44	$ 660.00
Supplies Subtotal			**0**	**$ -**	**22**	**$ 330.00**	**22**	**$ 330.00**	**0**	**$ -**	**44**	**$ 660.00**
Equipment												
1 200 Excavator	$ 10,900.00	week		$ -	1	$ 10,900.00	1	$ 10,900.00		$ -	2	$ 21,800.00
1 960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
1 15-yard Rock Truck	$ 12,900.00	week		$ -	1	$ 12,900.00	1	$ 12,900.00		$ -	2	$ 25,800.00
3 UTV	$ 3,360.00	week		$ -	3	$ 10,080.00	3	$ 10,080.00		$ -	6	$ 20,160.00
1 Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Rentals (1 wk rental to cover mob/demob)	$ 7,802.00	LS		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
1 Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11 Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1 Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
Maintenance tools	$ 812.50	week			1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
1 750 Dozer	$ 20,300.00	week		$ -	1	$ 20,300.00	1	$ 20,300.00		$ -	2	$ 40,600.00
Equipment Subtotal			**0**	**$ -**	**24**	**$ 98,024.50**	**24**	**$ 98,024.50**	**0**	**$ -**	**48**	**$ 196,049.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Other Direct Costs Subtotal			**0**	**$ -**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**26**	**$ 22,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	2	$ 9,000.00	2	$ 9,000.00		$ -	4	$ 18,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**9**	**$ 288,960.00**	**9**	**$ 288,960.00**	**0**	**$ -**	**18**	**$ 577,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	11	$ 1,243.00	11	$ 1,243.00		$ -	22	$ 2,486.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	5.5	$ 3,575.00	5.5	$ 3,575.00		$ -	11	$ 7,150.00
Hotel DUT	$ 150.00	day		$ -	11	$ 1,650.00	11	$ 1,650.00		$ -	22	$ 3,300.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	11	$ 1,064.25	11	$ 1,064.25		$ -	22	$ 2,128.50
Travel Subtotal			**0**	**$ -**	**38.5**	**$ 7,532.25**	**38.5**	**$ 7,532.25**	**0**	**$ -**	**77**	**$ 15,064.50**
Task Totals				$ 30,402.17		$ 439,181.33		$ 439,181.33		$ 15,201.08	$ 923,965.91	$ 923,965.91
Running Total by Task				$ 30,402.17		$ 469,583.50		$ 908,764.83		$ 923,965.91	**GRAND TOTAL**	**$ 923,965.91**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 11 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.
4 Tundra mats originate in Fairbanks.

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site setup		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2026 Rate	Unit			Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor														
Project Manager	$ 200.64	hour	14	$ 2,808.90	65.3	$ 13,108.18	65.3	$ 13,108.18	65.3	$ 13,108.18	14	$ 2,808.90	224.0	$ 44,942.33
Geospatial Specialist	$ 118.02	hour		$ -		$ -	84	$ 9,913.75		$ -		$ -	84	$ 9,913.75
Engineer	$ 153.43	hour	84	$ 12,887.88	1,176	$ 180,430.25		$ -		$ -	84	$ 12,887.88	1,344	$ 206,206.01
Scientist	$ 153.43	hour		$ -		$ -	84	$ 12,887.88		$ -		$ -	84	$ 12,887.88
Professional Land Surveyor	$ 129.82	hour		$ -		$ -	84	$ 10,905.13		$ -		$ -	84	$ 10,905.13
Construction Manager	$ 165.23	hour	84	$ 13,879.25		$ -		$ -	1,176	$ 194,309.50	84	$ 13,879.25	1344	$ 222,068.01
Superintendent	$ 177.03	hour	84	$ 14,870.63		$ -		$ -	1,176	$ 208,188.76	84	$ 14,870.63	1,344	$ 237,930.01
Professional Labor Subtotal			**266**	**$ 44,446.65**	**1,241**	**$ 193,538.44**	**317.3**	**$ 46,814.93**	**2,417**	**$ 415,606.44**	**266**	**$ 44,446.65**	**4,508.0**	**$ 744,853.10**
Craft Labor														
Operator	$ 147.95	hour	252	$ 37,283.34	3,528	$ 521,966.75		$ -		$ -	252	$ 37,283.34	4,032	$ 596,533.43
Laborer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1,176	$ 161,561.14	84	$ 11,540.08	1,344	$ 184,641.30
Truck Driver	$ 105.68	hour	84	$ 8,876.99	1,176	$ 124,277.80		$ -		$ -	84	$ 8,876.99	1,344	$ 142,031.77
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	1,176	$ 161,561.14	84	$ 11,540.08	1,344	$ 184,641.30
Craft Labor Subtotal			**504**	**$ 69,240.49**	**4,704**	**$ 646,244.55**	**0**	**$ -**	**2,352**	**$ 323,122.28**	**504**	**$ 69,240.49**	**8,064**	**$ 1,107,847.80**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
EPL	$ 14,995.80	LS		$ -		$ -		$ -	1	$ 14,995.80		$ -	1	$ 14,995.80
Health and Safety/PPE	$ 15.00	man-day	77	$ 1,155.00	490	$ 7,350.00	21	$ 315.00	588	$ 8,820.00	77	$ 1,155.00	1,253	$ 18,795.00
Gasoline	$ 4.00	gal	105	$ 420.00	490	$ 1,960.00	490	$ 1,960.00	490	$ 1,960.00	105	$ 420.00	1,680	$ 6,720.00
Diesel	$ 3.75	gal	2,245.8	$ 8,421.88	19,600.0	$ 73,500.00	0.0	$ -	11,841.7	$ 44,406.25	2,245.8	$ 8,421.88	35,933.3	$ 134,750.00
Maintenance supplies	$ 10.00	equip-day	56	$ 560.00	588	$ 5,880.00		$ -	196	$ 1,960.00	56	$ 560.00	896	$ 8,960.00
Supplies Subtotal			**2483.8**	**$ 10,556.88**	**21168.0**	**$ 88,690.00**	**511.0**	**$ 2,275.00**	**13,116.7**	**$ 72,142.05**	**2,483.8**	**$ 10,556.88**	**39,763.3**	**$ 184,220.80**
Equipment														
1 200 Excavator	$ 6,500.00	month	0.2	$ 1,516.67	3.3	$ 21,233.33		$ -		$ -	0.2	$ 1,516.67	3.7	$ 24,266.67
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33	3.3	$ 25,806.67		$ -		$ -	0.2	$ 1,843.33	3.7	$ 29,493.33
1 15-yard Rock Truck	$ 12,900.00	month	0.2	$ 3,010.00	3.3	$ 42,140.00		$ -		$ -	0.2	$ 3,010.00	3.7	$ 48,160.00
3 UTV	$ 3,360.00	month	0.7	$ 2,352.00	3.3	$ 10,976.00	3.3	$ 10,976.00	3.3	$ 10,976.00	0.7	$ 2,352.00	11.2	$ 37,632.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	3.3	$ 11,923.33	0.2	$ 851.67	3.7	$ 13,626.67
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	3.3	$ 1,633.33	0.2	$ 116.67	3.7	$ 1,866.67
Rentals	$ 23,371.00	month	0.2	$ 5,453.23		$ -		$ -	3.3	$ 76,345.27	0.2	$ 5,453.23	3.7	$ 87,251.73
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	3.3	$ 24,173.33	0.2	$ 1,726.67	3.7	$ 27,626.67
11 Shipping Container	$ 15.00	month	2.6	$ 38.50		$ -		$ -	35.9	$ 539.00	2.6	$ 38.50	41.1	$ 616.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	3.3	$ 32,340.00		$ -		$ -	0.2	$ 2,310.00	3.7	$ 36,960.00
Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	3.3	$ 66,150.00		$ -		$ -	0.2	$ 4,725.00	3.7	$ 75,600.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00
Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	3.3	$ 10,616.67	0.2	$ 758.33	3.7	$ 12,133.33
1 (1) 750 Dozer	$ 7,900.00	month	0.2	$ 1,843.33	3.3	$ 25,806.67		$ -		$ -	0.2	$ 1,843.33	3.7	$ 29,493.33
Equipment Subtotal			**5.8**	**$ 26,545.40**	**22.9**	**$ 224,452.67**	**3.3**	**$ 10,976.00**	**56.5**	**$ 137,206.93**	**5.8**	**$ 26,545.40**	**94.3**	**$ 425,726.40**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	1	$ 100.00		$ -		$ -	1	$ 100.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	3.3	$ 41,813.33		$ -	3.3	$ 41,813.33
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**0**	**$ -**	**1**	**$ 100.00**	**3.3**	**$ 41,813.33**	**0**	**$ -**	**5.3**	**$ 49,682.33**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	98	$ 63,700.00	7	$ 4,550.00	112	$ 72,800.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	14	$ 245,000.00		$ -	14	$ 245,000.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	98	$ 81,830.00	7	$ 5,845.00	112	$ 93,520.00
Analytical Laboratory (Post Treatment ISM)	$ 2,898.50			$ -		$ -	1	$ 2,898.50		$ -		$ -	1	$ 2,898.50
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**0**	**$ -**	**1**	**$ 2,898.50**	**210**	**$ 390,530.00**	**14**	**$ 10,395.00**	**239**	**$ 414,218.50**

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site setup		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	**2026 Rate**	**Unit**			**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel														
Meals / Incidentals	$ 113.00	day	77	$ 8,701.00	490	$ 55,370.00	15	$ 1,695.00	588	$ 66,444.00	77	$ 8,701.00	1247	$ 140,911.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	98	$ 294,000.00	7	$ 21,000.00	112	$ 336,000.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -		$ -	6	$ 508.50		$ -		$ -	6	$ 508.50
Travel Subtotal			**84**	**$ 29,701.00**	**490**	**$ 55,370.00**	**21**	**$ 2,203.50**	**686**	**$ 360,444.00**	**84**	**$ 29,701.00**	**1,365**	**$ 477,419.50**
Task Totals				$ 198,654.41		$ 1,208,295.65		$ 65,267.93		$ 1,740,865.03		$ 190,885.41	$ 3,403,968.44	$ 3,403,968.44
Running Total by Task				$ 198,654.41		$ 1,406,950.06		$ 1,472,218.00		$ 3,213,083.03		$ 3,403,968.44	**GRAND TOTAL**	**$ 3,403,968.44**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 9.1 includes site setup. Site setup takes 7 days. All crew (11 people) and equipment used during this period.
3 Task 9.2 includes backfill of treated material, and grading. Assumes a duration of 98 days for three operators, truck driver, and field team lead.
4 Task 9.3 includes ISM sampling of treatment area after soil backfilling, as well as survey activities. Assume a duration of 7 days for one scientist and the survey team.
5 Crew for Task 9.3 mobilizes and demobilizes from the site on the last two resupply air charters.
6 Task 9.4 includes site and camp management activities. Assumes a duration of 98 days for superintendent, mechanic, camp manager, subcontracted camp cook, and subcontracted EMT
7 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
8 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
9 Task 9.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (11 people) and equipment are used during this period.
10 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
11 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
12 Overall duration determined by backfill rate after startup, which is 100 cy per day.

TASK 10 - Reporting			Task 10.1		Task 10.2		Task 10.3		Task 10.4		Task 10.5		Task 10.6		Task 10.7		Task 10.8		Task 10.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate	2027 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 206.25	hour	40	$ 8,250.13	8	$ 1,650.03	10	$ 2,062.53	5	$ 1,031.27	5	$ 1,031.27	2	$ 412.51	2	$ 412.51	2	$ 412.51		$ -	74	$ 15,262.74
Geospatial Specialist	$ 121.33	hour	160	$ 19,412.07	32	$ 3,882.41	40	$ 4,853.02	20	$ 2,426.51	20	$ 2,426.51	4	$ 485.30	4	$ 485.30		$ -		$ -	280	$ 33,971.12
Engineer	$ 157.72	hour	120	$ 18,926.77	24	$ 3,785.35	30	$ 4,731.69	15	$ 2,365.85	15	$ 2,365.85		$ -		$ -		$ -		$ -	204	$ 32,175.50
Scientist	$ 157.72	hour	180	$ 28,390.15	36	$ 5,678.03	45	$ 7,097.54	23	$ 3,627.63	23	$ 3,627.63		$ -		$ -		$ -		$ -	307	$ 48,420.98
Project Chemist	$ 121.33	hour	140	$ 16,985.56	28	$ 3,397.11	35	$ 4,246.39	18	$ 2,183.86	18	$ 2,183.86		$ -		$ -		$ -		$ -	239	$ 28,996.78
Tech Editor	$ 169.86	hour	40	$ 6,794.22		$ -	24	$ 4,076.53		$ -	24	$ 4,076.53		$ -	60	$ 10,191.34		$ -		$ -	148	$ 25,138.63
Archaeologist	$ 254.78	hour	140	$ 35,669.67	28	$ 7,133.93	35	$ 8,917.42	18	$ 4,586.10	18	$ 4,586.10	120	$ 30,574.01	120	$ 30,574.01	16	$ 4,076.53	24	$ 6,114.80	519	$ 132,232.58
Professional Labor Subtotal			**820**	**$ 134,428.57**	**156**	**$ 25,526.87**	**219**	**$ 35,985.12**	**99**	**$ 16,221.21**	**123**	**$ 20,297.74**	**126**	**$ 31,471.81**	**186**	**$ 41,663.15**	**18**	**$ 4,489.04**	**24**	**$ 6,114.80**	**1771**	**$ 316,198.31**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 134,468.57		$ 25,526.87		$ 36,045.12		$ 16,221.21		$ 20,357.74		$ 31,471.81		$ 41,663.15		$ 14,489.04		$ 7,114.80	$ 327,358.31	$ 327,358.31
Running Total by Task				$ 134,468.57		$ 159,995.43		$ 196,040.55		$ 212,261.76		$ 232,619.50		$ 264,091.32		$ 305,754.47		$ 320,243.51		$ 327,358.31	**GRAND TOTAL**	**$ 327,358.31**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/25	110	100	11,000	Excavation/backfill operations
8/26	9/1	7	0	0	Teardown and site restoration
			Max excavation/backfill per year per team	11,000	
			Low volume estimate of soil (cy)	9,790	
			Excavation/Backfill Teams required	1	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season.
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team

Treatment Duration
Assume tilling starts on 1 May, and ends 1 September of each field season; every other month during this duration
Treatment rate is estimated at 3 years with constant tilling and no amendment additions

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting 1 May to 21 August with 1 week setup, 1 week teardown.
2023	Tech memo for 2022 field effort; tilling field effort: onsite starting 1 May to 1 September
2024	Tech memo for 2023 field effort; tilling field effort: onsite starting 1 May to 1 September
2025	Tech memo for 2024 field effort; tilling field effort: onsite starting 1 May to 1 September
2026	Tech memo for 2025 field effort; backfill field effort: onsite starting 1 May to 21 August with 1 week setup, 1 week teardown
2027	Project reporting

Total duration 84 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	8/13/22	98	100	9,800	Excavation operations
8/14/22	8/20/22	7	0	0	Teardown and site restoration
			Total treated volume	9,790	
			Total field duration	112	
			Number of resupply flights	14	

2023 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/23	9/1/23	124	Tilling operations

Total field duration 124
Number of resupply flights 4

2024 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/24	9/1/24	124	Tilling operations

Total field duration 124
Number of resupply flights 4

2025 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/25	9/1/25	124	Tilling operations

Total field duration 124
Number of resupply flights 4

2026 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/26	5/7/26	7	0	0	Setup and site access
5/8/26	8/13/26	98	100	9,800	Backfill operations
8/14/26	8/20/26	7	0	0	Teardown and site restoration

Total treated volume 9,790
Total field duration 112
Number of resupply flights 14

Excavation Field Effort
Personnel

3	Operators	
1	Truck drivers	
1	Arch	
2	Laborer	Includes housekeeper
1	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate

Excavation Team	6	people
Landfarm Team	2	people
Support Team	6	people
Total Excavation Crew	14	people
Survey Team	2	people

All personnel will stay in Fort Glenn Lodge

Tilling Field Effort

1	Operator	
1	Laborer	
1	Cook	subcontracted
1	Surveyor	
1	Assistant surveyor	geospatial specialist rate
1	Mechanic	
2	Scientist	

Landfarm Team	2	people
Support Team	1	people
Total Crew	3	people
Survey Team	2	people
Mechanic	1	people
Sampling Team	2	people

All personnel will stay in Fort Glenn Lodge

Backfill Field Effort
Personnel

3	Operators	
1	Truck drivers	
1	Laborer	Includes housekeeper
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate
1	Scientist	

Backfill Team	5	people
Support Team	6	people
Total Excavation Crew	11	people
Survey Team	2	people
Sample Team	1	person

All personnel will stay in Fort Glenn Lodge

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Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
200 Excavator	25	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge
Truck	5	Rented from lodge, assume diesel truck
Total gal 2022	39,667	
Total gal 2023	15,845	
Total gal 2024	15,845	
Total gal 2025	15,845	
Total gal 2026	35,933	

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total	
UTV (excavation)	5	4	20	
UTV (backfill)	5	3	15	
		Total gal 2,022	2,240	2x 2,000 gal with mob
		Total gal 2,026	1,680	1x 2,000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	Notes
15000-gal AST at Lodge	15000	1	15,000	
25,000-gal AST rental	25000	2	50,000	onsite for excavation and backfill only
		Total volume	65,000	
		Number fueling trips required 2022	0	
		Number fueling trips required 2023	0	
		Number fueling trips required 2024	0	
		Number fueling trips required 2025	0	
		Number fueling trips required 2026	0	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully.

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ 300.00	day	Rented from lodge
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	Assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	Heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Purchase

Description	Rate	Unit	Notes
D6 Dozer	$ 430,000.00	each	
24" Root Rake for front blade	$ 5,450.00	each	
Root Rake Shipping	$ 2,000.00	each	
Multi-Shank Ripper Attachment	$ 20,000.00	each	
Dozer with Tilling Equipment	$ 457,450.00	LS	Purchase to leave on island for tilling

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Low Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	15	1	2	1	20	$199.50	$3,591.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	15	1	2	0	19	$236.25	$4,016.25	
Pesticides	SW8081	Confirmation	SO	24 hr	15	1	2	0	19	$231.00	$3,927.00	
GRO	AK101	Confirmation	SO	24 hr	15	1	2	1	20	$115.50	$2,079.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	15	1	2	0	19	$136.50	$2,320.50	
PCBs	SW8082	Confirmation	SO	24 hr	15	1	2	0	19	$147.00	$2,499.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	15	1	2	0	19	$220.50	$3,748.50	
									SUBTOTAL =		$22,181.25	$22,181.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$1,800.00	$1,800.00
									TOTAL =		$23,981.25	$23,981.25
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	287	15	29	15	361	$199.50	$66,034.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	287	15	29	0	346	$236.25	$74,655.00	
GRO	AK101	Confirmation	SO	24 hr	287	15	29	15	361	$115.50	$38,230.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	287	15	29	0	346	$136.50	$43,134.00	
									SUBTOTAL =		$222,054.00	$222,054.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$33,100.00	$33,100.00
									TOTAL =		$255,154.00	$255,154.00
ISM Baseline Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Baseline Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Landspread ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Landspread ISM	SO	24 hr	2	1	2	1	7	$115.50	$577.50	
DRO/RRO	AK102/103	Landspread ISM	SO	24 hr	2	1	2	0	6	$136.50	$546.00	
									SUBTOTAL =		$2,398.50	$2,398.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,898.50	$2,898.50
ISM Sampling of Landfarm Soil - Post-Tilling (annually)												
ISM PREP	ITRC	Landspread ISM	SO	14 day	10	1	2	0	14	$95.00	$1,140.00	**ISM Sampling of Landfarm Soil - Post-Tilling (annually)**
VOCs	SW8260D	Landspread ISM	SO	14 day	10	1	2	1	15	$95.00	$1,235.00	
PAH	SW8270C	Landspread ISM	SO	14 day	10	1	2	0	14	$105.00	$1,260.00	
GRO	AK101	Landspread ISM	SO	24 hr	10	1	2	1	15	$115.50	$1,501.50	
DRO/RRO	AK102/103	Landspread ISM	SO	24 hr	10	1	2	0	14	$136.50	$1,638.00	
									SUBTOTAL =		$6,774.50	$6,774.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$1,300.00	$1,300.00
									TOTAL =		$8,074.50	$8,074.50
ISM Post-Treatment Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	2	1	2	0	6	$95.00	$380.00	**ISM Post-Treatment Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	2	1	2	1	7	$95.00	$475.00	
PAH	SW8270C	Landspread ISM	SO	14 day	2	1	2	0	6	$105.00	$420.00	
GRO	AK101	Landspread ISM	SO	24 hr	2	1	2	1	7	$115.50	$577.50	
DRO/RRO	AK102/103	Landspread ISM	SO	24 hr	2	1	2	0	6	$136.50	$546.00	
									SUBTOTAL =		$2,398.50	$2,398.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$500.00	$500.00
									TOTAL =		$2,898.50	$2,898.50
									GRAND TOTAL =		$293,006.75	$293,006.75

Notes:
Assume no equipment blanks will be required for this project.
Assume ISM triplicate samples will be collected 1 per 10 primary samples.
Assume ISM samples will be collected from contaminated soil at a frequency of 1 per 1,000 cy.
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
Shipping/courier fees not included in laboratory pricing.
5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

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Empty, Crush, and Dispose of Approximately 2,554 drums

Field Duration 126 days

Equipment	Rate	Number	Unit	Total	
Open-top containers	$ 15.00	9	day	$ 17,010.00	
Overpacks	$ 175.00	15	each	$ 2,625.00	
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00	
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00	
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00	
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00	per 40-foot container
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00	
Container Transport Cost	$ 300.00	9	each	$ 2,700.00	
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00	
			Total	**$ 312,275.00**	

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Gallon Freezer Bags (14)	5	box	$ 9.95	$ 49.75
Quart Freezer Bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Setup	$5,800.00	
Travel Costs for Setup Crew	$500.00	
Food Costs for Setup Crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rentals

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,247.00**	**$ 7,802.00**	**$ 23,371.00**	**$ 1,114.57**

ALTERNATIVE 5
PROJECT 02 LANDFARMING – MIDDLE ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 142,861	$ 142,861	2021	$ 142,861
Task 2	Planning Documents	1	Job	$ 127,067	$ 127,067	2021	$ 127,067
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization #1	1	Job	$ 1,640,837	$ 1,640,837	2022	$ 1,596,145
Task 5	Excavation Field Effort	1	Job	$ 6,683,108	$ 6,683,108	2022	$ 6,501,078
Task 6A	Tilling Field Effort	1	Job	$ 1,120,080	$ 1,120,080	2023	$ 1,059,895
Task 7A	Technical Memorandum	1	Job	$ 38,631	$ 38,631	2023	$ 36,556
Task 6B	Tilling Field Effort	1	Job	$ 1,151,443	$ 1,151,443	2024	$ 1,059,895
Task 7B	Technical Memorandum	1	Job	$ 39,713	$ 39,713	2024	$ 36,556
Task 6C	Tilling Field Effort	1	Job	$ 1,183,683	$ 1,183,683	2025	$ 1,059,895
Task 7C	Technical Memorandum	1	Job	$ 40,825	$ 40,825	2025	$ 36,556
Task 8	Mobilization/Demobilization #2	1	Job	$ 1,100,272	$ 1,100,272	2026	$ 958,373
Task 9	Backfilling Field Effort	1	Job	$ 3,625,487	$ 3,625,487	2026	$ 3,157,918
Task 10	Reporting	1	Job	$ 356,816	$ 356,816	2027	$ 302,333
				TOTAL	**$ 17,299,589**	**Total Net Present Worth Cost**	**$ 16,123,892**
				Total per Cubic Yard	**$ 754**	**Total per Cubic Yard**	**$ 703**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate		2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor										
	Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
	Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
	Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
	Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
	Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
	Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
	Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
	Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
	Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
	Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
	Professional Labor Subtotal									
Craft Labor										
	Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
	Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
	Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
	Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1 - Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	42	$ 9,066.96	42	$ 9,066.96		$ -	84	$ 18,133.92
Project Manager	$ 174.76	hour	184	$ 32,155.84	84	$ 14,679.84	21	$ 3,669.96	289	$ 50,505.64
Contract Manager	$ 143.92	hour		$ -	84	$ 12,089.28		$ -	84	$ 12,089.28
Project Controls	$ 195.32	hour		$ -	168	$ 32,813.76	21	$ 4,101.72	189	$ 36,915.48
Administrative Assistant	$ 92.52	hour		$ -	84	$ 7,771.68	21	$ 1,942.92	105	$ 9,714.60
Engineer	$ 133.64	hour	116	$ 15,502.24		$ -		$ -	116	$ 15,502.24
Professional Labor Subtotal			**342**	**$ 56,725.04**	**462**	**$ 76,421.52**	**63**	**$ 9,714.60**	**867**	**$ 142,861.16**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 56,725.04		$ 76,421.52		$ 9,714.60	$ 142,861.16	$ 142,861.16
Running Total by Task				$ 56,725.04		$ 133,146.56		$ 142,861.16	**GRAND TOTAL**	**$ 142,861.16**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 7 reports total
4 PoP=84 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	2021 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																
Project Manager	$ 174.76	hour	8	$ 1,398.08	50	$ 8,738.00	10	$ 1,747.60	13	$ 2,271.88	7	$ 1,223.32	7	$ 1,223.32	95	$ 16,602.20
Project Controls	$ 195.32	hour	8	$ 1,562.56		$ -		$ -		$ -		$ -		$ -	8	$ 1,562.56
Geospatial Specialist	$ 102.80	hour		$ -	50	$ 5,140.00	10	$ 1,028.00	13	$ 1,336.40	7	$ 719.60	7	$ 719.60	87	$ 8,943.60
Engineer	$ 133.64	hour		$ -	100	$ 13,364.00	20	$ 2,672.80	25	$ 3,341.00	13	$ 1,737.32	13	$ 1,737.32	171	$ 22,852.44
Scientist	$ 133.64	hour		$ -	110	$ 14,700.40	22	$ 2,940.08	28	$ 3,741.92	14	$ 1,870.96	14	$ 1,870.96	188	$ 25,124.32
Regulatory Specialist	$ 215.88	hour		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Project Chemist	$ 102.80	hour		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Tech Editor	$ 143.92	hour		$ -	32	$ 4,605.44		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	72	$ 10,362.24
Archaeologist	$ 215.88	hour		$ -	32	$ 6,908.16	7	$ 1,511.16	8	$ 1,727.04	4	$ 863.52	4	$ 863.52	55	$ 11,873.40
Safety Officer	$ 154.20	hour		$ -	16	$ 2,467.20	4	$ 616.80	4	$ 616.80	2	$ 308.40	2	$ 308.40	28	$ 4,317.60
Professional Labor Subtotal			**16**	**$ 2,960.64**	**490**	**$ 70,726.40**	**93**	**$ 13,477.08**	**136**	**$ 19,614.24**	**60**	**$ 8,624.92**	**80**	**$ 11,503.32**	**875**	**$ 126,906.60**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 2,960.64		$ 70,766.40		$ 13,477.08		$ 19,674.24		$ 8,624.92		$ 11,563.32	$ 127,066.60	$ 127,066.60
Running Total by Task				$ 2,960.64		$ 73,727.04		$ 87,204.12		$ 106,878.36		$ 115,503.28		$ 127,066.60	**GRAND TOTAL**	**$ 127,066.60**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor		**153.4271**												
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00			10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes two-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization #1				Task 4.1		Task 4.2		Task 4.3		Task 4.4			
				Pre-Mobilizations /		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate		2022 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor													
	Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
	Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
	Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
	Geospatial Specialist	$ 105.68	hour		$ -	24	$ 2,536.28	24	$ 2,536.28		$ -	48	$ 5,072.56
	Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
	Scientist	$ 137.38	hour	40	$ 5,495.28	72	$ 9,891.50	72	$ 9,891.50	20	$ 2,747.64	204	$ 28,025.91
	Professional Land Surveyor	$ 116.25	hour		$ -	24	$ 2,789.91	24	$ 2,789.91		$ -	48	$ 5,579.82
	Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
	Archaeologist	$ 221.92	hour		$ -	72	$ 15,978.57	72	$ 15,978.57		$ -	144	$ 31,957.15
	Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
	Professional Labor Subtotal			**200**	**$ 27,222.76**	**272**	**$ 43,285.87**	**272**	**$ 43,285.87**	**100**	**$ 13,611.38**	**844**	**$ 127,405.88**
Craft Labor													
	Operator	$ 147.95	hour		$ -	120	$ 17,753.97	120	$ 17,753.97		$ -	240	$ 35,507.94
	Laborer	$ 137.38	hour		$ -	96	$ 13,188.66	96	$ 13,188.66		$ -	192	$ 26,377.33
	Truck Driver	$ 105.68	hour		$ -	72	$ 7,608.84	72	$ 7,608.84		$ -	144	$ 15,217.69
	Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
	Craft Labor Subtotal			**0**	**$ -**	**312**	**$ 41,848.65**	**312**	**$ 41,848.65**	**0**	**$ -**	**624**	**$ 83,697.29**
Materials													
	Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies													
	Health and Safety/PPE	$ 15.00	man-day		$ -	52	$ 780.00	52	$ 780.00		$ -	104	$ 1,560.00
	Supplies Subtotal			**0**	**$ -**	**52**	**$ 780.00**	**52**	**$ 780.00**	**0**	**$ -**	**104**	**$ 1,560.00**
Equipment													
4	350 Excavator	$ 10,900.00	week		$ -	4	$ 43,600.00	4	$ 43,600.00		$ -	8	$ 87,200.00
1	960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
3	15-yard Rock Truck	$ 12,900.00	week		$ -	3	$ 38,700.00	3	$ 38,700.00		$ -	6	$ 77,400.00
5	UTV	$ 3,360.00	week		$ -	5	$ 16,800.00	5	$ 16,800.00		$ -	10	$ 33,600.00
1	Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1	2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
3	Rentals (1 wk rental to cover mob/demob)	$ 7,802.00	LS		$ -	3	$ 23,406.00	3	$ 23,406.00		$ -	6	$ 46,812.00
1	Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11	Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1	Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
1	Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
1	Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
	Equipment Subtotal			**0**	**$ -**	**33**	**$ 158,548.50**	**33**	**$ 158,548.50**	**0**	**$ -**	**66**	**$ 317,097.00**
Other Direct Costs													
1	Dozer with Tilling Equipment	$ 457,450.00	LS	1	$ 457,450.00		$ -		$ -		$ -	1	$ 457,450.00
	Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
	Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
	Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
	Other Direct Costs Subtotal			**1**	**$ 457,450.00**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**27**	**$ 479,550.00**
Subcontractors/Vendors													
	Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
	Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
	Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
	EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
	Charter Flights	$ 4,500.00	each		$ -	4	$ 18,000.00	4	$ 18,000.00		$ -	8	$ 36,000.00
	Subcontractors/Vendors Subtotal			**0**	**$ -**	**11**	**$ 297,960.00**	**11**	**$ 297,960.00**	**0**	**$ -**	**22**	**$ 595,920.00**

TASK 4 - Mobilization/Demobilization #1			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations /		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel												
Meals / Incidentals	$ 113.00	day		$ -	26	$ 2,938.00	26	$ 2,938.00		$ -	52	$ 5,876.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	13	$ 8,450.00	13	$ 8,450.00		$ -	26	$ 16,900.00
Hotel DUT	$ 150.00	day		$ -	26	$ 3,900.00	26	$ 3,900.00		$ -	52	$ 7,800.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	26	$ 2,515.50	26	$ 2,515.50		$ -	52	$ 5,031.00
Travel Subtotal			**0**	**$ -**	**91**	**$ 17,803.50**	**91**	**$ 17,803.50**	**0**	**$ -**	**182**	**$ 35,607.00**
Task Totals				$ 484,672.76		$ 571,276.52		$ 571,276.52		$ 13,611.38	$ 1,640,837.17	$ 1,640,837.17
Running Total by Task				$ 484,672.76		$ 1,055,949.27		$ 1,627,225.79		$ 1,640,837.17	**GRAND TOTAL**	**$ 1,640,837.17**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 14 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Excavation Field Effort

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	2022 Rate	Unit	Task 5.1 Site setup Units	Task 5.1 Site setup Cost	Task 5.2 Excavation and Sampling Activities Units	Task 5.2 Excavation and Sampling Activities Cost	Task 5.3 Landfarm setup and Tilling Activities Units	Task 5.3 Landfarm setup and Tilling Activities Cost	Task 5.4 Site Management Activities Units	Task 5.4 Site Management Activities Cost	Task 5.5 Site Breakdown and Restoration Activities Units	Task 5.5 Site Breakdown and Restoration Activities Cost	Total Units	Subtotal
Professional Labor														
Project Manager	$ 179.65	hour	14	$ 2,515.15	51.3	$ 9,222.20	51.3	$ 9,222.20	51.3	$ 9,222.20	14	$ 2,515.15	182.0	$ 32,696.90
Geospatial Specialist	$ 105.68	hour	84	$ 8,876.99	924	$ 97,646.84		$ -		$ -	84	$ 8,876.99	1092	$ 115,400.81
Engineer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	924	$ 126,940.89	84	$ 11,540.08	1092	$ 150,021.06
Scientist	$ 137.38	hour	252	$ 34,620.24	2772	$ 380,822.68		$ -		$ -	252	$ 34,620.24	3276	$ 450,063.17
Professional Land Surveyor	$ 116.25	hour	84	$ 9,764.68	924	$ 107,411.53		$ -		$ -	84	$ 9,764.68	1092	$ 126,940.89
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	924	$ 136,705.58	84	$ 12,427.78	1092	$ 161,561.14
Archaeologist	$ 221.92	hour	252	$ 55,925.01	2772	$ 615,175.10		$ -		$ -	252	$ 55,925.01	3276	$ 727,025.12
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	924	$ 146,470.26	84	$ 13,315.48	1092	$ 173,101.22
Professional Labor Subtotal			**938**	**$ 148,985.41**	**7443.3**	**$ 1,210,278.35**	**51.3**	**$ 9,222.20**	**2823.3**	**$ 419,338.94**	**938**	**$ 148,985.41**	**12194.0**	**$ 1,936,810.31**
Craft Labor														
Operator	$ 147.95	hour	420	$ 62,138.90	2772	$ 410,116.73	1848	$ 273,411.16		$ -	420	$ 62,138.90	5460	$ 807,805.69
Laborer	$ 137.38	hour	336	$ 46,160.33	2772	$ 380,822.68		$ -	924	$ 126,940.89	336	$ 46,160.33	4368	$ 600,084.23
Truck Driver	$ 105.68	hour	252	$ 26,630.96	2772	$ 292,940.52		$ -		$ -	252	$ 26,630.96	3276	$ 346,202.44
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	924	$ 126,940.89	84	$ 11,540.08	1092	$ 150,021.06
Craft Labor Subtotal			**1092**	**$ 146,470.26**	**8316**	**$ 1,083,879.94**	**1848**	**$ 273,411.16**	**1848**	**$ 253,881.79**	**1092**	**$ 146,470.26**	**14196**	**$ 1,904,113.41**
Materials														
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
EPL	$ 14,995.80	LS		$ -	3	$ 44,987.40		$ -		$ -		$ -	3	$ 44,987.40
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	23	$ 2,300.00		$ -		$ -	23	$ 2,300.00
Health and Safety/PPE	$ 15.00	man-day	182	$ 2,730.00	1309	$ 19,635.00	154	$ 2,310.00	539	$ 8,085.00	182	$ 2,730.00	2366	$ 35,490.00
Gasoline	$ 4.00	gal	175	$ 700.00	1155	$ 4,620.00	0	$ -	770	$ 3,080.00	175	$ 700.00	2275	$ 9,100.00
Diesel	$ 3.75	gal	4462.5	$ 16,734.38	33687.5	$ 126,328.13	5133.3	$ 19,250.00	10266.7	$ 38,500.00	4462.5	$ 16,734.38	58012.5	$ 217,546.88
Maintenance supplies	$ 10.00	equip-day	84	$ 840.00	539	$ 5,390.00	154	$ 1,540.00	231	$ 2,310.00	84	$ 840.00	1092	$ 10,920.00
Supplies Subtotal			**4903.5**	**$ 21,004.38**	**36,693.5**	**$ 200,960.53**	**5,464.3**	**$ 25,400.00**	**11,806.7**	**$ 51,975.00**	**4,903.5**	**$ 21,004.38**	**63,771.5**	**$ 320,344.28**
Equipment														
4 350 Excavator	$ 10,900.00	month	0.9	$ 10,173.33	7.7	$ 83,930.00	2.6	$ 27,976.67		$ -	0.9	$ 10,173.33	12.1	$ 132,253.33
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33		$ -		$ -	2.6	$ 20,276.67	0.2	$ 1,843.33	3.0	$ 23,963.33
3 15-yard Rock Truck	$ 12,900.00	month	0.7	$ 9,030.00	7.7	$ 99,330.00		$ -		$ -	0.7	$ 9,030.00	9.1	$ 117,390.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	7.7	$ 25,872.00		$ -	5.1	$ 17,248.00	1.2	$ 3,920.00	15.2	$ 50,960.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	2.6	$ 9,368.33	0.2	$ 851.67	3.0	$ 11,071.67
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	2.6	$ 1,283.33	0.2	$ 116.67	3.0	$ 1,516.67
3 Rentals	$ 23,371.00	month	0.7	$ 16,359.70	7.7	$ 179,956.70		$ -		$ -	0.7	$ 16,359.70	9.1	$ 212,676.10
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	2.6	$ 18,993.33	0.2	$ 1,726.67	3.0	$ 22,446.67
11 Shipping Container	$ 450.00	month	2.6	$ 1,155.00		$ -		$ -	28.2	$ 12,705.00	2.6	$ 1,155.00	33.4	$ 15,015.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	2.6	$ 25,410.00		$ -		$ -	0.2	$ 2,310.00	3.0	$ 30,030.00
1 Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	2.6	$ 51,975.00		$ -		$ -	0.2	$ 4,725.00	3.0	$ 61,425.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -	2.0	$ 2,000.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	2.6	$ 8,341.67	0.2	$ 758.33	3.0	$ 9,858.33
Equipment Subtotal			**7.7**	**$ 52,969.70**	**35.9**	**$ 466,473.70**	**2.6**	**$ 27,976.67**	**48.2**	**$ 90,216.33**	**7.7**	**$ 52,969.70**	**102.1**	**$ 690,606.10**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -	80	$ 8,000.00	5	$ 500.00		$ -		$ -	85	$ 8,500.00
Drum Disposal	$ 309,440.00	LS		$ -	1	$ 309,440.00		$ -		$ -		$ -	1	$ 309,440.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	2.6	$ 32,853.33		$ -	2.6	$ 32,853.33
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**81**	**$ 317,440.00**	**5**	**$ 500.00**	**2.6**	**$ 32,853.33**	**0**	**$ -**	**89.6**	**$ 358,562.33**

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5			
			Site setup		Excavation and Sampling Activities		Landfarm setup and Tilling Activities		Site Management Activities		Site Breakdown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	77	$ 50,050.00	7	$ 4,550.00	91	$ 59,150.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	11	$ 192,500.00		$ -	11	$ 192,500.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	77	$ 64,295.00	7	$ 5,845.00	91	$ 75,985.00
Analytical Laboratory (confirmation samples)	$ 526,850.75	LS		$ -	1	$ 526,850.75		$ -		$ -		$ -	1	$ 526,850.75
Analytical Laboratory (Landfarm ISM samples)	$ 15,435.00	LS		$ -		$ -	1	$ 15,435.00		$ -		$ -	1	$ 15,435.00
Analytical Laboratory (Baseline ISM samples)	$ 3,340.00	LS		$ -		$ -	1	$ 3,340.00		$ -		$ -	1	$ 3,340.00
Analytical Laboratory (pre-excavation sampling)	$ 59,052.50	LS		$ -	1	$ 59,052.50		$ -		$ -		$ -	1	$ 59,052.50
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**2**	**$ 585,903.25**	**2**	**$ 18,775.00**	**165**	**$ 306,845.00**	**14**	**$ 10,395.00**	**197**	**$ 932,313.25**
Travel														
Meals / Incidentals	$ 113.00	day	182	$ 20,566.00	1309	$ 147,917.00	154	$ 17,402.00	539	$ 60,907.00	182	$ 20,566.00	2366	$ 267,358.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	77	$ 231,000.00	7	$ 21,000.00	91	$ 273,000.00
Travel Subtotal			**189**	**$ 41,566.00**	**1,309**	**$ 147,917.00**	**154**	**$ 17,402.00**	**616**	**$ 291,907.00**	**189**	**$ 41,566.00**	**2,457**	**$ 540,358.00**
Task Totals				$ 429,159.75		$ 4,012,852.77		$ 372,687.02		$ 1,447,017.39		$ 421,390.75	$ 6,683,107.68	$ 6,683,107.68
Running Total by Task				$ 429,159.75		$ 4,442,012.52		$ 4,814,699.54		$ 6,261,716.93		$ 6,683,107.68	**GRAND TOTAL**	**$ 6,683,107.68**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup. Site setup takes 7 days. All crew (26 people) and equipment used during this period.
3 Task 5.2 includes pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 77 days for three Excavation Teams, and survey crew.
4 Task 5.2 also includes grading and contouring of excavations along the way to minimize risk to animals and people in the area.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump feature.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the setup of the landspread area or areas, including baseline ISM sampling. This also includes the management and operation of the landfarm while soils are being added to it. Assume a duration of 77 days for two operators.
8 Task 5.4 includes site and camp management activities. Assumes a duration of 77 days for field team lead, superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
9 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
10 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
11 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (26 people) and equipment are used during this period.
12 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen are observed.
13 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
14 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
15 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
16 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor is observed.
17 Assume no liner will be placed below or on top of the landfarm.
18 Assume material used to build berms around the landfarm are from a local, clean source accessible by road.
19 Assume landfarm will be constructed to a depth of 2 feet and the tilling equipment can reach the full depth of the landfarm with each pass.
20 Assume moisture, pH, and C:N:P ratio are all within the limits amenable to biodegradation and no amendments are necessary.
21 Overall duration determined by excavation rate after setup, which is 100 cy per day per Excavation Team.
22 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
23 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 6 - Tilling Field Effort			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5			
			Mobilization		Landspread Amendments and Tilling Activities		ISM Sampling Activities		Maintenance and Survey Activities		Demobilization		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 184.68	hour	4	$ 738.73	248	$ 45,801.53		$ -		$ -	4	$ 738.73	256	$ 47,278.99
Geospatial Specialist	$ 108.64	hour		$ -		$ -		$ -	84	$ 9,125.54	24	$ 2,607.30	108	$ 11,732.84
Scientist	$ 141.23	hour	48	$ 6,778.97		$ -	480	$ 67,789.73		$ -	48	$ 6,778.97	576	$ 81,347.68
Professional Land Surveyor	$ 119.50	hour		$ -		$ -		$ -	84	$ 10,038.10	24	$ 2,868.03	108	$ 12,906.12
Professional Labor Subtotal			**52**	**$ 7,517.71**	**248**	**$ 45,801.53**	**480**	**$ 67,789.73**	**168**	**$ 19,163.64**	**100**	**$ 12,993.03**	**1,048**	**$ 153,265.64**
Craft Labor														
Operator	$ 152.09	hour	24	$ 3,650.22	1488	$ 226,313.42		$ -	72	$ 10,950.65	24	$ 3,650.22	1608	$ 244,564.50
Laborer	$ 141.23	hour	24	$ 3,389.49	1488	$ 210,148.18		$ -		$ -	24	$ 3,389.49	1536	$ 216,927.15
Mechanic	$ 141.23	hour		$ -		$ -		$ -	84	$ 11,863.20	24	$ 3,389.49	108	$ 15,252.69
Craft Labor Subtotal			**48**	**$ 7,039.70**	**2,976**	**$ 436,461.60**	**0**	**$ -**	**156**	**$ 22,813.85**	**72**	**$ 10,429.19**	**3,252**	**$ 476,744.35**
Materials														
Material Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	23	$ 2,300.00		$ -		$ -	23	$ 2,300.00
Health and Safety/PPE	$ 15.00	man-day	10	$ 150.00	372	$ 5,580.00	40	$ 600.00	27	$ 405.00	16	$ 240.00	465	$ 6,975.00
EPL	$ 14,995.80	LS		$ -		$ -	1	$ 14,995.80		$ -		$ -	1	$ 14,995.80
Diesel	$ 3.75	gal	105.00	$ 393.75	15,500	$ 58,125.00	100.00	$ 375.00	35.00	$ 131.25	105.00	$ 393.75	15845	$ 59,418.75
Maintenance supplies	$ 10.00	equip-day		$ -	124	$ 1,240.00		$ -		$ -		$ -	124	$ 1,240.00
Supplies Subtotal			**115.00**	**$ 543.75**	**15,996**	**$ 64,945.00**	**164**	**$ 18,270.80**	**62**	**$ 536.25**	**121**	**$ 633.75**	**16,458**	**$ 84,929.55**
Equipment														
Truck	$ 300.00	day	1	$ 300.00		$ -	20	$ 6,000.00	7	$ 2,100.00	1	$ 300.00	29	$ 8,700.00
Rentals	$ 6,902.00	week	0.6	$ 3,944.00		$ -	2.9	$ 19,720.00		$ -	0.6	$ 3,944.00	4.0	$ 27,608.00
Electric Bikes	$ 1,350.00	month		$ -	5	$ 6,750.00		$ -		$ -		$ -	5	$ 6,750.00
Equipment Subtotal			**1.6**	**$ 4,244.00**	**5**	**$ 6,750.00**	**22.9**	**$ 25,720.00**	**7**	**$ 2,100.00**	**1.6**	**$ 4,244.00**	**38.0**	**$ 43,058.00**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	4	$ 400.00		$ -		$ -	4	$ 400.00
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**4**	**$ 400.00**	**0**	**$ -**	**0**	**$ -**	**4**	**$ 400.00**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	2	$ 1,300.00	124	$ 80,600.00		$ -		$ -	2.00	$ 1,300.00	128	$ 83,200.00
Charter Flights (from Anchorage)	$ 17,500.00	LS		$ -	4	$ 70,000.00	1	$ 17,500.00	1	$ 17,500.00		$ -	6	$ 105,000.00
Analytical Laboratory (Post-Tilling ISM samples)	$ 15,435.00	each		$ -		$ -	1	$ 15,435.00		$ -		$ -	1	$ 15,435.00
Charter Flights (from Dutch Harbor)	$ 4,500.00	each	1	$ 4,500.00		$ -		$ -		$ -	1	$ 4,500.00	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**3**	**$ 5,800.00**	**128**	**$ 150,600.00**	**2**	**$ 32,935.00**	**1**	**$ 17,500.00**	**3**	**$ 5,800.00**	**137**	**$ 212,635.00**

TASK 6 - Tilling Field Effort			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5			
			Mobilization		Landspread Amendments and Tilling Activities		ISM Sampling Activities		Maintenance and Survey Activities		Demobilization		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel														
Meals / Incidentals	$ 113.00	day	7	$ 791.00	372	$ 42,036.00	40	$ 4,520.00	27	$ 3,051.00	10	$ 1,130.00	456	$ 51,528.00
Air Transport ANC-DUT	$ 650.00	RT	3.5	$ 2,275.00		$ -		$ -		$ -	5	$ 3,250.00	8.5	$ 5,525.00
Hotel DUT	$ 150.00	day	7	$ 1,050.00		$ -		$ -		$ -	10	$ 1,500.00	17	$ 2,550.00
Travel Per Diem DUT (75%)	$ 96.75	day	7	$ 677.25		$ -		$ -		$ -	10	$ 967.50	17	$ 1,644.75
Fort Glenn Lodge	$ 200.00	day		$ -	372	$ 74,400.00	40	$ 8,000.00	27	$ 5,400.00		$ -	439	$ 87,800.00
Travel Subtotal			**24.5**	**$ 4,793.25**	**744**	**$ 116,436.00**	**80**	**$ 12,520.00**	**54**	**$ 8,451.00**	**35**	**$ 6,847.50**	**937.5**	**$ 149,047.75**
Task Totals				$ 29,938.41		$ 820,994.12		$ 157,635.53		$ 70,564.74		$ 40,947.47	$ 1,120,080.28	$ 1,120,080.28
Running Total by Task				$ 29,938.41		$ 850,932.54		$ 1,008,568.07		$ 1,079,132.81		$ 1,120,080.28	**GRAND TOTAL**	**$ 1,120,080.28**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 6.1 includes mobilization of one operator, one laborer, and one subcontracted cook. Includes setup of any necessary field equipment.
3 Task 6.2 adding nutrients and amendments to the landfarm and conducting tilling activities to mix and aerate the soil. This will require one operator and one laborer.
4 Task 6.2 will result in soil being turned over approximately 540 times every season with this schedule.
5 Task 6.3 includes the collection of ISM samples from the landfarmed soil. This will require four technical staff. Assume one ISM sample per 1,000 cy of soil as well as the appropriate QC sampling.
6 Crew for Task 6.3 will mobilize out 10 days before demob, and collect samples to measure progress; they will demobilize with the rest of the crew.
7 Task 6.4 includes the tear down of any field gear and maintenance, site restoration activities as necessary and survey activities of landfarm boundaries, ISM sample locations, and any other pertinent site features.
8 Survey team and mechanic onsite during Task 6.4 for 1 week prior to demob, and leave with the rest of the crew.
9 Task 6.5 includes the demobilization of all field personnel and equipment from the site, with the exception of the dozer/tiller, which will remain on-island.
10 Assume monthly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, and resupply.

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TASK 7 - Technical Memorandum			Task 7.1			
			Annual Tech Memo		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**		
Professional Labor						
Project Manager	$ 184.68	hour	16	$ 2,954.94	16	$ 2,954.94
Geospatial Specialist	$ 108.64	hour	68	$ 7,387.34	68	$ 7,387.34
Engineer	$ 141.23	hour	48	$ 6,778.97	48	$ 6,778.97
Scientist	$ 141.23	hour	68	$ 9,603.55	68	$ 9,603.55
Project Chemist	$ 108.64	hour	48	$ 5,214.59	48	$ 5,214.59
Tech Editor	$ 152.09	hour	20	$ 3,041.85	20	$ 3,041.85
Archaeologist	$ 228.14	hour	16	$ 3,650.22	16	$ 3,650.22
Professional Labor Subtotal			**284**	**$ 38,631.46**	**284**	**$ 38,631.46**
Craft Labor						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**
Materials						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**
Supplies						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**
Equipment						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**
Other Direct Costs						
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**
Travel						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**
Task Totals				$ 38,631.46	$ 38,631.46	$ 38,631.46
Running Total by Task				$ 38,631.46	**GRAND TOTAL**	**$ 38,631.46**

Basis of Estimate:

1 This is a technical memorandum that will be written at the end of each interim field season to document the tasks that were completed and summarize the remaining work. It will be submitted as a PDF only.

2 Level of effort based on USACE-AK District and stakeholder review.

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TASK 8 - Mobilization/Demobilization #2			Task 8.1		Task 8.2		Task 8.3		Task 8.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2026 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 200.64	hour	40	$ 8,025.42	8	$ 1,605.08	8	$ 1,605.08	20	$ 4,012.71	76	$ 15,248.29
Contract Manager	$ 165.23	hour	16	$ 2,643.67		$ -		$ -	8	$ 1,321.83	24	$ 3,965.50
Material Expeditor	$ 82.61	hour	40	$ 3,304.58		$ -		$ -	20	$ 1,652.29	60	$ 4,956.88
Engineer	$ 153.43	hour	24	$ 3,682.25	24	$ 3,682.25	24	$ 3,682.25	12	$ 1,841.13	84	$ 12,887.88
Scientist	$ 153.43	hour	40	$ 6,137.08		$ -		$ -	20	$ 3,068.54	60	$ 9,205.63
Construction Manager	$ 165.23	hour	40	$ 6,609.17	24	$ 3,965.50	24	$ 3,965.50	20	$ 3,304.58	108	$ 17,844.75
Superintendent	$ 177.03	hour		$ -	24	$ 4,248.75	24	$ 4,248.75		$ -	48	$ 8,497.50
Professional Labor Subtotal			**200**	**$ 30,402.17**	**80**	**$ 13,501.58**	**80**	**$ 13,501.58**	**100**	**$ 15,201.08**	**460**	**$ 72,606.42**
Craft Labor												
Operator	$ 147.95	hour		$ -	120	$ 17,753.97	120	$ 17,753.97		$ -	240	$ 35,507.94
Laborer	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Truck Driver	$ 105.68	hour		$ -	72	$ 7,608.84	72	$ 7,608.84		$ -	144	$ 15,217.69
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**240**	**$ 31,957.15**	**240**	**$ 31,957.15**	**0**	**$ -**	**480**	**$ 63,914.30**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	30	$ 450.00	30	$ 450.00		$ -	60	$ 900.00
Supplies Subtotal			**0**	**$ -**	**30**	**$ 450.00**	**30**	**$ 450.00**	**0**	**$ -**	**60**	**$ 900.00**
Equipment												
1 200 Excavator	$ 10,900.00	week		$ -	1	$ 10,900.00	1	$ 10,900.00		$ -	2	$ 21,800.00
1 960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
3 15-yard Rock Truck	$ 12,900.00	week		$ -	3	$ 38,700.00	3	$ 38,700.00		$ -	6	$ 77,400.00
5 UTV	$ 3,360.00	week		$ -	5	$ 16,800.00	5	$ 16,800.00		$ -	10	$ 33,600.00
1 Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Rentals (1 wk rental to cover mob/demob)	$ 7,802.00	LS		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
1 Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11 Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1 Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
1 Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
3 750 Dozer	$ 20,300.00	week		$ -	3	$ 60,900.00	3	$ 60,900.00		$ -	6	$ 121,800.00
Equipment Subtotal			**0**	**$ -**	**28**	**$ 171,144.50**	**28**	**$ 171,144.50**	**0**	**$ -**	**56**	**$ 342,289.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Other Direct Costs Subtotal			**0**	**$ -**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**26**	**$ 22,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	2	$ 9,000.00	2	$ 9,000.00		$ -	4	$ 18,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**9**	**$ 288,960.00**	**9**	**$ 288,960.00**	**0**	**$ -**	**18**	**$ 577,920.00**

TASK 8 - Mobilization/Demobilization #2			Task 8.1		Task 8.2		Task 8.3		Task 8.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2026 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel												
Meals / Incidentals	$ 113.00	day		$ -	15	$ 1,695.00	15	$ 1,695.00		$ -	30	$ 3,390.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	7.5	$ 4,875.00	7.5	$ 4,875.00		$ -	15.0	$ 9,750.00
Hotel DUT	$ 150.00	day		$ -	15	$ 2,250.00	15	$ 2,250.00		$ -	30	$ 4,500.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	15	$ 1,451.25	15	$ 1,451.25		$ -	30	$ 2,902.50
Travel Subtotal			**0**	**$ -**	**52.5**	**$ 10,271.25**	**52.5**	**$ 10,271.25**	**0**	**$ -**	**105.0**	**$ 20,542.50**
Task Totals				$ 30,402.17		$ 527,334.48		$ 527,334.48		$ 15,201.08	$ 1,100,272.21	$ 1,100,272.21
Running Total by Task				$ 30,402.17		$ 557,736.65		$ 1,085,071.13		$ 1,100,272.21	**GRAND TOTAL**	**$ 1,100,272.21**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 11 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site setup		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	2026 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor														
Project Manager	$ 200.64	hour	14	$ 2,808.90	51.3	$ 10,299.28	51.3	$ 10,299.28	51.3	$ 10,299.28	14	$ 2,808.90	182.0	$ 36,515.65
Geospatial Specialist	$ 118.02	hour		$ -		$ -	84	$ 9,913.75		$ -		$ -	84	$ 9,913.75
Engineer	$ 153.43	hour	84	$ 12,887.88		$ -		$ -	924	$ 141,766.63	84	$ 12,887.88	1092	$ 167,542.38
Scientist	$ 153.43	hour		$ -		$ -	84	$ 12,887.88		$ -		$ -	84	$ 12,887.88
Professional Land Surveyor	$ 129.82	hour		$ -		$ -	84	$ 10,905.13		$ -		$ -	84	$ 10,905.13
Construction Manager	$ 165.23	hour	84	$ 13,879.25		$ -		$ -	924	$ 152,671.75	84	$ 13,879.25	1092	$ 180,430.25
Superintendent	$ 177.03	hour	84	$ 14,870.63		$ -		$ -	924	$ 163,576.88	84	$ 14,870.63	1092	$ 193,318.13
Professional Labor Subtotal			**266**	**$ 44,446.65**	**51.3**	**$ 10,299.28**	**303.3**	**$ 44,006.04**	**2,823.3**	**$ 468,314.55**	**266**	**$ 44,446.65**	**3,710.0**	**$ 611,513.16**
Craft Labor														
Operator	$ 147.95	hour	420	$ 62,138.90	4620	$ 683,527.89		$ -		$ -	420	$ 62,138.90	5460	$ 807,805.69
Laborer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	924	$ 126,940.89	84	$ 11,540.08	1092	$ 150,021.06
Truck Driver	$ 105.68	hour	252	$ 26,630.96	2772	$ 292,940.52		$ -		$ -	252	$ 26,630.96	3276	$ 346,202.44
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	924	$ 126,940.89	84	$ 11,540.08	1092	$ 150,021.06
Craft Labor Subtotal			**840**	**$ 111,850.02**	**7,392**	**$ 976,468.42**	**0**	**$ -**	**1,848**	**$ 253,881.79**	**840**	**$ 111,850.02**	**10,920**	**$ 1,454,050.24**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
EPL	$ 14,995.80	LS		$ -		$ -		$ -	1	$ 14,995.80		$ -	1	$ 14,995.80
Health and Safety/PPE	$ 15.00	man-day	105	$ 1,575.00	616	$ 9,240.00	21	$ 315.00	539	$ 8,085.00	105	$ 1,575.00	1386	$ 20,790.00
Gasoline	$ 4.00	gal	175	$ 700.00	1155	$ 4,620.00	385	$ 1,540.00	385	$ 1,540.00	175	$ 700.00	2275	$ 9,100.00
Diesel	$ 3.75	gal	3995.8	$ 14,984.38	33687.5	$ 126,328.13		$ -	10266.7	$ 38,500.00	3995.8	$ 14,984.38	51945.8	$ 194,796.88
Maintenance supplies	$ 10.00	equip-day	84	$ 840.00	693	$ 6,930.00		$ -	231	$ 2,310.00	84	$ 840.00	1092	$ 10,920.00
Supplies Subtotal			**4359.8**	**$ 18,099.38**	**36,151.5**	**$ 147,118.13**	**406**	**$ 1,855.00**	**11,422.7**	**$ 65,430.80**	**4359.8**	**$ 18,099.38**	**56,699.8**	**$ 250,602.68**
Equipment														
1 200 Excavator	$ 6,500.00	month	0.2	$ 1,516.67	2.6	$ 16,683.33		$ -		$ -	0.2	$ 1,516.67	3.0	$ 19,716.67
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33		$ -		$ -	2.6	$ 20,276.67	0.2	$ 1,843.33	3.0	$ 23,963.33
3 15-yard Rock Truck	$ 12,900.00	month	0.7	$ 9,030.00	7.7	$ 99,330.00		$ -		$ -	0.7	$ 9,030.00	9.1	$ 117,390.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	7.7	$ 25,872.00	2.6	$ 8,624.00	2.6	$ 8,624.00	1.2	$ 3,920.00	15.2	$ 50,960.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	2.6	$ 9,368.33	0.2	$ 851.67	3.0	$ 11,071.67
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	2.6	$ 1,283.33	0.2	$ 116.67	3.0	$ 1,516.67
1 Rentals	$ 23,371.00	month	0.2	$ 5,453.23		$ -		$ -	2.6	$ 59,985.57	0.2	$ 5,453.23	3.0	$ 70,892.03
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	2.6	$ 18,993.33	0.2	$ 1,726.67	3.0	$ 22,446.67
11 Shipping Container	$ 450.00	month	2.6	$ 1,155.00		$ -		$ -	28.2	$ 12,705.00	2.6	$ 1,155.00	33.4	$ 15,015.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	2.6	$ 25,410.00		$ -		$ -	0.2	$ 2,310.00	3.0	$ 30,030.00
1 Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	2.6	$ 51,975.00		$ -		$ -	0.2	$ 4,725.00	3.0	$ 61,425.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -	2	$ 2,000.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	2.6	$ 8,341.67	0.2	$ 758.33	3.0	$ 9,858.33
3 750 Dozer	$ 7,900.00	month	0.7	$ 5,530.00	7.7	$ 60,830.00		$ -		$ -	0.7	$ 5,530.00	9.1	$ 71,890.00
Equipment Subtotal			**7.2**	**$ 38,936.57**	**30.8**	**$ 280,100.33**	**2.6**	**$ 8,624.00**	**48.2**	**$ 141,577.90**	**7.2**	**$ 38,936.57**	**96.0**	**$ 508,175.37**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	1	$ 100.00		$ -		$ -	1	$ 100.00
Site Communications (internet/radios) setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	2.6	$ 32,853.33		$ -	2.6	$ 32,853.33
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**0**	**$ -**	**1**	**$ 100.00**	**2.6**	**$ 32,853.33**	**0**	**$ -**	**4.6**	**$ 40,722.33**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	77	$ 50,050.00	7	$ 4,550.00	91	$ 59,150.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	11	$ 192,500.00		$ -	11	$ 192,500.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	77	$ 64,295.00	7	$ 5,845.00	91	$ 75,985.00
Analytical Laboratory (Post Treatment ISM)	$ 3,340.00	LS		$ -		$ -	1	$ 3,340.00		$ -		$ -	1	$ 3,340.00
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**0**	**$ -**	**1**	**$ 3,340.00**	**165**	**$ 306,845.00**	**14**	**$ 10,395.00**	**194**	**$ 330,975.00**

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site setup		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	**2026 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel														
Meals / Incidentals	$ 113.00	day	105	$ 11,865.00	616	$ 69,608.00	15	$ 1,695.00	539	$ 60,907.00	105	$ 11,865.00	1380	$ 155,940.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	77	$ 231,000.00	7	$ 21,000.00	91	$ 273,000.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -		$ -	6	$ 508.50		$ -		$ -	6	$ 508.50
Travel Subtotal			**112**	**$ 32,865.00**	**616**	**$ 69,608.00**	**21**	**$ 2,203.50**	**616**	**$ 291,907.00**	**112**	**$ 32,865.00**	**1,477**	**$ 429,448.50**
Task Totals				$ 264,361.61		$ 1,483,594.16		$ 60,128.54		$ 1,560,810.37		$ 256,592.61	$ 3,625,487.28	$ 3,625,487.28
Running Total by Task				$ 264,361.61		$ 1,747,955.77		$ 1,808,084.30		$ 3,368,894.67		$ 3,625,487.28	**GRAND TOTAL**	**$ 3,625,487.28**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 9.1 includes site setup. Site setup takes 7 days. All crew (15 people) and equipment used during this period.
3 Task 9.2 includes backfill of treated material, and grading. Assumes a duration of 77 days for three Backfill Teams.
4 Task 9.3 includes ISM sampling of treatment area after soil backfilling, as well as survey activities. Assume a duration of 7 days for one scientist and the survey crew.
5 Crew for Task 9.3 mobilizes and demobilizes from the site on the last two resupply air charters.
6 Task 9.4 includes site and camp management activities. Assumes a duration of 77 days for superintendent, mechanic, camp manager, subcontracted camp cook, and subcontracted EMT.
7 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
8 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
9 Task 9.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (11 people) and equipment are used during this period.
10 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
11 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
12 Overall duration determined by backfill rate after startup, which is 100 cy per day.

TASK 10 - Reporting			Task 10.1		Task 10.2		Task 10.3		Task 10.4		Task 10.5		Task 10.6		Task 10.7		Task 10.8		Task 10.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate	2027 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 206.25	hour	50	$ 10,312.66	10	$ 2,062.53	13	$ 2,681.29	7	$ 1,443.77	7	$ 1,443.77	2	$ 412.51	2	$ 412.51	2	$ 412.51		$ -	93	$ 19,181.55
Geospatial Specialist	$ 121.33	hour	184	$ 22,323.88	37	$ 4,489.04	46	$ 5,580.97	23	$ 2,790.48	23	$ 2,790.48	4	$ 485.30	4	$ 485.30		$ -		$ -	321	$ 38,945.46
Engineer	$ 157.72	hour	136	$ 21,450.33	28	$ 4,416.25	34	$ 5,362.58	17	$ 2,681.29	17	$ 2,681.29		$ -		$ -		$ -		$ -	232	$ 36,591.75
Scientist	$ 157.72	hour	204	$ 32,175.50	41	$ 6,466.64	51	$ 8,043.88	26	$ 4,100.80	26	$ 4,100.80		$ -		$ -		$ -		$ -	348	$ 54,887.62
Project Chemist	$ 121.33	hour	156	$ 18,926.77	32	$ 3,882.41	39	$ 4,731.69	20	$ 2,426.51	20	$ 2,426.51		$ -		$ -		$ -		$ -	267	$ 32,393.89
Tech Editor	$ 169.86	hour	48	$ 8,153.07		$ -	28	$ 4,755.96		$ -	28	$ 4,755.96		$ -	60	$ 10,191.34		$ -		$ -	164	$ 27,856.32
Archaeologist	$ 254.78	hour	148	$ 37,707.94	30	$ 7,643.50	37	$ 9,426.99	19	$ 4,840.88	19	$ 4,840.88	120	$ 30,574.01	120	$ 30,574.01	16	$ 4,076.53	24	$ 6,114.80	533	$ 135,799.54
Professional Labor Subtotal			**926**	**$ 151,050.15**	**178**	**$ 28,960.38**	**248**	**$ 40,583.35**	**112**	**$ 18,283.74**	**140**	**$ 23,039.70**	**126**	**$ 31,471.81**	**186**	**$ 41,663.15**	**18**	**$ 4,489.04**	**24**	**$ 6,114.80**	**1,958**	**$ 345,656.12**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 151,090.15		$ 28,960.38		$ 40,643.35		$ 18,283.74		$ 23,099.70		$ 31,471.81		$ 41,663.15		$ 14,489.04		$ 7,114.80	$ 356,816.12	$ 356,816.12
Running Total by Task				$ 151,090.15		$ 180,050.53		$ 220,693.88		$ 238,977.62		$ 262,077.32		$ 293,549.13		$ 335,212.28		$ 349,701.32		$ 356,816.12	**GRAND TOTAL**	**$ 356,816.12**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.
6 Reporting costs includes pre-RA documentation reporting conducted by the archaeologist onsite.
7 Assume draft and final copies of Fort Glenn History Book will be produced
8 Assume 250 soft-cover copies of Fort Glenn History Book will be produced.
9 Distribution to parties of Fort Glenn History Book are listed in Section 4.4.6 of Project 02 EE/CA Report.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/25	110	100	11,000	Excavation/backfill operations
8/26	9/1	7	0	0	Teardown and site restoration
			Max excavation/backfill per year per team	11,000	
			Middle volume estimate of soil (cy)	22,942	
			Excavation/Backfill Teams required	3	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season.
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team.

Treatment Duration
Assume tilling starts on 1 May, and ends 1 September of each field season.
Treatment rate is estimated at 3 years with constant tilling and no amendment additions.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting 1 May to 31 August with 1 week setup, 1 week teardown.
2023	Tech memo for 2022 field effort; tilling field effort: onsite starting 1 May to 1 September.
2024	Tech memo for 2023 field effort; tilling field effort: onsite starting 1 May to 1 September.
2025	Tech memo for 2024 field effort; tilling field effort: onsite starting 1 May to 1 September.
2026	Tech memo for 2025 field effort; backfill field effort: onsite starting 1 May to 31 July with 1 week setup, 1 week teardown.
2027	Project reporting

Total duration 84 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	7/23/22	77	300	23,100	Excavation operations
7/24/22	7/30/22	7	0	0	Teardown and site restoration
			Total treated volume	22,942	
			Total field duration	91	
			Number of resupply flights	11	

2023 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/23	9/1/23	124	Tilling operations
		Total field duration	124
		Number of resupply flights	4

2024 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/24	9/1/24	124	Tilling operations
		Total field duration	124
		Number of resupply flights	4

2025 Field Schedule

Start Date	Finish Date	Duration	Description
5/1/25	9/1/25	124	Tilling operations
		Total field duration	124
		Number of resupply flights	4

2026 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/26	5/7/26	7	0	0	Setup and site access
5/8/26	7/23/26	77	300	23,100	Backfill operations
7/24/26	7/30/26	7	0	0	Teardown and site restoration
			Total treated volume	22,942	
			Total field duration	91	
			Number of resupply flights	11	

Excavation Field Effort
Personnel

5	Operators	
3	Truck drivers	
3	Arch	
4	Laborer	Includes housekeeper
3	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate

All personnel will stay in Fort Glenn Lodge, along with two cabins

Excavation Teams		15	people
Landfarm Team		2	people
Support Team		7	people
Survey Team		2	people
Total Excavation Crew		26	people

Excavation Team

Equipment	Personnel
350 Excavator	Operator
15-yard Rock Truck	Truck driver
UTV	Arch
	Scientist
	Laborer

Landfarm Team

Equipment	Personnel
350 Excavator	Operator
Dozer	Operator

Marooka used by both Excavation and Backfill Teams

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Survey Team

Equipment	Personnel
UTV	Surveyor
	Assistant surveyor

Tilling Field Effort

1	Operator	
1	Laborer	
1	Cook	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate
1	Mechanic	
4	Scientist	

All personnel will stay in Fort Glenn Lodge

Landfarm Team	2	people
Support Team	1	people
Total Crew	3	people

Survey Team	2	people
Mechanic	1	people
Sampling Team	4	people

Backfill Field Effort
Personnel

5	Operators	
3	Truck drivers	
1	Laborer	Includes housekeeper
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate
1	Scientist	

All personnel will stay in Fort Glenn Lodge

Backfill Team	8	people
Support Team	7	people
Total Excavation Crew	15	people

Survey Team	2	people
Sample Team	1	person

Backfill Team

Equipment	Personnel
Dozer	Operator
15-yard Rock Truck	Truck driver
UTV	

Landfarm Team

Equipment	Personnel
200 Excavator	Operator
Dozer	Operator

Marooka used in place of Rock Truck as required

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Survey Team

Equipment	Personnel
UTV	Surveyor
	Assistant surveyor

Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
200 Excavator	25	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge
Truck	5	Rented from lodge, assume diesel truck
Total gal 2022	58,013	
Total gal 2023	15,845	
Total gal 2024	15,845	
Total gal 2025	15,845	
Total gal 2026	51,946	

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total	
UTV (excavation)	5	5	25	
UTV (backfill)	5	5	25	
		Total gal 2,022	2,275	2x 2,000 gal with mob
		Total gal 2,026	2,275	2x 2,000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	
15,000-gal AST at Lodge	15,000	1	15,000	
25,000-gal AST rental	25,000	2	50,000	onsite for excavation and backfill only
		Total volume	65,000	
		Number fueling trips required 2022	0	
		Number fueling trips required 2023	0	
		Number fueling trips required 2024	0	
		Number fueling trips required 2025	0	
		Number fueling trips required 2026	0	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully.

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ 300.00	day	Rented from lodge
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	Assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	Heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Purchase

Description	Rate	Unit	Notes
D6 Dozer	$ 430,000.00	each	
24" Root Rake for front blade	$ 5,450.00	each	
Root Rake Shipping	$ 2,000.00	each	
Multi Shank Ripper Attachment	$ 20,000.00	each	
Dozer with Tilling Equipment	$ 457,450.00	LS	Purchase to leave on-island for tilling

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - Middle Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	38	2	4	2	48	$199.50	$8,778.00	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	38	2	4	0	46	$236.25	$9,922.50	
Pesticides	SW8081	Confirmation	SO	24 hr	38	2	4	0	46	$231.00	$9,702.00	
GRO	AK101	Confirmation	SO	24 hr	38	2	4	2	48	$115.50	$5,082.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	38	2	4	0	46	$136.50	$5,733.00	
PCBs	SW8082	Confirmation	SO	24 hr	38	2	4	0	46	$147.00	$6,174.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	38	2	4	0	46	$220.50	$9,261.00	
									SUBTOTAL =		$54,652.50	$54,652.50
									OTHER CHARGES/EDDs/DELIVERABLES =		$4,400.00	$4,400.00
									TOTAL =		$59,052.50	$59,052.50
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	593	30	60	30	743	$199.50	$136,258.50	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	593	30	60	0	713	$236.25	$154,271.25	
GRO	AK101	Confirmation	SO	24 hr	593	30	60	30	743	$115.50	$78,886.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	593	30	60	0	713	$136.50	$89,134.50	
									SUBTOTAL =		$458,550.75	$458,550.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$68,300.00	$68,300.00
									TOTAL =		$526,850.75	$526,850.75
ISM Baseline Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	4	1	2	0	8	$95.00	$570.00	**ISM Baseline Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	4	1	2	1	9	$95.00	$665.00	
PAH	SW8270C	Landspread ISM	SO	14 day	4	1	2	0	8	$105.00	$630.00	
GRO	AK101	Landspread ISM	SO	14 day	4	1	2	1	9	$55.00	$385.00	
DRO/RRO	AK102/103	Landspread ISM	SO	14 day	4	1	2	0	8	$65.00	$390.00	
									SUBTOTAL =		$2,640.00	$2,640.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$700.00	$700.00
									TOTAL =		$3,340.00	$3,340.00
ISM Sampling of Landfarm Soil - Post-Tilling (annually)												
ISM PREP	ITRC	Landspread ISM	SO	14 day	23	2	6	0	33	$95.00	$2,755.00	**ISM Sampling of Landfarm Soil - Post-Tilling (annually)**
VOCs	SW8260D	Landspread ISM	SO	14 day	23	2	6	2	35	$95.00	$2,945.00	
PAH	SW8270C	Landspread ISM	SO	14 day	23	2	6	0	33	$105.00	$3,045.00	
GRO	AK101	Landspread ISM	SO	14 day	23	2	6	2	35	$55.00	$1,705.00	
DRO/RRO	AK102/103	Landspread ISM	SO	14 day	23	2	6	0	33	$65.00	$1,885.00	
									SUBTOTAL =		$12,335.00	$12,335.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$3,100.00	$3,100.00
									TOTAL =		$15,435.00	$15,435.00
ISM Post-Treatment Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	4	1	2	0	8	$95.00	$570.00	**ISM Post-Treatment Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	4	1	2	1	9	$95.00	$665.00	
PAH	SW8270C	Landspread ISM	SO	14 day	4	1	2	0	8	$105.00	$630.00	
GRO	AK101	Landspread ISM	SO	14 day	4	1	2	1	9	$55.00	$385.00	
DRO/RRO	AK102/103	Landspread ISM	SO	14 day	4	1	2	0	8	$65.00	$390.00	
									SUBTOTAL =		$2,640.00	$2,640.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$700.00	$700.00
									TOTAL =		$3,340.00	$3,340.00
									GRAND TOTAL =		$608,018.25	$608,018.25

Notes:
Assume no equipment blanks will be required for this project.
Assume ISM triplicate samples will be collected 1 per 10 primary samples.
Assume ISM samples will be collected from contaminated soil at a frequency of 1 per 1000 CY.
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
Shipping/courier fees not included in laboratory pricing.
5035 supply for AK101 and 8260 - $25 per preweighed 25-ml methanol jar.

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Empty, Crush, and Dispose of Approximately 2,554 drums

Field Duration 105 days

Equipment	Rate	Number	Unit	Total	
open-top containers	$ 15.00	9	day	$ 14,175.00	
Overpacks	$ 175.00	15	each	$ 2,625.00	
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00	
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00	
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00	
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00	per 40-foot container
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00	
Container Transport Cost	$ 300.00	9	each	$ 2,700.00	
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00	
			Total	**$ 309,440.00**	

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Setup	$5,800.00	
Travel Costs for Setup Crew	$500.00	
Food Costs for Setup Crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rentals

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,247.00**	**$ 7,802.00**	**$ 23,371.00**	**$ 1,114.57**

ALTERNATIVE 5
PROJECT 02 LANDFARMING – HIGH ESTIMATE

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Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate							
Task	**Description**	**Quantity**	**Unit**	**Unit Price**	**Amount**	**Year Performed**	**Net Present Worth (2021)**
Task 1	Project Management	1	Job	$ 142,861	$ 142,861	2021	$ 142,861
Task 2	Planning Documents	1	Job	$ 153,353	$ 153,353	2021	$ 153,353
Task 3	Site Visit	1	Job	$ 48,765	$ 48,765	2021	$ 48,765
Task 4	Mobilization/Demobilization #1	1	Job	$ 1,640,837	$ 1,640,837	2022	$ 1,596,145
Task 5	Excavation Field Effort	1	Job	$ 7,228,898	$ 7,228,898	2022	$ 7,032,002
Task 6A	Tilling Field Effort	1	Job	$ 1,159,026	$ 1,159,026	2023	$ 1,096,748
Task 7A	Technical Memorandum	1	Job	$ 38,631	$ 38,631	2023	$ 36,556
Task 6B	Tilling Field Effort	1	Job	$ 1,191,479	$ 1,191,479	2024	$ 1,096,748
Task 7B	Technical Memorandum	1	Job	$ 39,713	$ 39,713	2024	$ 36,556
Task 6C	Tilling Field Effort	1	Job	$ 1,224,840	$ 1,224,840	2025	$ 1,096,748
Task 7C	Technical Memorandum	1	Job	$ 40,825	$ 40,825	2025	$ 36,556
Task 8	Mobilization/Demobilization #2	1	Job	$ 1,100,272	$ 1,100,272	2026	$ 958,373
Task 9	Backfilling Field Effort	1	Job	$ 3,791,318	$ 3,791,318	2026	$ 3,302,362
Task 10	Reporting	1	Job	$ 385,097	$ 385,097	2027	$ 326,296
				TOTAL	**$ 18,185,917**	**Total Net Present Worth Cost**	**$ 16,960,069**
				Total per Cubic Yard	**$ 754**	**Total per Cubic Yard**	**$ 704**

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	2020 Rate	2021 Rate	2022 Rate	2023 Rate	2024 Rate	2025 Rate	2026 Rate	2027 Rate	Unit
Professional Labor									
Program Manager	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Manager	$ 170.00	$ 174.76	$ 179.65	$ 184.68	$ 189.85	$ 195.17	$ 200.64	$ 206.25	hour
Contract Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Project Controls	$ 190.00	$ 195.32	$ 200.79	$ 206.41	$ 212.19	$ 218.13	$ 224.24	$ 230.52	hour
Administrative Assistant	$ 90.00	$ 92.52	$ 95.11	$ 97.77	$ 100.51	$ 103.33	$ 106.22	$ 109.19	hour
Material Expeditor	$ 70.00	$ 71.96	$ 73.97	$ 76.05	$ 78.18	$ 80.36	$ 82.61	$ 84.93	hour
Environmental Tech/Sampler	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Engineering Tech	$ 80.00	$ 82.24	$ 84.54	$ 86.91	$ 89.34	$ 91.85	$ 94.42	$ 97.06	hour
Geospatial Specialist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Engineer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Scientist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Regulatory Specialist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Project Chemist	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Professional Land Surveyor	$ 110.00	$ 113.08	$ 116.25	$ 119.50	$ 122.85	$ 126.29	$ 129.82	$ 133.46	hour
Tech Editor	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Construction Manager	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Archaeologist	$ 210.00	$ 215.88	$ 221.92	$ 228.14	$ 234.53	$ 241.09	$ 247.84	$ 254.78	hour
Geologist	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Safety Officer	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Superintendent	$ 150.00	$ 154.20	$ 158.52	$ 162.96	$ 167.52	$ 172.21	$ 177.03	$ 181.99	hour
Professional Labor Subtotal									
Craft Labor									
Operator	$ 140.00	$ 143.92	$ 147.95	$ 152.09	$ 156.35	$ 160.73	$ 165.23	$ 169.86	hour
Laborer	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour
Truck Driver	$ 100.00	$ 102.80	$ 105.68	$ 108.64	$ 111.68	$ 114.81	$ 118.02	$ 121.33	hour
Mechanic	$ 130.00	$ 133.64	$ 137.38	$ 141.23	$ 145.18	$ 149.25	$ 153.43	$ 157.72	hour

Note: 2019 inflation rate of 2.8% used for escalation from 2020 rates.

TASK 1-Project Management			Task 1.1		Task 1.2		Task 1.3			
			Coordination and Communication		Monthly Status Reports		Contractor Manpower Reporting		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor										
Program Manager	$ 215.88	hour	42	$ 9,066.96	42	$ 9,066.96		$ -	84	$ 18,133.92
Project Manager	$ 174.76	hour	184	$ 32,155.84	84	$ 14,679.84	21	$ 3,669.96	289	$ 50,505.64
Contract Manager	$ 143.92	hour		$ -	84	$ 12,089.28		$ -	84	$ 12,089.28
Project Controls	$ 195.32	hour		$ -	168	$ 32,813.76	21	$ 4,101.72	189	$ 36,915.48
Administrative Assistant	$ 92.52	hour		$ -	84	$ 7,771.68	21	$ 1,942.92	105	$ 9,714.60
Engineer	$ 133.64	hour	116	$ 15,502.24		$ -		$ -	116	$ 15,502.24
Professional Labor Subtotal			**342**	**$ 56,725.04**	**462**	**$ 76,421.52**	**63**	**$ 9,714.60**	**867**	**$ 142,861.16**
Craft Labor										
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials										
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies										
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment										
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs										
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors										
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel										
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 56,725.04		$ 76,421.52		$ 9,714.60	$ 142,861.16	$ 142,861.16
Running Total by Task				$ 56,725.04		$ 133,146.56		$ 142,861.16	**GRAND TOTAL**	**$ 142,861.16**

Basis of Estimate:

1 Task 1.1: PgM=0.5 hr/mo, PM=2 hr/mo, Eng Mid=1 hr/mo; three 4-hour meetings for PM and Eng Mid, additional hours prep for Eng Mid
2 Task 1.2: PgM=0.5 hr/mo, PM=1 hr/mo, PC=2 hr/mo, CM=1 hr/mo, Admin=1 hr/mo
3 Task 1.3: PM, PC, Admin=3 hr/report, 7 reports total
4 PoP=84 months

TASK 2 - Planning Documents			Task 2.1		Task 2.2		Task 2.3		Task 2.4		Task 2.5		Task 2.6			
			Project Schedule		Work Plan Task 2.2 (Pre-Draft)		Planning Documents (Pre-Draft RTCs)		Work Plan (Draft)		Planning Documents (Draft RTCs)		Work Plan (Final)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor																
Project Manager	$ 174.76	hour	12	$ 2,097.12	60	$ 10,485.60	12	$ 2,097.12	15	$ 2,621.40	8	$ 1,398.08	8	$ 1,398.08	115	$ 20,097.40
Project Controls	$ 195.32	hour	12	$ 2,343.84		$ -		$ -		$ -		$ -		$ -	12	$ 2,343.84
Geospatial Specialist	$ 102.80	hour		$ -	60	$ 6,168.00	12	$ 1,233.60	15	$ 1,542.00	8	$ 822.40	8	$ 822.40	103	$ 10,588.40
Engineer	$ 133.64	hour		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Scientist	$ 133.64	hour		$ -	120	$ 16,036.80	24	$ 3,207.36	30	$ 4,009.20	15	$ 2,004.60	15	$ 2,004.60	204	$ 27,262.56
Regulatory Specialist	$ 215.88	hour		$ -	48	$ 10,362.24	10	$ 2,158.80	12	$ 2,590.56	6	$ 1,295.28	6	$ 1,295.28	82	$ 17,702.16
Project Chemist	$ 102.80	hour		$ -	88	$ 9,046.40	18	$ 1,850.40	22	$ 2,261.60	11	$ 1,130.80	11	$ 1,130.80	150	$ 15,420.00
Tech Editor	$ 143.92	hour		$ -	40	$ 5,756.80		$ -	20	$ 2,878.40		$ -	20	$ 2,878.40	80	$ 11,513.60
Archaeologist	$ 215.88	hour		$ -	40	$ 8,635.20	8	$ 1,727.04	10	$ 2,158.80	5	$ 1,079.40	5	$ 1,079.40	68	$ 14,679.84
Safety Officer	$ 154.20	hour		$ -	24	$ 3,700.80	5	$ 771.00	6	$ 925.20	3	$ 462.60	3	$ 462.60	41	$ 6,322.20
Professional Labor Subtotal			**24**	**$ 4,440.96**	**600**	**$ 86,228.64**	**113**	**$ 16,252.68**	**160**	**$ 22,996.36**	**71**	**$ 10,197.76**	**91**	**$ 13,076.16**	**1059**	**$ 153,192.56**
Craft Labor																
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																
Hard copies	$ 20.00	each		$ -	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00	8	$ 160.00
Other Direct Costs Subtotal			**0**	**$ -**	**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**8**	**$ 160.00**
Subcontractors/Vendors																
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Total				$ 4,440.96		$ 86,268.64		$ 16,252.68		$ 23,056.36		$ 10,197.76		$ 13,136.16	$ 153,352.56	$ 153,352.56
Running Total by Task				$ 4,440.96		$ 90,709.60		$ 106,962.28		$ 130,018.64		$ 140,216.40		$ 153,352.56	**GRAND TOTAL**	**$ 153,352.56**

Basis of Estimate:

1 Level of effort based on USACE-AK District and stakeholder review.
2 Includes WP, UFP-QAPP, and APP/SSHP.
3 Pre-Draft RTC effort is 20% of the Pre-Draft WP development effort.
4 Draft WP effort is 25% of the Pre-Draft WP effort.
5 Draft RTC effort is 50% of the Draft WP development effort.
6 Final WP effort is 50% of the Draft WP.
7 Assume site registration with the AHRS and significance as historic properties evaluation will be complete and done by the USACE.

TASK 3 - Site Visit			Task 3.1		Task 3.2		Task 3.3		Task 3.4		Task 3.5			
			Pre-Mobilizations / Procurements		Mobilization		Site Activities		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2021 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 174.76	hour	5	$ 873.80	1	$ 174.76	6	$ 1,048.56	1	$ 174.76	2	$ 349.52	15	$ 2,621.40
Scientist	$ 133.64	hour	15	$ 2,004.60	12	$ 1,603.68	36	$ 4,811.04	12	$ 1,603.68	10	$ 1,336.40	85	$ 11,359.40
Archaeologist	$ 215.88	hour	10	$ 2,158.80	12	$ 2,590.56	36	$ 7,771.68	12	$ 2,590.56	5	$ 1,079.40	75	$ 16,191.00
Safety Officer	$ 154.20	hour	2	$ 308.40		$ -		$ -		$ -		$ -	2	$ 308.40
Professional Labor Subtotal			**32**	**$ 5,345.60**	**25**	**$ 4,369.00**	**78**	**$ 13,631.28**	**25**	**$ 4,369.00**	**17**	**$ 2,765.32**	**177**	**$ 30,480.20**
Craft Labor														
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials														
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Various hand tools	$ 200.00	LS		$ -	1	$ 200.00	1	$ 200.00		$ -		$ -	2	$ 400.00
Various supplies	$ 500.00	LS		$ -	1	$ 500.00	1	$ 500.00		$ -		$ -	2	$ 1,000.00
Health and Safety/PPE	$ 15.00	man-day		$ -	2	$ 30.00	6	$ 90.00	2	$ 30.00		$ -	10	$ 150.00
Supplies Subtotal			**0**	**$ -**	**4**	**$ 730.00**	**8**	**$ 790.00**	**2**	**$ 30.00**	**0**	**$ -**	**14**	**$ 1,550.00**
Equipment														
Electric Bikes	$ 450.00	week		$ -		$ -	2	$ 900.00		$ -		$ -	2	$ 900.00
Mapping Grade GPS w/ Tablet	$ 390.00	week		$ -		$ -	1	$ 390.00		$ -		$ -	1	$ 390.00
Camera (waterproof, shockproof)	$ 90.00	week		$ -		$ -	1	$ 90.00		$ -		$ -	1	$ 90.00
Satellite Phone	$ 180.00	week		$ -		$ -	1	$ 180.00		$ -		$ -	1	$ 180.00
Garmin InReach	$ 50.00	week		$ -		$ -	2	$ 100.00		$ -		$ -	2	$ 100.00
Handheld Marine Grade Radios	$ 310.00	week		$ -		$ -	1	$ 310.00		$ -		$ -	1	$ 310.00
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**	**0**	**$ -**	**0**	**$ -**	**8**	**$ 1,970.00**
Other Direct Costs														
Cargo Shipments ANC-DUT DUT-ANC	$ 1,000.00	LS		$ -	1	$ 1,000.00		$ -	1	$ 1,000.00		$ -	2	$ 2,000.00
Other Direct Costs Subtotal			**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**1**	**$ 1,000.00**	**0**	**$ -**	**2**	**$ 2,000.00**
Subcontractors/Vendors														
Charter flights (DUT-FTG)	$ 4,500.00	each		$ -	1	$ 4,500.00		$ -	1	$ 4,500.00		$ -	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**1**	**$ 4,500.00**	**0**	**$ -**	**2**	**$ 9,000.00**
Travel														
Meals / Incidentals	$ 113.00	ppl-day		$ -		$ -	6	$ 678.00		$ -		$ -	6	$ 678.00
Air Transport ANC-DUT (round trip)	$ 650.00	RT		$ -	2	$ 1,300.00		$ -		$ -		$ -	2	$ 1,300.00
Hotel DUT	$ 150.00	day		$ -	2	$ 300.00		$ -	2	$ 300.00		$ -	4	$ 600.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	2	$ 193.50		$ -	2	$ 193.50		$ -	4	$ 387.00
Lodging in Fort Glenn	$ 200.00	day		$ -		$ -	4	$ 800.00		$ -		$ -	4	$ 800.00
Travel Subtotal			**0**	**$ -**	**6**	**$ 1,793.50**	**10**	**$ 1,478.00**	**4**	**$ 493.50**	**0**	**$ -**	**20**	**$ 3,765.00**
Task Totals				$ 5,345.60		$ 12,392.50		$ 17,869.28		$ 10,392.50		$ 2,765.32	$ 48,765.20	$ 48,765.20
Running Total by Task				$ 5,345.60		$ 17,738.10		$ 35,607.38		$ 45,999.88		$ 48,765.20	**GRAND TOTAL**	**$ 48,765.20**

Basis of Estimate:

1 Assumes two-person field crew mobilizing from Anchorage to Dutch Harbor.
2 Assumes a charter flight from Dutch Harbor to Fort Glenn and back.
3 Assumes a team of two technical staff can complete the inspection of all drum features in 3 days of fieldwork.

TASK 4 - Mobilization/Demobilization #1			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor												
Project Manager	$ 179.65	hour	40	$ 7,186.13	8	$ 1,437.23	8	$ 1,437.23	20	$ 3,593.07	76	$ 13,653.65
Contract Manager	$ 147.95	hour	16	$ 2,367.20		$ -		$ -	8	$ 1,183.60	24	$ 3,550.79
Material Expeditor	$ 73.97	hour	40	$ 2,959.00		$ -		$ -	20	$ 1,479.50	60	$ 4,438.49
Geospatial Specialist	$ 105.68	hour		$ -	24	$ 2,536.28	24	$ 2,536.28		$ -	48	$ 5,072.56
Engineer	$ 137.38	hour	24	$ 3,297.17	24	$ 3,297.17	24	$ 3,297.17	12	$ 1,648.58	84	$ 11,540.08
Scientist	$ 137.38	hour	40	$ 5,495.28	72	$ 9,891.50	72	$ 9,891.50	20	$ 2,747.64	204	$ 28,025.91
Professional Land Surveyor	$ 116.25	hour		$ -	24	$ 2,789.91	24	$ 2,789.91		$ -	48	$ 5,579.82
Construction Manager	$ 147.95	hour	40	$ 5,917.99	24	$ 3,550.79	24	$ 3,550.79	20	$ 2,959.00	108	$ 15,978.57
Archaeologist	$ 221.92	hour		$ -	72	$ 15,978.57	72	$ 15,978.57		$ -	144	$ 31,957.15
Superintendent	$ 158.52	hour		$ -	24	$ 3,804.42	24	$ 3,804.42		$ -	48	$ 7,608.84
Professional Labor Subtotal			**200**	**$ 27,222.76**	**272**	**$ 43,285.87**	**272**	**$ 43,285.87**	**100**	**$ 13,611.38**	**844**	**$ 127,405.88**
Craft Labor												
Operator	$ 147.95	hour		$ -	120	$ 17,753.97	120	$ 17,753.97		$ -	240	$ 35,507.94
Laborer	$ 137.38	hour		$ -	96	$ 13,188.66	96	$ 13,188.66		$ -	192	$ 26,377.33
Truck Driver	$ 105.68	hour		$ -	72	$ 7,608.84	72	$ 7,608.84		$ -	144	$ 15,217.69
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**312**	**$ 41,848.65**	**312**	**$ 41,848.65**	**0**	**$ -**	**624**	**$ 83,697.29**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	52	$ 780.00	52	$ 780.00		$ -	104	$ 1,560.00
Supplies Subtotal			**0**	**$ -**	**52**	**$ 780.00**	**52**	**$ 780.00**	**0**	**$ -**	**104**	**$ 1,560.00**
Equipment												
4 350 Excavator	$ 10,900.00	week		$ -	4	$ 43,600.00	4	$ 43,600.00		$ -	8	$ 87,200.00
1 960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
3 15-yard Rock Truck	$ 12,900.00	week		$ -	3	$ 38,700.00	3	$ 38,700.00		$ -	6	$ 77,400.00
5 UTV	$ 3,360.00	week		$ -	5	$ 16,800.00	5	$ 16,800.00		$ -	10	$ 33,600.00
1 Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
3 Rentals (1 wk rental to cover mob/demob)	$ 7,802.00	LS		$ -	3	$ 23,406.00	3	$ 23,406.00		$ -	6	$ 46,812.00
1 Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11 Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1 Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
1 Maintenance tools	$ 812.50	week			1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
Equipment Subtotal			**0**	**$ -**	**33**	**$ 158,548.50**	**33**	**$ 158,548.50**	**0**	**$ -**	**66**	**$ 317,097.00**
Other Direct Costs												
1 D6 Dozer	$ 457,450.00	LS	1	$ 457,450.00		$ -		$ -		$ -	1	$ 457,450.00
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Other Direct Costs Subtotal			**1**	**$ 457,450.00**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**27**	**$ 479,550.00**

TASK 4 - Mobilization/Demobilization #1			Task 4.1		Task 4.2		Task 4.3		Task 4.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2022 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Subcontractors/Vendors												
Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	4	$ 18,000.00	4	$ 18,000.00		$ -	8	$ 36,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**11**	**$ 297,960.00**	**11**	**$ 297,960.00**	**0**	**$ -**	**22**	**$ 595,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	26	$ 2,938.00	26	$ 2,938.00		$ -	52	$ 5,876.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	13	$ 8,450.00	13	$ 8,450.00		$ -	26	$ 16,900.00
Hotel DUT	$ 150.00	day		$ -	26	$ 3,900.00	26	$ 3,900.00		$ -	52	$ 7,800.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	26	$ 2,515.50	26	$ 2,515.50		$ -	52	$ 5,031.00
Travel Subtotal			**0**	**$ -**	**91**	**$ 17,803.50**	**91**	**$ 17,803.50**	**0**	**$ -**	**182**	**$ 35,607.00**
Task Totals				$ 484,672.76		$ 571,276.52		$ 571,276.52		$ 13,611.38	$ 1,640,837.17	$ 1,640,837.17
Running Total by Task				$ 484,672.76		$ 1,055,949.27		$ 1,627,225.79		$ 1,640,837.17	**GRAND TOTAL**	**$ 1,640,837.17**

Basis of Estimate:

1 Assumes 1 week for barging equipment from point of origin to Fort Glenn.
2 Assumes 14 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5			
			Site Set Up		Excavation and Sampling Activities		Landfarm Set Up and Tilling Activities		Site Management Activities		Site Breakdown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	2022 Rate	Unit			Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor														
Project Manager	$ 179.65	hour	14	$ 2,515.15	54	$ 9,701.28	54	$ 9,701.28	54	$ 9,701.28	14	$ 2,515.15	190	$ 34,134.12
Geospatial Specialist	$ 105.68	hour	84	$ 8,876.99	972	$ 102,719.40		$ -		$ -	84	$ 8,876.99	1140	$ 120,473.38
Engineer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	972	$ 133,535.23	84	$ 11,540.08	1140	$ 156,615.39
Scientist	$ 137.38	hour	252	$ 34,620.24	2916	$ 400,605.68		$ -		$ -	252	$ 34,620.24	3420	$ 469,846.17
Professional Land Surveyor	$ 116.25	hour	84	$ 9,764.68	972	$ 112,991.35		$ -		$ -	84	$ 9,764.68	1140	$ 132,520.71
Construction Manager	$ 147.95	hour	84	$ 12,427.78		$ -		$ -	972	$ 143,807.17	84	$ 12,427.78	1140	$ 168,662.73
Archaeologist	$ 221.92	hour	252	$ 55,925.01	2916	$ 647,132.25		$ -		$ -	252	$ 55,925.01	3420	$ 758,982.27
Superintendent	$ 158.52	hour	84	$ 13,315.48		$ -		$ -	972	$ 154,079.11	84	$ 13,315.48	1140	$ 180,710.06
Professional Labor Subtotal			**938**	**$ 148,985.41**	**7,830**	**$ 1,273,149.96**	**54**	**$ 9,701.28**	**2,970**	**$ 441,122.78**	**938**	**$ 148,985.41**	**12,730**	**$ 2,021,944.83**
Craft Labor														
Operator	$ 147.95	hour	420	$ 62,138.90	2916	$ 431,421.50	1944	$ 287,614.33		$ -	420	$ 62,138.90	5700	$ 843,313.63
Laborer	$ 137.38	hour	336	$ 46,160.33	2916	$ 400,605.68		$ -	972	$ 133,535.23	336	$ 46,160.33	4560	$ 626,461.56
Truck Driver	$ 105.68	hour	252	$ 26,630.96	2916	$ 308,158.21		$ -		$ -	252	$ 26,630.96	3420	$ 361,420.13
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	972	$ 133,535.23	84	$ 11,540.08	1140	$ 156,615.39
Craft Labor Subtotal			**1092**	**$ 146,470.26**	**8,748**	**$ 1,140,185.39**	**1,944**	**$ 287,614.33**	**1,944**	**$ 267,070.45**	**1,092**	**$ 146,470.26**	**14,820**	**$ 1,987,810.70**
Materials														
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
EPL	$ 14,995.80	LS		$ -	3	$ 44,987.40		$ -		$ -		$ -	3	$ 44,987.40
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	25	$ 2,500.00		$ -		$ -	25	$ 2,500.00
Health and Safety/PPE	$ 15.00	man-day	182	$ 2,730.00	1377	$ 20,655.00	162	$ 2,430.00	567	$ 8,505.00	182	$ 2,730.00	2470	$ 37,050.00
Gasoline	$ 4.00	gal	175	$ 700.00	1215	$ 4,860.00	0	$ -	810	$ 3,240.00	175	$ 700.00	2375	$ 9,500.00
Diesel	$ 3.75	gal	4462.5	$ 16,734.38	35437.5	$ 132,890.63	5400.0	$ 20,250.00	10800.0	$ 40,500.00	4462.5	$ 16,734.38	60562.5	$ 227,109.38
Maintenance supplies	$ 10.00	equip-day	84	$ 840.00	567	$ 5,670.00	162	$ 1,620.00	243	$ 2,430.00	84	$ 840.00	1140	$ 11,400.00
Supplies Subtotal			**4903.5**	**$ 21,004.38**	**38,599.5**	**$ 209,063.03**	**5,749.0**	**$ 26,800.00**	**12,420.0**	**$ 54,675.00**	**4,903.5**	**$ 21,004.38**	**66,575.5**	**$ 332,546.78**
Equipment														
4 350 Excavator	$ 10,900.00	month	0.9	$ 10,173.33	8.1	$ 88,290.00	2.7	$ 29,430.00		$ -	0.9	$ 10,173.33	13	$ 138,066.67
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33		$ -		$ -	2.7	$ 21,330.00	0.2	$ 1,843.33	3	$ 25,016.67
3 15-yard Rock Truck	$ 12,900.00	month	0.7	$ 9,030.00	8.1	$ 104,490.00		$ -		$ -	0.7	$ 9,030.00	10	$ 122,550.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	8.1	$ 27,216.00		$ -	5.4	$ 18,144.00	1.2	$ 3,920.00	16	$ 53,200.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	2.7	$ 9,855.00	0.2	$ 851.67	3	$ 11,558.33
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	2.7	$ 1,350.00	0.2	$ 116.67	3	$ 1,583.33
3 Rentals	$ 23,371.00	month	0.7	$ 16,359.70	8.1	$ 189,305.10		$ -		$ -	0.7	$ 16,359.70	10	$ 222,024.50
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	2.7	$ 19,980.00	0.2	$ 1,726.67	3	$ 23,433.33
11 Shipping Container	$ 450.00	month	2.6	$ 1,155.00		$ -		$ -	29.7	$ 13,365.00	2.6	$ 1,155.00	35	$ 15,675.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	2.7	$ 26,730.00		$ -		$ -	0.2	$ 2,310.00	3	$ 31,350.00
1 Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	2.7	$ 54,675.00		$ -		$ -	0.2	$ 4,725.00	3	$ 64,125.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -	2	$ 2,000.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	2.7	$ 8,775.00	0.2	$ 758.33	3	$ 10,291.67
Equipment Subtotal			**7.7**	**$ 52,969.70**	**37.8**	**$ 490,706.10**	**2.7**	**$ 29,430.00**	**50.6**	**$ 94,799.00**	**7.7**	**$ 52,969.70**	**106.5**	**$ 720,874.50**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -	116	$ 11,600.00	5	$ 500.00		$ -		$ -	121	$ 12,100.00
Drum Disposal	$ 309,980.00	LS		$ -	1	$ 309,980.00		$ -		$ -		$ -	1	$ 309,980.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1	$ 7,769.00		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	2.7	$ 34,560.00		$ -	3	$ 34,560.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**117**	**$ 321,580.00**	**5**	**$ 500.00**	**2.7**	**$ 34,560.00**	**0**	**$ -**	**125.7**	**$ 364,409.00**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	81	$ 52,650.00	7	$ 4,550.00	95	$ 61,750.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	12	$ 210,000.00		$ -	12	$ 210,000.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	81	$ 67,635.00	7	$ 5,845.00	95	$ 79,325.00
Analytical Laboratory (confirmation samples)	$ 760,693.25	LS		$ -	1	$ 760,693.25		$ -		$ -		$ -	1	$ 760,693.25
Analytical Laboratory (Landfarm ISM samples)	$ 16,465.00	LS		$ -		$ -	1	$ 16,465.00		$ -		$ -	1	$ 16,465.00
Analytical Laboratory (Baseline ISM samples)	$ 3,340.00	LS		$ -		$ -	1	$ 3,340.00		$ -		$ -	1	$ 3,340.00
Analytical Laboratory (pre-excavation sampling)	$ 105,628.75	LS		$ -	1	$ 105,628.75		$ -		$ -		$ -	1	$ 105,628.75
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**2**	**$ 866,322.00**	**2**	**$ 19,805.00**	**174**	**$ 330,285.00**	**14**	**$ 10,395.00**	**206**	**$ 1,237,202.00**

TASK 5 - Excavation Field Effort			Task 5.1		Task 5.2		Task 5.3		Task 5.4		Task 5.5			
			Site Set Up		Excavation and Sampling Activities		Landfarm Set Up and Tilling Activities		Site Management Activities		Site Breakdown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2022 Rate**	**Unit**			**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel														
Meals / Incidentals	$ 113.00	day	182	$ 20,566.00	1377	$ 155,601.00	162	$ 18,306.00	567	$ 64,071.00	182	$ 20,566.00	2470	$ 279,110.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	81	$ 243,000.00	7	$ 21,000.00	95	$ 285,000.00
Travel Subtotal			**189**	**$ 41,566.00**	**1,377**	**$ 155,601.00**	**162**	**$ 18,306.00**	**648**	**$ 307,071.00**	**189**	**$ 41,566.00**	**2,565**	**$ 564,110.00**
Task Totals				$ 429,159.75		$ 4,456,607.47		$ 392,156.61		$ 1,529,583.23		$ 421,390.75	$ 7,228,897.81	$ 7,228,897.81
Running Total by Task				$ 429,159.75		$ 4,885,767.22		$ 5,277,923.83		$ 6,807,507.06		$ 7,228,897.81	**GRAND TOTAL**	**$ 7,228,897.81**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 5.1 includes site setup. Site setup takes 7 days. All crew (26 people) and equipment used during this period.
3 Task 5.2 includes pre-excavation sampling, excavation of contaminated soil, and collection of screening and analytical confirmation samples. Assumes a duration of 81 days for three Excavation Teams, and survey crew.
4 Task 5.2 also includes grading and contouring of excavations along the way to minimize risk to animals and people in the area.
5 Pre-excavation analytical samples will be collected from the surface beneath each drum site feature to pre-screen/ensure that no other types of contaminants exist. Grab samples will be collected beneath each individual drum feature and composite samples will be collected from each drum area and drum dump feature.
6 Assume confirmation sampling will be conducted in accordance with ADEC guidance.
7 Task 5.3 includes the setup of the landspread area or areas, including baseline ISM sampling. This also includes the management and operation of the landfarm while soils are being added to it. Assume a duration of 81 days for two operators.
8 Task 5.4 includes site and camp management activities. Assumes a duration of 81 days for field team lead, superintendent, mechanic, camp manager, housekeeper, subcontracted camp cook, and subcontracted EMT.
9 There is a drinking water source on-island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
10 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
11 Task 5.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (26 people) and equipment are used during this period.
12 Decontamination water will be containerized, treated onsite through a GAC, and discharged onsite if no odor or sheen are observed.
13 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
14 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
15 Assume drums contents that need to be containerized and disposed of offsite are limited to those listed in the 2017 site reconnaissance report.
16 Assume any drum contents not identified in 2017 are limited to rain water that has infiltrated the drums. The drums will be pumped, contents containerized and treated through a GAC onsite. Treated water will be discharged onsite if no sheen or odor observed.
17 Assume no liner will be placed below or on top of the landfarm.
18 Assume material used to build berms around the landfarm are from a local, clean source accessible by road.
19 Assume landfarm will be constructed to a depth of 2 feet and the tilling equipment can reach the full depth of the landfarm with each pass.
20 Assume moisture, pH, and C:N:P ratio are all within the limits amenable to biodegradation and no amendments are necessary.
21 Overall duration determined by excavation rate after setup, which is 100 cy per day per Excavation Team.
17 Task 5.1 includes preliminary documentation of cultural resources by the archaeologist. Drone aerial imagery will be collected during this time and throughout duration of fieldwork as necessary.
18 Archaeologist activities include documentation before removals are condcuted and documenting work locations after backfill is performed.

TASK 6 - Tilling Field Effort			Task 6.1		Task 6.2		Task 6.3		Task 6.4		Task 6.5			
			Mobilization		Landspread Amendments and Tilling Activities		ISM Sampling Activities		Maintenance and Survey Activities		Demobilization		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Professional Labor														
Project Manager	$ 184.68	hour	4	$ 738.73	248	$ 45,801.53		$ -		$ -	4	$ 738.73	256	$ 47,278.99
Geospatial Specialist	$ 108.64	hour		$ -		$ -		$ -	84	$ 9,125.54	24	$ 2,607.30	108	$ 11,732.84
Scientist	$ 141.23	hour	48	$ 6,778.97		$ -	720	$ 101,684.60		$ -	48	$ 6,778.97	816	$ 115,242.55
Professional Land Surveyor	$ 119.50	hour		$ -		$ -		$ -	84	$ 10,038.10	24	$ 2,868.03	108	$ 12,906.12
Professional Labor Subtotal			**52**	**$ 7,517.71**	**248**	**$ 45,801.53**	**720**	**$ 101,684.60**	**168**	**$ 19,163.64**	**100**	**$ 12,993.03**	**1,288**	**$ 187,160.50**
Craft Labor														
Operator	$ 152.09	hour	24	$ 3,650.22	1488	$ 226,313.42		$ -	72	$ 10,950.65	24	$ 3,650.22	1608	$ 244,564.50
Laborer	$ 141.23	hour	24	$ 3,389.49	1488	$ 210,148.18		$ -		$ -	24	$ 3,389.49	1536	$ 216,927.15
Mechanic	$ 141.23	hour		$ -		$ -		$ -	84	$ 11,863.20	24	$ 3,389.49	108	$ 15,252.69
Craft Labor Subtotal			**48**	**$ 7,039.70**	**2,976**	**$ 436,461.60**	**0**	**$ -**	**156**	**$ 22,813.85**	**72**	**$ 10,429.19**	**3,252**	**$ 476,744.35**
Materials														
Material Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies														
Field Test Kits (pH, moisture, C:N:P)	$ 100.00	LS		$ -		$ -	25	$ 2,500.00		$ -		$ -	25	$ 2,500.00
Health and Safety/PPE	$ 15.00	man-day	10	$ 150.00	372	$ 5,580.00	60	$ 900.00	27	$ 405.00	16	$ 240.00	485	$ 7,275.00
EPL	$ 14,995.80	LS		$ -		$ -	1	$ 14,995.80		$ -		$ -	1	$ 14,995.80
Diesel	$ 3.75	gal	105.0	$ 393.75	15500.0	$ 58,125.00	100.0	$ 375.00	35.0	$ 131.25	105.0	$ 393.75	15845.0	$ 59,418.75
Maintenance supplies	$ 10.00	equip-day		$ -	124	$ 1,240.00		$ -		$ -		$ -	124	$ 1,240.00
Supplies Subtotal			**115.0**	**$ 543.75**	**15996.0**	**$ 64,945.00**	**186.0**	**$ 18,770.80**	**62.0**	**$ 536.25**	**121.0**	**$ 633.75**	**16,480.0**	**$ 85,429.55**
Equipment														
Truck	$ 300.00	day	1	$ 300.00		$ -	20	$ 6,000.00	7	$ 2,100.00	1	$ 300.00	29	$ 8,700.00
Rentals	$ 6,902.00	week	0.6	$ 3,944.00		$ -	2.9	$ 19,720.00		$ -	0.6	$ 3,944.00	4.0	$ 27,608.00
Electric Bikes	$ 1,350.00	month		$ -	5	$ 6,750.00		$ -		$ -		$ -	5	$ 6,750.00
Equipment Subtotal			**1.6**	**$ 4,244.00**	**5**	**$ 6,750.00**	**22.9**	**$ 25,720.00**	**7**	**$ 2,100.00**	**1.6**	**$ 4,244.00**	**38.0**	**$ 43,058.00**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	4	$ 400.00		$ -		$ -	4	$ 400.00
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**	**4**	**$ 400.00**	**0**	**$ -**	**0**	**$ -**	**4**	**$ 400.00**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	2	$ 1,300.00	124	$ 80,600.00		$ -		$ -	2.00	$ 1,300.00	128	$ 83,200.00
Charter Flights (from Anchorage)	$ 17,500.00	LS		$ -	4	$ 70,000.00	1.00	$ 17,500.00	1.00	$ 17,500.00		$ -	6	$ 105,000.00
Analytical Laboratory (Post-Tilling ISM samples)	$ 16,465.00	each		$ -		$ -	1	$ 16,465.00		$ -		$ -	1	$ 16,465.00
Charter Flights (from Dutch Harbor)	$ 4,500.00	each	1	$ 4,500.00		$ -		$ -		$ -	1	$ 4,500.00	2	$ 9,000.00
Subcontractors/Vendors Subtotal			**3**	**$ 5,800.00**	**128**	**$ 150,600.00**	**2**	**$ 33,965.00**	**1**	**$ 17,500.00**	**3**	**$ 5,800.00**	**137**	**$ 213,665.00**
Travel														
Meals / Incidentals	$ 113.00	day	5	$ 565.00	372	$ 42,036.00	60	$ 6,780.00	27	$ 3,051.00	8	$ 904.00	472	$ 53,336.00
Air Transport ANC-DUT	$ 650.00	RT	2.5	$ 1,625.00		$ -		$ -		$ -	4	$ 2,600.00	6.5	$ 4,225.00
Hotel DUT	$ 150.00	day	5	$ 750.00		$ -		$ -		$ -	8	$ 1,200.00	13	$ 1,950.00
Travel Per Diem DUT (75%)	$ 96.75	day	5	$ 483.75		$ -		$ -		$ -	8	$ 774.00	13	$ 1,257.75
Fort Glenn Lodge	$ 200.00	day		$ -	372	$ 74,400.00	60	$ 12,000.00	27	$ 5,400.00		$ -	459	$ 91,800.00
Travel Subtotal			**17.5**	**$ 3,423.75**	**744**	**$ 116,436.00**	**120**	**$ 18,780.00**	**54**	**$ 8,451.00**	**28**	**$ 5,478.00**	**963.5**	**$ 152,568.75**
Task Totals				$ 28,568.91		$ 820,994.12		$ 199,320.40		$ 70,564.74		$ 39,577.97	$ 1,159,026.15	$ 1,159,026.15
Running Total by Task				$ 28,568.91		$ 849,563.04		$ 1,048,883.44		$ 1,119,448.18		$ 1,159,026.15	**GRAND TOTAL**	**$ 1,159,026.15**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 6.1 includes mobilization of one operator, one laborer, and one subcontracted cook. Includes setup of any necessary field equipment.
3 Task 6.2 adding nutrients and amendments to the landfarm and conducting tilling activities to mix and aerate the soil. This will require one operator and one laborer.
4 Task 6.2 will result in soil being turned over approximately 480 times every season with this schedule.
5 Task 6.3 includes the collection of ISM samples from the landfarmed soil. This will require six technical staff. Assume one ISM sample per 1,000 cy of soil as well as the appropriate QC sampling.
6 Crew for Task 6.3 will mobilize out 10 days before demob, and collect samples to measure progress; they will demobilize with the rest of the crew.
7 Task 6.4 includes the teardown of any field gear and maintenance, site restoration activities as necessary and survey activities of landfarm boundaries, ISM sample locations, and any other pertinent site features.
8 Survey team and mechanic onsite during Task 6.4 for 1 week prior to demob, and leave with the rest of the crew.
9 Task 6.5 includes the demobilization of all field personnel and equipment from the site, with the exception of the dozer/tiller, which will remain on-island.
10 Assume monthly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, and resupply.

TASK 7 - Technical Memorandum			Task 7.1			
			Annual Tech Memo		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2023 Rate**	**Unit**	**Units**	**Cost**		
Professional Labor						
Project Manager	$ 184.68	hour	16	$ 2,954.94	16	$ 2,954.94
Geospatial Specialist	$ 108.64	hour	68	$ 7,387.34	68	$ 7,387.34
Engineer	$ 141.23	hour	48	$ 6,778.97	48	$ 6,778.97
Scientist	$ 141.23	hour	68	$ 9,603.55	68	$ 9,603.55
Project Chemist	$ 108.64	hour	48	$ 5,214.59	48	$ 5,214.59
Tech Editor	$ 152.09	hour	20	$ 3,041.85	20	$ 3,041.85
Archaeologist	$ 228.14	hour	16	$ 3,650.22	16	$ 3,650.22
Professional Labor Subtotal			**284**	**$ 38,631.46**	**284**	**$ 38,631.46**
Craft Labor						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**
Materials						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**
Supplies						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**
Equipment						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**
Other Direct Costs						
Other Direct Costs Subtotal			**0**	**$ -**	**0**	**$ -**
Subcontractors/Vendors						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**
Travel						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**
Task Totals				$ 38,631.46	$ 38,631.46	$ 38,631.46
Running Total by Task				$ 38,631.46	**GRAND TOTAL**	**$ 38,631.46**

Basis of Estimate:

1 This is a technical memorandum that will be written at the end of each interim field season to document the tasks that were completed and summarize the remaining work. It will be submitted as a PDF only.

2 Level of effort based on USACE-AK District and stakeholder review.

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TASK 8 - Mobilization/Demobilization #2			Task 8.1		Task 8.2		Task 8.3		Task 8.4			
			Pre-Mobilizations / Procurements		Mobilization		Demobilization		Post-Demobilization Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	2026 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor												
Project Manager	$ 200.64	hour	40	$ 8,025.42	8	$ 1,605.08	8	$ 1,605.08	20	$ 4,012.71	76	$ 15,248.29
Contract Manager	$ 165.23	hour	16	$ 2,643.67		$ -		$ -	8	$ 1,321.83	24	$ 3,965.50
Material Expeditor	$ 82.61	hour	40	$ 3,304.58		$ -		$ -	20	$ 1,652.29	60	$ 4,956.88
Engineer	$ 153.43	hour	24	$ 3,682.25	24	$ 3,682.25	24	$ 3,682.25	12	$ 1,841.13	84	$ 12,887.88
Scientist	$ 153.43	hour	40	$ 6,137.08		$ -		$ -	20	$ 3,068.54	60	$ 9,205.63
Construction Manager	$ 165.23	hour	40	$ 6,609.17	24	$ 3,965.50	24	$ 3,965.50	20	$ 3,304.58	108	$ 17,844.75
Superintendent	$ 177.03	hour		$ -	24	$ 4,248.75	24	$ 4,248.75		$ -	48	$ 8,497.50
Professional Labor Subtotal			**200**	**$ 30,402.17**	**80**	**$ 13,501.58**	**80**	**$ 13,501.58**	**100**	**$ 15,201.08**	**460**	**$ 72,606.42**
Craft Labor												
Operator	$ 147.95	hour		$ -	120	$ 17,753.97	120	$ 17,753.97		$ -	240	$ 35,507.94
Laborer	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Truck Driver	$ 105.68	hour		$ -	72	$ 7,608.84	72	$ 7,608.84		$ -	144	$ 15,217.69
Mechanic	$ 137.38	hour		$ -	24	$ 3,297.17	24	$ 3,297.17		$ -	48	$ 6,594.33
Craft Labor Subtotal			**0**	**$ -**	**240**	**$ 31,957.15**	**240**	**$ 31,957.15**	**0**	**$ -**	**480**	**$ 63,914.30**
Materials												
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												
Health and Safety/PPE	$ 15.00	man-day		$ -	30	$ 450.00	30	$ 450.00		$ -	60	$ 900.00
Supplies Subtotal			**0**	**$ -**	**30**	**$ 450.00**	**30**	**$ 450.00**	**0**	**$ -**	**60**	**$ 900.00**
Equipment												
1 200 Excavator	$ 10,900.00	week		$ -	1	$ 10,900.00	1	$ 10,900.00		$ -	2	$ 21,800.00
1 960 Loader	$ 7,900.00	week		$ -	1	$ 7,900.00	1	$ 7,900.00		$ -	2	$ 15,800.00
3 15-yard Rock Truck	$ 12,900.00	week		$ -	3	$ 38,700.00	3	$ 38,700.00		$ -	6	$ 77,400.00
5 UTV	$ 3,360.00	week		$ -	5	$ 16,800.00	5	$ 16,800.00		$ -	10	$ 33,600.00
1 Tracked Skidsteer	$ 3,650.00	week		$ -	1	$ 3,650.00	1	$ 3,650.00		$ -	2	$ 7,300.00
1 2,000-gal Water Tank	$ 500.00	week		$ -	1	$ 500.00	1	$ 500.00		$ -	2	$ 1,000.00
1 Rentals (1 wk rental to cover mob/demo)	$ 7,802.00	LS		$ -	1	$ 7,802.00	1	$ 7,802.00		$ -	2	$ 15,604.00
1 Fuel Truck	$ 7,400.00	LS		$ -	1	$ 7,400.00	1	$ 7,400.00		$ -	2	$ 14,800.00
11 Shipping Container	$ 105.00	week		$ -	11	$ 1,155.00	11	$ 1,155.00		$ -	22	$ 2,310.00
1 Marooka	$ 9,900.00	week		$ -	1	$ 9,900.00	1	$ 9,900.00		$ -	2	$ 19,800.00
1 Maintenance tools	$ 812.50	week		$ -	1	$ 812.50	1	$ 812.50		$ -	2	$ 1,625.00
1 Tundra Mats (75)	$ 4,725.00	week		$ -	1	$ 4,725.00	1	$ 4,725.00		$ -	2	$ 9,450.00
3 750 Dozer	$ 20,300.00	week		$ -	3	$ 60,900.00	3	$ 60,900.00		$ -	6	$ 121,800.00
Equipment Subtotal			**0**	**$ -**	**28**	**$ 171,144.50**	**28**	**$ 171,144.50**	**0**	**$ -**	**56**	**$ 342,289.00**
Other Direct Costs												
Container Transport to/from Port of Anchorage	$ 300.00	each		$ -	11	$ 3,300.00	11	$ 3,300.00		$ -	22	$ 6,600.00
Tundra Mat Mob/Demob	$ 2,900.00	LS		$ -	1	$ 2,900.00	1	$ 2,900.00		$ -	2	$ 5,800.00
Mob/Demob to Port of Anchorage	$ 4,850.00	LS		$ -	1	$ 4,850.00	1	$ 4,850.00		$ -	2	$ 9,700.00
Other Direct Costs Subtotal			**0**	**$ -**	**13**	**$ 11,050.00**	**13**	**$ 11,050.00**	**0**	**$ -**	**26**	**$ 22,100.00**
Subcontractors/Vendors												
Camp Cook	$ 650.00	LS		$ -	2	$ 1,300.00	2	$ 1,300.00		$ -	4	$ 2,600.00
Barge to/from Anchorage	$ 273,750.00	LS		$ -	1	$ 273,750.00	1	$ 273,750.00		$ -	2	$ 547,500.00
Barge load/unload fee	$ 1,620.00	LS		$ -	2	$ 3,240.00	2	$ 3,240.00		$ -	4	$ 6,480.00
EMT3	$ 835.00	day		$ -	2	$ 1,670.00	2	$ 1,670.00		$ -	4	$ 3,340.00
Charter Flights	$ 4,500.00	each		$ -	2	$ 9,000.00	2	$ 9,000.00		$ -	4	$ 18,000.00
Subcontractors/Vendors Subtotal			**0**	**$ -**	**9**	**$ 288,960.00**	**9**	**$ 288,960.00**	**0**	**$ -**	**18**	**$ 577,920.00**
Travel												
Meals / Incidentals	$ 113.00	day		$ -	15	$ 1,695.00	15	$ 1,695.00		$ -	30	$ 3,390.00
Air Transport ANC-DUT	$ 650.00	RT		$ -	7.5	$ 4,875.00	7.5	$ 4,875.00		$ -	15	$ 9,750.00
Hotel DUT	$ 150.00	day		$ -	15	$ 2,250.00	15	$ 2,250.00		$ -	30	$ 4,500.00
Travel Per Diem DUT (75%)	$ 96.75	day		$ -	15	$ 1,451.25	15	$ 1,451.25		$ -	30	$ 2,902.50
Travel Subtotal			**0**	**$ -**	**52.5**	**$ 10,271.25**	**52.5**	**$ 10,271.25**	**0**	**$ -**	**105**	**$ 20,542.50**
Task Totals				$ 30,402.17		$ 527,334.48		$ 527,334.48		$ 15,201.08	$ 1,100,272.21	$ 1,100,272.21
Running Total by Task				$ 30,402.17		$ 557,736.65		$ 1,085,071.13		$ 1,100,272.21	**GRAND TOTAL**	**$ 1,100,272.21**

Basis of Estimate:

1 Assume 1 week for barging equipment from point of origin to Fort Glenn.
2 Assume 11 field crew mobilizing from Anchorage to Fort Glenn, 2 days, 12-hr days.
3 Assume 1 week for barging equipment from Fort Glenn to point of origin.
4 Tundra mats originate in Fairbanks.

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site Set Up		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	2026 Rate	Unit			Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor														
Project Manager	$ 200.64	hour	14	$ 2,808.90	54	$ 10,834.31	54	$ 10,834.31	54	$ 10,834.31	14	$ 2,808.90	190	$ 38,120.73
Geospatial Specialist	$ 118.02	hour		$ -		$ -	84	$ 9,913.75		$ -		$ -	84	$ 9,913.75
Engineer	$ 153.43	hour	84	$ 12,887.88		$ -		$ -	972	$ 149,131.13	84	$ 12,887.88	1140	$ 174,906.88
Scientist	$ 153.43	hour		$ -		$ -	84	$ 12,887.88		$ -		$ -	84	$ 12,887.88
Professional Land Surveyor	$ 129.82	hour		$ -		$ -	84	$ 10,905.13		$ -		$ -	84	$ 10,905.13
Construction Manager	$ 165.23	hour	84	$ 13,879.25		$ -		$ -	972	$ 160,602.75	84	$ 13,879.25	1140	$ 188,361.25
Superintendent	$ 177.03	hour	84	$ 14,870.63		$ -		$ -	972	$ 172,074.38	84	$ 14,870.63	1140	$ 201,815.63
Professional Labor Subtotal			**266**	**$ 44,446.65**	**54**	**$ 10,834.31**	**306**	**$ 44,541.06**	**2970**	**$ 492,642.58**	**266**	**$ 44,446.65**	**3862**	**$ 636,911.25**
Craft Labor														
Operator	$ 147.95	hour	420	$ 62,138.90	4860	$ 719,035.83		$ -		$ -	420	$ 62,138.90	5700	$ 843,313.63
Laborer	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	972	$ 133,535.23	84	$ 11,540.08	1140	$ 156,615.39
Truck Driver	$ 105.68	hour	252	$ 26,630.96	2916	$ 308,158.21		$ -		$ -	252	$ 26,630.96	3420	$ 361,420.13
Mechanic	$ 137.38	hour	84	$ 11,540.08		$ -		$ -	972	$ 133,535.23	84	$ 11,540.08	1140	$ 156,615.39
Craft Labor Subtotal			**840**	**$ 111,850.02**	**7776**	**$ 1,027,194.05**	**0**	**$ -**	**1944**	**$ 267,070.45**	**840**	**$ 111,850.02**	**11400**	**$ 1,517,964.54**
Materials														
Materials Subtotal				**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies												**$ -**		
EPL	$ 14,995.80	LS		$ -		$ -		$ -	1	$ 14,995.80		$ -	1	$ 14,995.80
Health and Safety/PPE	$ 15.00	man-day	105	$ 1,575.00	648	$ 9,720.00	21	$ 315.00	567	$ 8,505.00	105	$ 1,575.00	1446	$ 21,690.00
Gasoline	$ 4.00	gal	175	$ 700.00	1215	$ 4,860.00	405	$ 1,620.00	405	$ 1,620.00	175	$ 700.00	2375	$ 9,500.00
Diesel	$ 3.75	gal	3995.8	$ 14,984.38	35437.5	$ 132,890.63	0.0	$ -	10800.0	$ 40,500.00	3995.8	$ 14,984.38	54229.2	$ 203,359.38
Maintenance supplies	$ 10.00	equip-day	84	$ 840.00	729	$ 7,290.00	0	$ -	243	$ 2,430.00	84	$ 840.00	1140	$ 11,400.00
Supplies Subtotal			**4359.8**	**$ 18,099.38**	**38,029.5**	**$ 154,760.63**	**426.0**	**$ 1,935.00**	**12,016.0**	**$ 68,050.80**	**4,359.8**	**$ 18,099.38**	**59,191.2**	**$ 260,945.18**
Equipment														
1 200 Excavator	$ 6,500.00	month	0.2	$ 1,516.67	2.7	$ 17,550.00		$ -		$ -	0.2	$ 1,516.67	3.2	$ 20,583.33
1 960 Loader	$ 7,900.00	month	0.2	$ 1,843.33		$ -		$ -	2.7	$ 21,330.00	0.2	$ 1,843.33	3.2	$ 25,016.67
3 15-yard Rock Truck	$ 12,900.00	month	0.7	$ 9,030.00	8.1	$ 104,490.00		$ -		$ -	0.7	$ 9,030.00	9.5	$ 122,550.00
5 UTV	$ 3,360.00	month	1.2	$ 3,920.00	8.1	$ 27,216.00	2.7	$ 9,072.00	2.7	$ 9,072.00	1.2	$ 3,920.00	15.8	$ 53,200.00
1 Tracked Skidsteer	$ 3,650.00	month	0.2	$ 851.67		$ -		$ -	2.7	$ 9,855.00	0.2	$ 851.67	3.2	$ 11,558.33
1 2,000-gal Water Tank	$ 500.00	month	0.2	$ 116.67		$ -		$ -	2.7	$ 1,350.00	0.2	$ 116.67	3.2	$ 1,583.33
1 Rentals	$ 23,371.00	month	0.2	$ 5,453.23		$ -		$ -	2.7	$ 63,101.70	0.2	$ 5,453.23	3.2	$ 74,008.17
1 Fuel Truck	$ 7,400.00	month	0.2	$ 1,726.67		$ -		$ -	2.7	$ 19,980.00	0.2	$ 1,726.67	3.2	$ 23,433.33
11 Shipping Container	$ 450.00	month	2.6	$ 1,155.00		$ -		$ -	29.7	$ 13,365.00	2.6	$ 1,155.00	34.8	$ 15,675.00
1 Marooka	$ 9,900.00	month	0.2	$ 2,310.00	2.7	$ 26,730.00		$ -		$ -	0.2	$ 2,310.00	3.2	$ 31,350.00
1 Tundra Mats (75)	$ 20,250.00	month	0.2	$ 4,725.00	2.7	$ 54,675.00		$ -		$ -	0.2	$ 4,725.00	3.2	$ 64,125.00
2,000-gal gasoline tank	$ 1,000.00	each		$ -		$ -		$ -	2	$ 2,000.00		$ -	2.0	$ 2,000.00
1 Maintenance tools	$ 3,250.00	month	0.2	$ 758.33		$ -		$ -	2.7	$ 8,775.00	0.2	$ 758.33	3.2	$ 10,291.67
3 750 Dozer	$ 7,900.00	month	0.7	$ 5,530.00	8.1	$ 63,990.00		$ -		$ -	0.7	$ 5,530.00	9.5	$ 75,050.00
Equipment Subtotal			**7.2**	**$ 38,936.57**	**32.4**	**$ 294,651.00**	**2.7**	**$ 9,072.00**	**50.6**	**$ 148,828.70**	**7.2**	**$ 38,936.57**	**100.2**	**$ 530,424.83**
Other Direct Costs														
Sample shipping, per cooler	$ 100.00	each		$ -		$ -	1	$ 100.00		$ -		$ -	1	$ 100.00
Site Communications (internet/radios) Setup	$ 7,769.00	LS	1.0	$ 7,769.00		$ -		$ -		$ -		$ -	1	$ 7,769.00
Site Communications (internet/radios)	$ 12,800.00	month		$ -		$ -		$ -	2.7	$ 34,560.00		$ -	3	$ 34,560.00
Other Direct Costs Subtotal			**1**	**$ 7,769.00**	**0**	**$ -**	**1**	**$ 100.00**	**2.7**	**$ 34,560.00**	**0**	**$ -**	**4.7**	**$ 42,429.00**
Subcontractors/Vendors														
Camp Cook	$ 650.00	day	7	$ 4,550.00		$ -		$ -	81	$ 52,650.00	7	$ 4,550.00	95	$ 61,750.00
Charter Flights (weekly flights)	$ 17,500.00	LS		$ -		$ -		$ -	12	$ 210,000.00		$ -	12	$ 210,000.00
EMT3	$ 835.00	day	7	$ 5,845.00		$ -		$ -	81	$ 67,635.00	7	$ 5,845.00	95	$ 79,325.00
Analytical Laboratory (Post Treatment ISM)	$ 3,340.00	LS		$ -		$ -	1	$ 3,340.00		$ -		$ -	1	$ 3,340.00
Subcontractors/Vendors Subtotal			**14**	**$ 10,395.00**	**0**	**$ -**	**1**	**$ 3,340.00**	**174**	**$ 330,285.00**	**14**	**$ 10,395.00**	**203**	**$ 354,415.00**

TASK 9 - Backfilling Field Effort			Task 9.1		Task 9.2		Task 9.3		Task 9.4		Task 9.5			
			Site Set Up		Backfill and Grading Activities		Landfarm Sampling and Survey Activities		Site Management Activities		Site Teardown and Restoration Activities		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	**2026 Rate**	**Unit**			**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**	**Units**	**Cost**		
Travel														
Meals / Incidentals	$ 113.00	day	105	$ 11,865.00	648	$ 73,224.00	15	$ 1,695.00	567	$ 64,071.00	105	$ 11,865.00	1440	$ 162,720.00
Fort Glenn Lodge	$ 3,000.00	day	7	$ 21,000.00		$ -		$ -	81	$ 243,000.00	7	$ 21,000.00	95	$ 285,000.00
Travel per diem (Fort Glenn)	$ 84.75	day		$ -		$ -	6	$ 508.50		$ -		$ -	6	$ 508.50
Travel Subtotal			**112**	**$ 32,865.00**	**648**	**$ 73,224.00**	**21**	**$ 2,203.50**	**648**	**$ 307,071.00**	**112**	**$ 32,865.00**	**1541**	**$ 448,228.50**
Task Totals				$ 264,361.61		$ 1,560,663.99		$ 61,191.56		$ 1,648,508.53		$ 256,592.61	$ 3,791,318.29	$ 3,791,318.29
Running Total by Task				$ 264,361.61		$ 1,825,025.59		$ 1,886,217.16		$ 3,534,725.68		$ 3,791,318.29	**GRAND TOTAL**	**$ 3,791,318.29**

Basis of Estimate:

1 All tasks require 2 hr/day for PM. Field days are 12 hours for personnel, with equipment run 10 hours.
2 Task 9.1 includes site setup. Site setup takes 7 days. All crew (15 people) and equipment used during this period.
3 Task 9.2 includes backfill of treated material, and grading. Assumes a duration of 81 days for three Backfill Teams.
4 Task 9.3 includes ISM sampling of treatment area after soil backfilling, as well as survey activities. Assume a duration of 7 days for one scientist and the survey crew.
5 Crew for Task 9.3 mobilizes and demobilizes from the site on the last two resupply air charters.
6 Task 9.4 includes site and camp management activities. Assumes a duration of 81 days for superintendent, mechanic, camp manager, subcontracted camp cook, and subcontracted EMT.
7 There is a drinking water source on island, which is assumed sufficient for drinking, washing, bathing, and incineration needs.
8 Assume weekly charter flights from Anchorage to Fort Glenn for sample shipment, personnel rotations, survey team rotations, and resupply.
9 Task 9.6 includes teardown and site restoration activities. Duration is 7 days, and assumes all crew (11 people) and equipment are used during this period.
10 Refueling costs from Dutch Harbor are per gallon of diesel delivered, no per trip charge.
11 25,000-gal ASTs staged at barge landing full by separate ship, cost is price of fuel.
12 Overall duration determined by backfill rate after startup, which is 100 cy per day.

TASK 10 - Reporting			Task 10.1		Task 10.2		Task 10.3		Task 10.4		Task 10.5		Task 10.6		Task 10.7		Task 10.8		Task 10.9			
			Report (Pre-Draft)		Report (Pre-Draft RTCs)		Report (Draft)		Report (Draft RTCs)		Report (Final)		Fort Glenn History Book (Research)		Fort Glenn History Book (Development)		Fort Glenn History Book (Production)		Fort Glenn History Book (Distribution)		Total Units	Subtotal
Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate	2027 Rate	Unit	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost		
Professional Labor																						
Project Manager	$ 206.25	hour	60	$ 12,375.19	12	$ 2,475.04	15	$ 3,093.80	8	$ 1,650.03	8	$ 1,650.03	2	$ 412.51	2	$ 412.51	2	$ 412.51		$ -	109	$ 22,481.60
Geospatial Specialist	$ 121.33	hour	200	$ 24,265.08	40	$ 4,853.02	50	$ 6,066.27	25	$ 3,033.14	25	$ 3,033.14	4	$ 485.30	4	$ 485.30		$ -		$ -	348	$ 42,221.25
Engineer	$ 157.72	hour	160	$ 25,235.69	32	$ 5,047.14	40	$ 6,308.92	20	$ 3,154.46	20	$ 3,154.46		$ -		$ -		$ -		$ -	272	$ 42,900.67
Scientist	$ 157.72	hour	220	$ 34,699.07	44	$ 6,939.81	55	$ 8,674.77	28	$ 4,416.25	28	$ 4,416.25		$ -		$ -		$ -		$ -	375	$ 59,146.14
Project Chemist	$ 121.33	hour	180	$ 21,838.58	36	$ 4,367.72	45	$ 5,459.64	23	$ 2,790.48	23	$ 2,790.48		$ -		$ -		$ -		$ -	307	$ 37,246.90
Tech Editor	$ 169.86	hour	56	$ 9,511.91		$ -	32	$ 5,435.38		$ -	32	$ 5,435.38		$ -	60	$ 10,191.34		$ -		$ -	180	$ 30,574.01
Archaeologist	$ 254.78	hour	156	$ 39,746.21	32	$ 8,153.07	39	$ 9,936.55	20	$ 5,095.67	20	$ 5,095.67	120	$ 30,574.01	120	$ 30,574.01	16	$ 4,076.53	24	$ 6,114.80	547	$ 139,366.51
Professional Labor Subtotal			**1032**	**$ 167,671.73**	**196**	**$ 31,835.79**	**276**	**$ 44,975.33**	**124**	**$ 20,140.02**	**156**	**$ 25,575.40**	**126**	**$ 31,471.81**	**186**	**$ 41,663.15**	**18**	**$ 4,489.04**	**24**	**$ 6,114.80**	**2138**	**$ 373,937.08**
Craft Labor																						
Craft Labor Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Materials																						
Materials Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Supplies																						
Supplies Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Equipment																						
Equipment Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Other Direct Costs																						
Hard copies	$ 20.00	each	2	$ 40.00		$ -	3	$ 60.00		$ -	3	$ 60.00		$ -		$ -		$ -		$ -	8	$ 160.00
Print and publish book (250 soft-cover copies)	$ 10,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 10,000.00		$ -	1	$ 10,000.00
Book postage and freight	$ 1,000.00	LS		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 1,000.00	1	$ 1,000.00
Other Direct Costs Subtotal			**2**	**$ 40.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**3**	**$ 60.00**	**0**	**$ -**	**0**	**$ -**	**1**	**$ 10,000.00**	**1**	**$ 1,000.00**	**10**	**$ 11,160.00**
Subcontractors/Vendors																						
Subcontractors/Vendors Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Travel																						
Travel Subtotal			**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**
Task Totals				$ 167,711.73		$ 31,835.79		$ 45,035.33		$ 20,140.02		$ 25,635.40		$ 31,471.81		$ 41,663.15		$ 14,489.04		$ 7,114.80	$ 385,097.08	$ 385,097.08
Running Total by Task				$ 167,711.73		$ 199,547.52		$ 244,582.85		$ 264,722.87		$ 290,358.27		$ 321,830.09		$ 363,493.23		$ 377,982.28		$ 385,097.08	**GRAND TOTAL**	**$ 385,097.08**

Basis of Estimate:

1 Pre-Draft RTC effort is 20% of the Pre-Draft Report development effort.
2 Draft Report effort is 25% of the Pre-Draft Report effort.
3 Draft RTC effort is 50% of the Draft Report development effort.
4 Final Report effort is 50% of the Draft Report.
5 Level of effort based on USACE-AK District and stakeholder review.

Field Duration Calculation
Excavation Requirements

Start Date	Finish Date	Duration	Excavation Rate (cy per day)	Total Production (cy)	Description
5/1	5/7	7	0	0	Setup and site access
5/8	8/25	110	100	11,000	Excavation/backfill operations
8/26	9/1	7	0	0	Teardown and site restoration
			Max excavation/backfill per year per team	11,000	
			High volume estimate of soil (cy)	24,107	
			Excavation/Backfill Teams required	3	

Assume barge offloads equipment at Fort Glenn on 1 May at the earliest, and loads equipment for demobilization 1 September at the latest each field season.
Excavation rate is 100 cy per day per Excavation Team; for backfill, assume the same rate per Backfill Team.

Treatment Duration
Assume tilling starts on 1 May, and ends 1 September of each field season.
Treatment rate is estimated at 3 years with constant tilling and no amendment additions.

Schedule Narrative

2021	Planning; Site Visit; Work Plan
2022	Excavation field effort: onsite starting 1 May to 21 August with 1 week setup, 1 week teardown.
2023	Tech memo for 2022 field effort; tilling field effort: onsite starting 1 May to 1 September.
2024	Tech memo for 2023 field effort; tilling field effort: onsite starting 1 May to 1 September.
2025	Tech memo for 2024 field effort; tilling field effort: onsite starting 1 May to 1 September.
2026	Tech memo for 2025 field effort; backfill field effort: onsite starting 1 May to 21 August with 1 week setup, 1 week teardown.
2027	Project reporting

Total duration 84 months

2022 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/22	5/7/22	7	0	0	Setup and site access
5/8/22	7/27/22	81	300	24,300	Excavation operations
7/28/22	8/3/22	7	0	0	Teardown and site restoration
			Total treated volume	24,107	
			Total field duration	95	
			Number of resupply flights	12	

2023 Field Schedule

Start Date	Finish Date	Duration	Description	
5/1/23	9/1/23	124	Tilling operations	
			Total field duration	124
			Number of resupply flights	4

2024 Field Schedule

Start Date	Finish Date	Duration	Description	
5/1/24	9/1/24	124	Tilling operations	
			Total field duration	124
			Number of resupply flights	4

2025 Field Schedule

Start Date	Finish Date	Duration	Description	
5/1/25	9/1/25	124	Tilling operations	
			Total field duration	124
			Number of resupply flights	4

2026 Field Schedule

Start Date	Finish Date	Duration	Production Rate (cys per day)	Total Production (cys)	Description
5/1/26	5/7/26	7	0	0	Setup and site access
5/8/26	7/27/26	81	300	24,300	Backfill operations
7/28/26	8/3/26	7	0	0	Teardown and site restoration
			Total treated volume	24,107	
			Total field duration	95	
			Number of resupply flights	12	

Excavation Field Effort
Personnel

5	Operators	
3	Truck drivers	
3	Arch	
4	Laborer	Includes housekeeper
3	Scientist	
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	surveyor	
1	assistant surveyor	Geospatial specialist rate

All personnel will stay in Fort Glenn Lodge, along with two cabins

Excavation Teams	15	people
Landfarm Team	2	people
Support Team	7	people
Survey Team	2	people
Total Excavation Crew	26	people

Excavation Team

Equipment	Personnel
350 Excavator	Operator
15-yard Rock Truck	Truck driver
UTV	Arch
	Scientist
	Laborer

Support Team

Equipment	Personnel
Tracked Skid steer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Landfarm Team

Equipment	Personnel
350 Excavator	Operator
Dozer	Operator

Survey Team

Equipment	Personnel
UTV	Surveyor
	Asst. surveyor

Marooka - used by both Excavation and Backfill Teams

Tilling Field Effort

1	Operator	
1	Laborer	
1	Cook	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate
1	Mechanic	
2	Scientist	

All personnel will stay in Fort Glenn Lodge

Landfarm Team		2	people
Support Team		1	people
Total Crew		3	people
Survey Team		2	people
Mechanic		1	people
Sampling Team		2	people

Backfill Team		8	people
Support Team		7	people
Total Excavation Crew		15	people
Survey Team		2	people
Sample Team		1	person

Backfill Field Effort
Personnel

5	Operators	
3	Truck drivers	
1	Laborer	Includes housekeeper
1	Field Team Lead	Engineer rate
1	Superintendent	
1	Mechanic	
1	Cook	Subcontracted
1	Camp manager	Construction manager rate
1	EMT	Subcontracted
1	Surveyor	
1	Assistant surveyor	Geospatial specialist rate
1	Scientist	

All personnel will stay in Fort Glenn Lodge

Backfill Team

Equipment	Personnel
Dozer	Operator
15-yard Rock Truck	Truck driver
UTV	

Support Team

Equipment	Personnel
Tracked Skidsteer	Field team lead
Fuel Truck	Superintendent
UTV	Mechanic
UTV	Cook
960 Loader	Camp manager
	EMT
	Housekeeper

Landfarm Team

Equipment	Personnel
200 Excavator	Operator
Dozer	Operator

Marooka used in place of Rock Truck as required

Survey Team

Equipment	Personnel
UTV	Surveyor
	Asst. surveyor

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Equipment Burn Rates

Diesel Equipment	gal/day	Notes
350 Excavator	42	
200 Excavator	25	
750 Dozer	25	
15-yard Rock Truck	100	
Marooka	13	
Tracked Skidsteer	17	
Fuel Truck	4	
960 Loader	13	
50kw Generator	100	Rented as part of lodge
Truck	5	Rented from lodge, assume diesel truck
Total gal 2022	60,563	
Total gal 2023	15,845	
Total gal 2024	15,845	
Total gal 2025	15,845	
Total gal 2026	54,229	

Assumes all equipment used every day for excavation and backfill durations.

Gasoline Equipment	gal/day	Number Used	Total	
UTV (excavation)	5	5	25	
UTV (backfill)	5	5	25	
		Total gal 2,022	2,375	2x 2,000 gal with mob
		Total gal 2,026	2,375	2x 2,000 gal with mob

Diesel Fuel Storage	Volume	Number	Total Volume	Notes
15000-gal AST at Lodge	15,000	1	15,000	
25,000-gal AST rental	25,000	2	50,000	onsite for excavation and backfill only
		Total volume	65,000	
		Number fueling trips required 2022	0	
		Number fueling trips required 2023	0	
		Number fueling trips required 2024	0	
		Number fueling trips required 2025	0	
		Number fueling trips required 2026	0	

Assumes fuel storage containers mobilized full, and equipment barge has capacity to fill AST at Fort Glenn Lodge fully.

Large Equipment Costs Rates

Equipment	Rate	Unit	Notes
350 Excavator	$ 10,900.00	month	
200 Excavator	$ 6,500.00	month	
750 Dozer	$ 7,900.00	month	
15-yard Rock Truck	$ 12,900.00	month	
Marooka	$ 9,900.00	month	
Tracked Skidsteer	$ 3,650.00	month	
Fuel Truck	$ 7,400.00	month	
960 Loader	$ 7,900.00	month	
UTV	$ 3,360.00	month	
50kw Generator	$ 2,910.00	month	
Shipping Container	$ 15.00	day	
Tundra Mats (75)	$ 675.00	day	
Tundra Mat Mob/Demob	$ 2,900.00	LS	
Incinerator	$ 118.00	ton	
Truck	$ 300.00	day	Rented from lodge
2,000-gal Water Tank	$ 500.00	month	

ODCs

Description	Rate	Unit	Notes
Incinerator Mob/Demob	$ 30,000.00	LS	
2,000-gal AST	$ 1,000.00	each	
Barge to/from Anchorage	$ 273,750.00	each	
Barge load/unload fee	$ 1,620.00	each	
Container Transport to/from Port of Anchorage	$ 300.00	each	Assumes truck at $150 per hour, 2 hours per container
Mob/Demob to Port of Anchorage	$ 4,850.00	each	Heavy equipment only
Diesel	$ 3.75	gal	
Gasoline	$ 4.00	gal	

Lodging

Description	Rate	Unit	Notes
Fort Glenn Lodge - camp	$ 3,000.00	night	20 people
Fort Glenn Lodge - cabin #1	$ 300.00	night	3 people
Fort Glenn Lodge - cabin #2	$ 300.00	night	3 people
Fort Glenn Lodge - overnight lodging	$ 200.00	night	per person

Purchase

Description	Rate	Unit	Notes
D6 Dozer	$ 430,000.00	each	
24" Root Rake for front blade	$ 5,450.00	each	
Root Rake Shipping	$ 2,000.00	each	
Multi Shank Ripper Attachment	$ 20,000.00	each	
Dozer with Tilling Equipment	$ 457,450.00	LS	Purchase to leave on-island for tilling

Engineering Evaluation/Cost Estimate, Fort Glenn FUDS F10AK029802, Project 02; Landfarming - High Estimate
Analytical Laboratory Cost Estimate

ANALYTE	METHOD	SAMPLE TYPE	MATRIX	TAT	# SAMPLES	MS/MSD	DUP (Triplicate for ISM)	TRIP BLANK	Total # Analyses	EMax Lab Unit Cost	EMax Lab Ext. Cost	TASK TOTALS
Composite Sampling at Features Prior to Excavations												
VOCs	SW8260D	Confirmation	SO	24 hr	68	4	7	4	87	$199.50	$15,760.50	**Composite Sampling at Features Prior to Excavations**
PAH	SW8270C	Confirmation	SO	24 hr	68	4	7	0	83	$236.25	$17,718.75	
Pesticides	SW8081	Confirmation	SO	24 hr	68	4	7	0	83	$231.00	$17,325.00	
GRO	AK101	Confirmation	SO	24 hr	68	4	7	4	87	$115.50	$9,124.50	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	68	4	7	0	83	$136.50	$10,237.50	
PCBs	SW8082	Confirmation	SO	24 hr	68	4	7	0	83	$147.00	$11,025.00	
RCRA Metals	E200.8	Confirmation	SO	24 hr	68	4	7	0	83	$220.50	$16,537.50	
									SUBTOTAL =		$97,728.75	$97,728.75
									OTHER CHARGES/EDDs/DELIVERABLES =		$7,900.00	$7,900.00
									TOTAL =		$105,628.75	$105,628.75
Confirmation Samples												
VOCs	SW8260D	Confirmation	SO	24 hr	857	43	86	43	1072	$199.50	$196,707.00	**Confirmation Samples**
PAH	SW8270C	Confirmation	SO	24 hr	857	43	86	0	1029	$236.25	$222,783.75	
GRO	AK101	Confirmation	SO	24 hr	857	43	86	43	1072	$115.50	$113,883.00	
DRO/RRO	AK102/103	Confirmation	SO	24 hr	857	43	86	0	1029	$136.50	$128,719.50	
									SUBTOTAL =		$662,093.25	$662,093.25
									OTHER CHARGES/EDDs/DELIVERABLES =		$98,600.00	$98,600.00
									TOTAL =		$760,693.25	$760,693.25
ISM Baseline Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	4	1	2	0	8	$95.00	$570.00	**ISM Baseline Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	4	1	2	1	9	$95.00	$665.00	
PAH	SW8270C	Landspread ISM	SO	14 day	4	1	2	0	8	$105.00	$630.00	
GRO	AK101	Landspread ISM	SO	14 day	4	1	2	1	9	$55.00	$385.00	
DRO/RRO	AK102/103	Landspread ISM	SO	14 day	4	1	2	0	8	$65.00	$390.00	
									SUBTOTAL =		$2,640.00	$2,640.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$700.00	$700.00
									TOTAL =		$3,340.00	$3,340.00
ISM Sampling of Landfarm Soil - Post-Tilling (annually)												
ISM PREP	ITRC	Landspread ISM	SO	14 day	25	2	6	0	35	$95.00	$2,945.00	**ISM Sampling of Landfarm Soil - Post-Tilling (annually)**
VOCs	SW8260D	Landspread ISM	SO	14 day	25	2	6	2	37	$95.00	$3,135.00	
PAH	SW8270C	Landspread ISM	SO	14 day	25	2	6	0	35	$105.00	$3,255.00	
GRO	AK101	Landspread ISM	SO	15 day	25	2	6	2	37	$55.00	$1,815.00	
DRO/RRO	AK102/103	Landspread ISM	SO	16 day	25	2	6	0	35	$65.00	$2,015.00	
									SUBTOTAL =		$13,165.00	$13,165.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$3,300.00	$3,300.00
									TOTAL =		$16,465.00	$16,465.00
ISM Post-Treatment Sampling of Landspread Area												
ISM PREP	ITRC	Landspread ISM	SO	14 day	4	1	2	0	8	$95.00	$570.00	**ISM Post-Treatment Sampling of Landspread Area**
VOCs	SW8260D	Landspread ISM	SO	14 day	4	1	2	1	9	$95.00	$665.00	
PAH	SW8270C	Landspread ISM	SO	14 day	4	1	2	0	8	$105.00	$630.00	
GRO	AK101	Landspread ISM	SO	15 day	4	1	2	1	9	$55.00	$385.00	
DRO/RRO	AK102/103	Landspread ISM	SO	16 day	4	1	2	0	8	$65.00	$390.00	
									SUBTOTAL =		$2,640.00	$2,640.00
									OTHER CHARGES/EDDs/DELIVERABLES =		$700.00	$700.00
									TOTAL =		$3,340.00	$3,340.00
									GRAND TOTAL =		$889,467.00	$889,467.00

Notes:
Assume no equipment blanks will be required for this project.
Assume ISM triplicate samples will be collected 1 per 10 primary samples.
Assume ISM samples will be collected from contaminated soil at a frequency of 1 per 1000 CY.
Field duplicates estimated at 10% frequency (one per 10 or fewer primary samples) and MS/MSD at 5% frequency (one per 20 or fewer primary samples).
Requested laboratory EDDs will include searchable and bookmarked Level IV PDF and SEDD version 5.2, Stage 2A compliant with the USACE-AK POA Instructional Set.
Shipping/courier fees not included in laboratory pricing.
5035 supply for AK101 and 8260 - $25 per preweighed 25ml methanol jar.

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Empty, Crush, and Dispose of Approximately 2554 drums

Field Duration 109 days

Equipment	Rate	Number	Unit	Total	
Open top containers	$ 15.00	9	day	$ 14,715.00	
Overpacks	$ 175.00	15	each	$ 2,625.00	
275 gal ISO tanks	$ 950.00	2	each	$ 1,900.00	
Grease and Tar Disposal	$ 8,775.00	15	overpack	$ 8,775.00	
Heating and Lube Oil Disposal	$ 1,725.00	450	gallons	$ 1,725.00	
Demobilization barging	$ 18,250.00	15	day	$ 273,750.00	per 40-foot container
Barge load/unload fee	$ 1,620.00	2	each	$ 3,240.00	
Container Transport Cost	$ 300.00	9	each	$ 2,700.00	
Oil Characterization Analysis	$ 275.00	2	each	$ 550.00	
			Total	**$ 309,980.00**	

Basis of Estimate:

300 crushed drums per 40-foot container.

Assume crushing and transport of the drums contents is covered under the main field task, and all drums removed first year of field effort.

Assume mobilization of open-top containers is covered under the main field task; open-top containers are filled as part of activities in main task, and remain onsite for field duration.

Demobilization costs require a separate barge from the main field task, and is loaded as part of site teardown in 1 day.

Travel times for barge include Seward to Fort Glenn (5 days), Fort Glenn to Anchorage (6 days), and Anchorage to Seward (2 days).

Metal reclaimer in Anchorage accepts drums for no charge. Takes one day to offload and transport containers from dock.

Product is characterized as part of main task, and transferred to waste subcontractor for disposal in Anchorage.

Product for disposal is non-hazardous.

EPL

General Field Supplies	Quantity	Unit	Unit Price	Total
Sharpies	24	each	$ 1.52	$ 36.48
Power Tank Pens	20	each	$ 12.12	$ 242.40
Rite in the rain notebooks	15	each	$ 14.36	$ 215.40
Highlighters, pens, pencils	5	misc. box	$ 20.00	$ 100.00
Large Rite in the rain notebooks	5	each	$ 16.65	$ 83.25
Rite in the rain copier paper	10	box	$ 33.61	$ 336.10
Paper towels	100	roll	$ 3.15	$ 315.00
Contractor trash bags	5	box (50 ct)	$ 24.53	$ 122.65
Clear tape	10	roll	$ 6.34	$ 63.40
Strapping tape	10	roll	$ 5.40	$ 54.00
Sample Fridge/Freezer	2	each	$ 1,100.00	$ 2,200.00
Labels, "Keep Refrigerated", 2" x 3".	100	each	$ 0.18	$ 18.00
Excepted quantities stickers	100	each	$ 0.23	$ 23.00
Labels, "Fragile", 4" H x 4" W.	100	each	$ 0.23	$ 23.00
Labels, "Up Arrows", 4" H x 3" W.	100	each	$ 0.18	$ 18.00
Extra batteries (AA, AAA, C, D)	5	misc. boxes	$ 45.00	$ 225.00
Alconox, 4 lb. Box.	4	4lb box	$ 38.48	$ 153.92
Scissors	5	each	$ 4.63	$ 23.15
Clipboard	12	each	$ 30.60	$ 367.20
Calibration Gas, Isobutylene 100 ppm	5	each	$ 63.90	$ 319.50
Long handle brushes (decon)	10	each	$ 18.06	$ 180.60
Survey tape	10	each	$ 2.48	$ 24.80
Tape measure	5	each	$ 20.00	$ 100.00
Ratchet straps	30	each	$ 9.77	$ 293.10
cloth measuring tape (200')	3	each	$ 51.50	$ 154.50
Spray paint (multiple colors)	10	each	$ 5.50	$ 55.00
Folding Table	3	each	$ 49.95	$ 149.85
Folding Canopy	3	each	$ 126.50	$ 379.50
Lath 36" (bundle of 50)	8	bundle	$ 32.95	$ 263.60
Pin Flags (bundle of 100)	10	bundle	$ 10.80	$ 108.00
Ziploc Freezer Bags, Gallon, 14 ct	5	box	$ 9.95	$ 49.75
Quart Freezer bags (54)	10	box	$ 4.28	$ 42.80
Sample spoons	500	each	$ 0.66	$ 330.00
Shovels (space, square, clam)	3	set of 3	$ 97.50	$ 292.50
Potable water jug, 5-gallon	10	each	$ 6.00	$ 60.00
Generator 5,000 watt	2	each	$ 485.00	$ 970.00
Electric heaters	3	each	$ 1,080.00	$ 3,240.00
1/4" poly rope	2	600-ft rope	$ 45.00	$ 90.00
Duct tape	10	roll	$ 4.00	$ 40.00
Box cutter + extra blades	5	each	$ 9.25	$ 46.25
Water Spray Bottles	10	each	$ 4.15	$ 41.50
Buckets with screw top lids	10	each	$ 27.80	$ 278.00
Deionized water	50	gallon	$ 7.35	$ 367.50
Trash bags	5	box (50 ct)	$ 17.00	$ 85.00
GAC	5	55-gal	$ 300.00	$ 1,500.00
Bubble wrap	10	roll	$ 13.00	$ 130.00
Extension cords (Heavy duty, 50')	12	each	$ 30.50	$ 366.00
Extension cords (Heavy duty, 100')	6	each	$ 58.85	$ 353.10
Power strip	10	3	$ 6.50	$ 65.00
			Total	**$ 14,995.80**

Site Satellite Communications

Item	Lump Sum	Monthly
VHF Repeater Solar Powered		$1,500.00
VHF Portable Rental Radios (20 each)		$2,800.00
VSAT Hardware		$4,000.00
VSAT Service Plan		$4,500.00
Installation Services and Set up	$5,800.00	
Travel Costs for Set up crew	$500.00	
Food Costs for Set up crew	$1,469.00	
Totals	**$7,769.00**	**$12,800.00**

Assume setup crew will fly out on weekly charter flight and will stay in the lodge.

Rentals

Item	Daily	Weekly	Monthly	Weekly Rate per Day
Magnetometer	$ 20.00	$ 60.00	$ 180.00	$ 8.57
Mapping Grade GPS w/ Tablet	$ 135.00	$ 410.00	$ 1,225.00	$ 58.57
Camera (waterproof, shockproof)	$ 30.00	$ 90.00	$ 270.00	$ 12.86
Rae, MiniRae 2000 PID, includes regulator	$ 86.00	$ 258.00	$ 774.00	$ 36.86
Scale, 320g	$ 8.00	$ 24.00	$ 72.00	$ 3.43
Satellite Phone	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Garmin InReach	$ 18.00	$ 50.00	$ 110.00	$ 7.14
Marine Grade Radios (3 each)	$ 105.00	$ 310.00	$ 930.00	$ 44.29
Electric bike	$ 150.00	$ 450.00	$ 1,350.00	$ 64.29
RTK System- tripod, rod, tribrac	$ 520.00	$ 1,565.00	$ 4,700.00	$ 223.57
Radios (3 each) and Repeater System	$ 205.00	$ 620.00	$ 1,860.00	$ 88.57
Oil Water Interface Probe	$ 50.00	$ 155.00	$ 460.00	$ 22.14
Port-a-potty	$ 60.00	$ 180.00	$ 545.00	$ 25.71
Drone	$ 650.00	$ 3,000.00	$ 9,000.00	$ 428.57
Totals	**$ 2,247.00**	**$ 7,802.00**	**$ 23,371.00**	**$ 1,114.57**

APPENDIX D
RESPONSE TO COMMENTS

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PROJECT: Fort Glenn CON/HTRW Project 02 Formerly Used Defense Site F10AK029802
DOCUMENT: Draft-Final EE/CA Report
Stakeholder Comment Summary

COMMENTER	COMMENTS	DATE
Alaska Department of Transportation and Public Facilities		
– Thomas A. Hildreth – Airport Leasing Specialist II AKDOT&PF Statewide Aviation Leasing Central Region Office 4111 Aviation Ave P.O. Box 196900 Anchorage, AK 99519-0600 907-269-0736 (office) 907-269-0489 (fax) thomas@alaska.gov	DOT&PF would like request that USACE involve the DOT&PF as the CERCLA process continues.	16 February 2021
Benjamin Storey – Regional Environmental Manager/PQI Archaeology AKDOT&PF, Southcoast Region P.O. Box 112506 Juneau, Alaska 99811-2506 907-465-4509 (office) benjamin.storey@alaska.gov		
Justin Hayes AKDOT&PF, Southcoast Region P.O. Box 112506 Juneau, Alaska 99811-2506		
Native Village of Nikolski		
Arnold Dushkin - President Native Village of Nikolski P.O. Box 105 Nikolski, AK 99638 nvnikolski@hotmail.com 907-576-2225 (office)	No response	N/A
Tanya Lestenkof - Tribal Administrator Native Village of Nikolski P.O. Box 105 Nikolski, AK 99638 nvnikolksi@hotmail.com 907-576-2225		

COMMENTER	COMMENTS	DATE
Qawalangin Tribe of Unalaska		
Executive Director Qawalangin Tribe of Unalaska P.O. Box 334 Unalaska, AK 99685 chris@qawalangin.com 907-359-3515 (cell) 907-581-2920 (office)	No response	N/A
Blaine Shaishnikoff – President Qawalangin Tribe of Unalaska P.O. Box 334 Unalaska, AK 99685 blaine.shai@qawalangin.com 907-581-2920 (office)		
Chandra Poe – Environmental Director Qawalangin Tribe of Unalaska P.O. Box 334 Unalaska, AK 99685 907-581-2920 (office) chandra@qawalangin.com		
Elise Contreras – TRP/NALEMP Project Manager Qawalangin Tribe of Unalaska P.O. Box 334 Unalaska, AK 99685 907-581-2920 (office) elise@qawalangin.com		
Elena Ramirez – Lands and Infrastructure Director Qawalangin Tribe of Unalaska P.O. Box 334 Unalaska, AK 99685 907-581-2920 (office) elena@qawalangin.com		

COMMENTER	COMMENTS	DATE
U.S. Fish & Wildlife Service		
Izembek National Wildlife Refuge U.S. Fish & Wildlife Service P.O. Box 127 MS 515 Cold Bay, Alaska 99571-0127 877-837-6332 907-532-2445 izembek@fws.gov	No comments	16 February 2021
Tim Plucinski - Environmental Contaminants Biologist U.S. Fish and Wildlife Service Alaska Maritime National Wildlife Refuge 1011 E. Tudor Rd MS 235 Anchorage, AK 99503 (O) 907-786-3464 (C) 907-242-7030 Email: timothy.plucinski@fws.gov		
Rita A. Miraglia - Archaeologist US Fish and Wildlife Service 1011 East Tudor Road Anchorage, Alaska 99503 Office: 907-786-3491 Cell: 907-350-6388 Fax: 907-786-3976 rita_miraglia@fws.gov		
Patrick Fitzmorris - Wildlife Biologist Izembek National Wildlife Refuge U.S. Fish & Wildlife Service PO Box 127 Cold Bay, AK 99571 877-837-6332 (toll free) 907-532-2445 (office) Patrick_fitzmorris@fws.gov		

COMMENTER	COMMENTS	DATE
Jeremy M. Karchut Regional Archaeologist/Regional Historic Preservation Officer US Fish & Wildlife Service, Alaska Region 1011 East Tudor Road Anchorage, AK 99503 Office: 907-786-9933 jeremy_karchut@fws.gov		
Tanadgusix Corporation		
Christopher Mandregan, Jr. - CEO Tanadgusix Corporation 3601 C. Street, Suite 1000 Anchorage, AK 99503 chrism@tdxcorp.com 907-278-2316 (office)	No response	N/A
Jason Bourdukofsky - President 3601 C Street, Ste 1000 Anchorage, AK 99503 907-278-2312 info@tdxcorp.com		
Constance Bergo - Lands Chair Tanadgusix Corporation 3601 C. Street, Suite 1000 Anchorage, AK 99503 connieb@tdxcorp.com		
St. George Tanaq Corporation		
Nathan McCowan - President St. George Tanaq Corporation 701 Sesame Street, Suite 200 Anchorage, AK 99503 nmccowan@tanaq.com 907-723-2373 (cell) 907-272-9886 (office)	No response	N/A

COMMENTER	COMMENTS	DATE
Museum of the Aleutians		
Dr. Virigina Hatfield – Executive Director Museum of the Aleutians virginiahatfield@aleutians.org 907-581-5150 (office)	No response	N/A
National Park Service		
Janet Clemens - National Register Historian National Park Service, Alaska Regional Office 240 West 5th Avenue Anchorage, AK 99501 907-644-3461 janet_clemens@nps.gov	See response letter included in this appendix.	18 February 2021
Aleutian Pribilof Islands Association, Inc.		
Dimitri Philemonof - President and CEO Aleutian Pribilof Islands Association, Inc. 1131 E International Airport Road Anchorage, AK 99518 907-276-2700 apiai@apiai.org dimitrip@apiai.org	No response	N/A
Karen Pletnikoff - Environmental and Safety Program Manager Aleutian Pribilof Islands Association, Inc. 1131 E. International Airport Rd. Anchorage, AK 99518 karenp@apiai.org 907-276-2700 (office)		
Dr. Michael Livingston - Cultural Heritage Specialist Aleutian Pribilof Islands Association mikel@apiai.org 907-276-2700 (office)		

COMMENTER	COMMENTS	DATE
Aleut Corporation		
Melvin Smith - Manager of Resource Development Aleut Corporation 4000 Old Seward Hwy., Suite 300 Anchorage, AK 99503 907-561-4300 msmith@aleutcorp.com	No response	N/A
Sharon Lind - Chair 4000 Old Seward Hwy, Ste 301 Anchorage, AK 99503 907-561-4300 TACdirectors@aleutcorp.com		
Alaska Department of Environmental Conservation		
Sammi Castle – Project Manager Alaska Department of Environmental Conservation Division of Spill Prevention and Response, Contaminated Sites Program 555 Cordova Street, Anchorage, Alaska 99501 907-269-7520 (office) sammi.castle@alaska.gov	See RTCs included in this appendix.	
Alaska DNR Office of History and Archaeology		
Ms. Sarah Meitl - Review and Compliance Coordinator Alaska DNR Office of History and Archaeology 550 W. 7th Avenue, Suite 1310 Anchorage, Alaska 99501 Email: sarah.meitl@alaska.gov Phone: (907) 269-8720	See response letter included in this appendix.	12 February 2021
Ms. Judith Bittner - Alaska State Historic Preservation Officer Alaska DNR Office of History and Archaeology 550 W 7th Avenue, Suite 1310 Anchorage, AK 99501-3565 Email: judy.bittner@alaska.gov Phone: 907-269-8700		

COMMENTER	COMMENTS	DATE
Bering Pacific Ranches Limited		
Patrick Harvie Bering Pacific Ranches Limited P.O. Box 326 Unalaska, Alaska 99685 403-931-3583 (cell) 403-650-7741 patharvie3@gmail.com	No response	N/A
Bering Pacific Ranches Limited 32 Abingdon, Cres SW Calgary, Alberta, Canada T2A 6S3		
Roy Baker, Registered Agent Alaska Natural Meats Ltd. Bering Pacific Ranches Limited 8150 Petersburg Street Anchorage, Alaska 99507		
Pribilof Islands Aleut Communities of Saint George Island (Federal Register), Saint George Traditional Council		
Christopher Merculief – President President Christopher Merculief PO Box 940 St. George Island, AK 99591-0940 907-859-2205 stgtribe@gci.net chrismerculief@yahoo.com	No response	N/A
Pribilof Islands Aleut Communities of Saint Paul Island (Federal Register), Aleut Community of St. Paul Island		
Amos Philemonoff - President PO Box 86 St. Paul Island, AK 99660 907-546-3200 president@aleut.com	No response	N/A

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From: Storey, Benjamin M (DOT)
To: Craner, Jeremy D CIV USARMY CEPOA (USA)
Subject: [Non-DoD Source] RE: Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report
Date: Tuesday, February 16, 2021 8:15:13 AM

Good morning Mr. Craner,

Thank you for the opportunity to comment on the Engineering Evaluation/Cost Analysis for the Fort Glenn CON/HTRW Formerly Used Defense Site (FUDS). The Alaska Department of Transportation & Public Facilities (DOT&PF) is a landowner in the Main Airfield area of Ft. Glenn. As such, we request that the USACE involve the DOT&PF as the CERCLA process continues.

Thanks again for reaching out and we look forward to working with you through this process,

Ben

Benjamin M. Storey
Regional Environmental Manager/PQI Archaeology
DOT&PF, Southcoast Region
6860 Glacier Highway
Juneau, AK 99811
Phone: 907.465.4509 | Mail: P.O. Box 112506, Juneau, Alaska 99811-2506

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017 and executed by FHWA and DOT&PF.

-----Original Message-----
From: Craner, Jeremy D CIV USARMY CEPOA (USA) <Jeremy.D.Craner@usace.army.mil>
Sent: Wednesday, January 13, 2021 3:16 PM
To: Kell, Michael W (DOT) <michael.kell@alaska.gov>; al.burton@alaska.gov; Storey, Benjamin M (DOT) <benjamin.storey@alaska.gov>; nvnikolski@hotmail.com; chris@qawalangin.com; blaine.shai@qawalangin.com; chandra@qawalangin.com; elise@qawalangin.com; izembek@fws.gov; patrick_fitzmorris@fws.gov; timothy.plucinski@fws.gov; chrism@tdxcorp.com; connieb@tdxcorp.com; nmccowan@tanaq.com; virginiahatfield@aleutians.org; janet_clemens@nps.gov; karenp@apiai.org; mikel@apiai.org; msmith@aleutcorp.com; rita_miraglia@fws.gov; jeremy_karchut@fws.gov; Castle, Sammi (DEC) <sammi.castle@alaska.gov>; Meitl, Sarah J (DNR) <sarah.meitl@alaska.gov>; Bittner, Judith E (DNR) <judy.bittner@alaska.gov>; patharvie3@gmail.com; stgtribe@gci.net; chrismerculief@yahoo.com; president@aleut.com; info@tdxcorp.com; TACdirectors@aleutcorp.com; apiai@apiai.org; dimitrip@apiai.org
Cc: Kranda, Forrest J CIV USARMY CEPOA (USA) <Forrest.J.Kranda@usace.army.mil>; Erik Dahl <edahl@briceeng.com>; Salamanca, Jenny Areli CIV (USA) <Jenny.A.Salamanca@usace.army.mil>; Geist, Lisa K CIV USARMY CEPOA (USA) <Lisa.K.Geist@usace.army.mil>; POA Fuds Program POA <POA-Fuds@usace.army.mil>
Subject: Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

Hello all,

We are planning to follow the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Engineering Evaluation/Cost Analysis (EE/CA) process for cleanup of 4 containerized waste projects at Fort Glenn on Umnak Island. This process is fairly straight forward and involves the landowners, stakeholders, and

general public in the decision making process. As many of you are well award, Fort Glenn is a National Historic Landmark and we intend to work within this sensitive area with care.

Attached is the EE/CA report which lays out remedial alternatives for consideration related to the Drum Piles project. In an effort of transparency, you are receiving this draft work plan for your review and input. Attached is the draft EE/CA report, blank comment form, and updated contact sheet. DUE DATE TO PROVIDE COMMENTS: FEBRUARY 12, 2021.

Future EE/CA's will soon be generated and submitted for comments similar to the Drum Piles project.

Public meetings are tentatively planned for this spring and at this time will be virtual. Non-time critical removal actions are anticipated to begin in 2022/2023 following the generation of Action Memorandums which will line out what will be conducted.

The USACE Alaska District looks forward to working with you to addressing cleanup activities at these Formerly Used Defense Sites (FUDS) projects in the future. If you have any questions please email me privately. If you feel someone else not included in this message should also receive this information please feel free to forward this message on to them.

Thanks,
Jeremy

Jeremy Craner, P.G.
Project Manager
Formerly Used Defense Sites (FUDS)
USACE Alaska District (PM-ESP)
Joint Base Elmendorf-Richardson, Alaska
907.753.2628 (office)
907.201.3446 (cell)

From:	Karchut, Jeremy M
To:	Kranda, Forrest J CIV USARMY CEPOA (USA)
Cc:	Craner, Jeremy D CIV USARMY CEPOA (USA)
Subject:	[Non-DoD Source] RE: [EXTERNAL] Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report
Date:	Tuesday, February 16, 2021 9:50:31 AM

Thank you very much for the information and explanation Forrest. At first I thought Fort Glenn was on USF&WS land but it is clearly not. I appreciate it!
Jeremy

Jeremy M. Karchut
Regional Archaeologist/ Regional Historic Preservation Officer
US Fish & Wildlife Service, Alaska Region
1011 E. Tudor Rd.
Anchorage, AK 99503
907.786.9933
jeremy_karchut@fws.gov

-----Original Message-----
From: Kranda, Forrest J CIV USARMY CEPOA (USA) <Forrest.J.Kranda@usace.army.mil>
Sent: Thursday, February 11, 2021 4:46 PM
To: Karchut, Jeremy M <jeremy_karchut@fws.gov>
Cc: Craner, Jeremy D CIV USARMY CEPOA (USA) <Jeremy.D.Craner@usace.army.mil>
Subject: RE: [EXTERNAL] Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

Jeremy,

Thanks for reaching out! At the district we are still in the process of fine tuning how our CERCLA projects interact with our responsibilities as an agency in regards to cultural resources at our project sites, most of which themselves are in fact the subject of the project. As this is a CERCAL project the applicable requirements of the National Historic Preservation Act (NHPA) include only those that are substantive rather than those portions of the law that are procedural or administrative [42 USC 9621(d)]. What this means is that our agency responsibilities are to identity historic properties and avoid, minimize, and mitigate any adverse effects we have to the Fort Glenn National Historic Landmark. As such we will not be conducting formal Section 106 for this project and cannot enter into a Memorandum of Agreement to resolve any adverse effects. That being said, the USACE, Alaska District is still highly committed to working with stakeholders to provide forms of mitigation for our impacts to the NHL and contributing resources. Excellent point about using section 106 terms in the document, I can see how that is confusing since we are not actually following NHPA, that is a lesson learned on my end and we will adjust for future projects.

For communication with agencies, tribes, and the public we have sent the EE/CA to the SHPO, NPS, landowners, ANSCA Corporations, and local tribes for review and comment and are also developing plans to hold public meetings. Monitoring and documentation is our base line approach to the cultural resources (so the avoid and minimize part) and we are looking for comments on how we can improve on that or if our plan is sufficient. We are also looking for suggestions on potential mitigation efforts that we might implement as a part of the project since we know we will be impacting the drum piles which are listed as contributing to the NHL.

I am really glad you posed these questions as we are still trying to refine how address cultural resources under CERCLA and observations like this will only help us improve as we move forward and navigate this together. If you would like to discuss this more or have any more questions please feel free to call me on my personal cell phone 907-227-5479. We could also do a webex call if you would like. I have a really open schedule tomorrow and I am also willing to talk when ever is convenient for you including weekends.

- Forrest

Respectfully,

Forrest J. Kranda
Archaeologist, Alaska District
U.S. Army Corps of Engineers
Environmental and Special Programs
Email: Forrest.J.Kranda@usace.army.mil
Office: (907) 753-2736

-----Original Message-----
From: Craner, Jeremy D CIV USARMY CEPOA (USA) <Jeremy.D.Craner@usace.army.mil>
Sent: Thursday, February 11, 2021 1:55 PM
To: Karchut, Jeremy M <jeremy_karchut@fws.gov>; Kranda, Forrest J CIV USARMY CEPOA (USA) <Forrest.J.Kranda@usace.army.mil>
Subject: RE: [EXTERNAL] Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

Hi Jeremy,

Thanks for the questions. I think I could do an OK job answering these questions, however I would like to defer to our FUDS expert, Forrest Kranda, on this subject. We have had similar questions in the past and I want to be sure our answers are consistent as well.

Forrest - Could you please address the questions in the email below?

Thanks,
Jeremy

-----Original Message-----
From: Karchut, Jeremy M <jeremy_karchut@fws.gov>
Sent: Thursday, February 11, 2021 12:37 PM
To: Craner, Jeremy D CIV USARMY CEPOA (USA) <Jeremy.D.Craner@usace.army.mil>
Subject: [Non-DoD Source] RE: [EXTERNAL] Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

Hi Jeremy,
Thank you for the opportunity to review the EE/CA for the proposed Fort Glenn Project. Since these types of projects are a bit new to me, I have a couple of questions and hope you can help me understand the process and involvement from other agencies. I am wondering why the report refers to legal terms associated with the National Historic Preservation Act Section 106 and it's regulations (e.g., Area of Potential Effect, Adverse Effect, Historic Properties), but there is no mention that actual 106 procedures will be followed or whether consultations have taken or will take place. Is NHPA followed, or just archaeological documentation and monitoring? Also, I understand the CERCLA process is unique, however since this project is within a National Historic Landmark, will there be consultations with tribes, the Alaska SHPO and the NPS Alaska Regional Office?
Thank you,
Jeremy

Jeremy M. Karchut
Regional Archaeologist/ Regional Historic Preservation Officer
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-----Original Message-----
From: Craner, Jeremy D CIV USARMY CEPOA (USA) <Jeremy.D.Craner@usace.army.mil>
Sent: Wednesday, January 13, 2021 3:16 PM
To: michael.kell@alaska.gov; al.burton@alaska.gov; benjamin.storey@alaska.gov; Arnold Dushkin <nvnikolski@hotmail.com>; chris@qawalangin.com; blaine.shai@qawalangin.com; chandra@qawalangin.com; elise@qawalangin.com; izembek comment, FW7 <izembek@fws.gov>; Fitzmorris, Patrick J <patrick_fitzmorris@fws.gov>; timothy.plucinski@fws.gov; chrism@tdxcorp.com; connieb@tdxcorp.com; nmccowan@tanaq.com; virginiahatfield@aleutians.org; Clemens, Janet F <Janet_Clemens@nps.gov>; karenp@apiai.org; mikel@apiai.org; msmith@aleutcorp.com; Miraglia, Rita A <rita_miraglia@fws.gov>; Karchut, Jeremy M <jeremy_karchut@fws.gov>; Castle, Sammi (DEC) <sammi.castle@alaska.gov>; sarah.meitl@alaska.gov; judy.bittner@alaska.gov; patharvie3@gmail.com; stgtribe@gci.net; chrismerculief@yahoo.com; president@aleut.com; info@tdxcorp.com; TACdirectors@aleutcorp.com; apiai@apiai.org; dimitrip@apiai.org
Cc: Kranda, Forrest J CIV USARMY CEPOA (USA) <Forrest.J.Kranda@usace.army.mil>; Erik Dahl <edahl@briceeng.com>; Salamanca, Jenny Areli CIV (USA) <Jenny.A.Salamanca@usace.army.mil>; Geist, Lisa K CIV USARMY CEPOA (USA) <Lisa.K.Geist@usace.army.mil>; POA Fuds Program POA <POA-Fuds@usace.army.mil>
Subject: [EXTERNAL] Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hello all,

We are planning to follow the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Engineering Evaluation/Cost Analysis (EE/CA) process for cleanup of 4 containerized waste projects at Fort Glenn on Umnak Island. This process is fairly straight forward and involves the landowners, stakeholders, and general public in the decision making process. As many of you are well award, Fort Glenn is a National Historic Landmark and we intend to work within this sensitive area with care.

Attached is the EE/CA report which lays out remedial alternatives for consideration related to the Drum Piles project. In an effort of transparency, you are receiving this draft work plan for your review and input. Attached is the draft EE/CA report, blank comment form, and updated contact sheet. DUE DATE TO PROVIDE COMMENTS: FEBRUARY 12, 2021.

Future EE/CA's will soon be generated and submitted for comments similar to the Drum Piles project.

Public meetings are tentatively planned for this spring and at this time will be virtual. Non-time critical removal actions are anticipated to begin in 2022/2023 following the generation of Action Memorandums which will line out what will be conducted.

The USACE Alaska District looks forward to working with you to addressing cleanup activities at these Formerly Used Defense Sites (FUDS) projects in the future. If you have any questions please email me privately. If you feel someone else not included in this message should also receive this information please feel free to forward this message on to them.

Thanks,
Jeremy

Jeremy Craner, P.G.
Project Manager
Formerly Used Defense Sites (FUDS)
USACE Alaska District (PM-ESP)
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REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

DOCUMENT: Draft EE/CA Report

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
Blanket comment from the Alaska District FUDS: Environmental restoration for DERP-FUDS is conducted following the Defense Environmental Restoration Account, 10 U.S.C. § 270 et seq. Funding appropriated to the Environmental Restoration (ER)-FUDS account may be used to remediate releases of petroleum where the release poses an imminent and substantial endangerment to the public health or welfare or to the environment [10 USC 2701(b)(2)]. Because of the linkages between the DERP and CERCLA and the delegation of certain Presidential authorities under CERCLA to DoD, CERCLA is DoD's preferred framework for environmental restoration. As you've eluded to in the comments, the CERCLA framework doesn't provide for a mechanism for establishing cleanup values for POL. Therefore, in those cases where POL poses an imminent and substantial endangerment to the public health or welfare or to the environment we will continue to use 18AAC75 as the guidelines for determining cleanup values for POL.					
1	Page ix, Executive Summary, First Paragraph	Text states: "This EE/CA document was completed in general accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and prepared in accordance with the U.S. Environmental Protection Agency (EPA) guidance document *Guidance on Conducting Non-Time Critical Removal Actions under CERCLA* (EPA 1993)." ADEC notes that this remedial action should not be conducted under CERCLA since Project 02 pertains only to petroleum contaminated soil and associated drums, and petroleum is not considered a hazardous substance under CERCLA. Text in Sections 5.2, 6.4.4.1, and 6.4.6.1 states that COPCs are limited to POL constituents and that any non-POL compounds found to be associated with the drum features will be included under a separate FUDS project.		This Project 02 EE/CA will focus on the removal of source soils (POL and non-POL, both of which may be addressed under the same FUDS or broken into separate projects at a later date) and will move forward with conducting the NTCRA under CERCLA. This Project 02 EE/CA report will be conducted under the CERCLA process because there is currently not enough information to determine the presence/absence of CERCLA compounds; note that the objective is to address all source soils, although it is currently written to address POL contamination as this is the most likely contaminant group present. The NTCRA approach will be modified as necessary depending on the results of the pre-excavation sampling so any non-POL contaminant identified is properly treated/removed. The NTCRA for this project will be conducted to meet soil cleanup levels found in ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and the most conservative of ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (ADEC 2020), as stated in Sections 3.2 and 5.2	In the absence of confirmed CERCLA contaminants and presence of confirmed petroleum within the bounds of this project, it is inappropriate to conduct this removal action under CERCLA. Because this removal action cannot be conducted under CERCLA, USACE must comply with all State of Alaska laws and regulations. Under state law, cleanup will have to meet cleanup levels for

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

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U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
				as remedial goals, and so will incorporate State regulations. Future work under the RI/FS process may be conducted if deemed necessary to meet future site goals after the completion of the soil source removal work (the purpose of this EE/CA report) to address all COPCs remaining on the site. Text will be updated in Sections 5.2, 6.4.4.1, and 6.4.6.1 and throughout the report, where applicable, to reflect the clarifications above – and specifically noting that ALL source soils will be addressed by the NTCRA (which are assumed to mostly be comprised of POL-impacted soils but may contain other contaminants).	the migration to groundwater pathway, as well as ingestion and inhalation. If USACE wishes to conduct the removal action under a CERCLA-like process that meets the requirements of 18 AAC 75, ADEC is amenable. As a "CERCLA-like process" though, ARARs are not applicable, and the action must comply with state law. **USACE Response:** Noted. USACE will continue to coordinate with ADEC throughout the cleanup process.

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

DOCUMENT: Draft EE/CA Report

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
2	Page ix, Executive Summary, Fifth Paragraph	Text states: "The scope for the NTCRA alternatives for the Fort Glenn FUDS, Project 02 features is removal of soils above cleanup levels found in Alaska Department of Environmental Conservation (ADEC) 18 Alaska Administrative Code (AAC) 75 Table B1 Over 40-Inch Zone for human health and ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (the remedial goals) (ADEC 2020)." ADEC notes that per 18 AAC 75.340(j)(1), migration to groundwater (MTGW) cleanup levels must also be met in surface and subsurface soils. If this removal action leaves soil contamination in place above MTGW cleanup levels, additional cleanup may be required.		Noted. It is stated in Section 5.2 that soil removal actions under this project will be conducted to meet the remedial goals, which are defined as ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and the most conservative of the ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (ADEC 2020). As stated in the work plan, this effort is focused on removing the source contaminants, and future remediation activities conducted at the site will deal with additional applicable or relevant and appropriate requirements (ARARs) and ecological concerns (if applicable). The following text will replace the second sentence in the second paragraph of Section 5.0: "This NTCRA will be focused on removing the source contaminants and future remediation activities conducted at the site will deal with additional applicable or relevant and appropriate requirements (ARARs) and ecological concerns (if applicable). " The first sentence of the second paragraph of Section 5.2 will be updated to read: "…all drums and drum contents will be removed from the site, and any associated contaminated source soil will be treated onsite or transported offsite…"	Because this petroleum removal action cannot be conducted under CERCLA, USACE must comply with all State of Alaska laws and regulations, which includes meeting cleanup levels for the migration to groundwater pathway. ADEC notes that it is inefficient given the high cost of mobilization to remove source areas to achieve ingestion and inhalation soil cleanup levels, while planning on additional later efforts when migration to groundwater soil exceedances could also be addressed during this effort.

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

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Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
					Additionally, if USACE removes soil to the ingestion and inhalation cleanup levels and then backfills, future efforts to address migration to groundwater soil exceedances may be complicated by the placement of clean fill. Additionally, the concept of ARARs does not apply to this project since the removal action is not being conducted under CERCLA. **USACE Response:** Noted. USACE will continue to coordinate with ADEC throughout the cleanup process.

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

DOCUMENT: Draft EE/CA Report

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

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3	Page 2-4, Section 2.3.5, Fourth Paragraph	Text states: "No major rookeries or haul out areas are in the project area." How close is the nearest rookery/haul out area to the project area?		A search of publicly available data indicates that the closest key walrus haul is approximately 5 miles from the nearest drum feature. Please note that the purpose of this document is to evaluate remedial alternatives and identify the best approach based on that evaluation. Additional site-specific details will be addressed as part of the Work Plan preparations prior to beginning NTCRA activities.	Agree.
4	Table 2-1	Table states that DM61-2017, which consists of an estimated 500 drums, is considered 'unlikely' to have contamination. Table 3-1 shows that this drum area has had no field screening sample collected. The 'unlikely' designation is unsupported. ADEC requests USACE field screen and sample at DM61-2017.		Noted. Collection of preliminary samples from the area prior to the NTCRA activities is included in all of the treatment alternatives evaluated.	Agree.
5	Page 3-1, Section 3.1	Text states that a cleanup complete without institutional controls (ICs) designation was evaluated at the site due to the potential for development and residential use. ADEC notes that in order to close a site as cleanup complete without ICs, the site must be safe for all land use scenarios (currently and in the future) and meet ADEC's cumulative risk standards of 1 in 100,000 for carcinogenic risk and a hazard index of 1 for noncarcinogenic risk across all exposure pathways.		Noted. This report addresses the first removal action to be conducted at the site. Additional remedial actions may be conducted if deemed necessary to meet future site goals.	Agree.
6	Page 3-2, Section 3.3, First Paragraph	Text states: "…individual drums are not expected to impact groundwater or surface water because field screening results indicated no environmental impacts beneath or around the individual drums; there are no surface waters near the isolated, individual drums; and there were no visual signs of contamination. Since exceedances and gross contamination		Agreed. Some assumptions had to be made based on the information that was available, and the difference of potential impacts from individual drums and drum piles. When remediation activities are conducted, preliminary screening samples will be collected from each removal area and additional contaminant information will be	The migration to groundwater pathway is not dependent on human receptors; the migration to groundwater

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		were not associated with individual drums, migration to groundwater and surface water is incomplete." Have all individual drum locations been sufficiently screened? Table 3-1 notes some locations that have had no field screening conducted. Additionally, text in the following paragraph notes that contaminant migration to subsurface soil from individual drums is potentially complete, and Section 2.3.3 mentions that groundwater at the site can be as shallow as 3.15 feet below ground surface (bgs). If all drum locations have not been sufficiently screened/sampled, migration to groundwater and groundwater ingestion must be retained as potentially complete pathways until additional investigation is conducted. Please revise.		available. The CSMs will be updated after these additional efforts are conducted. The migration to groundwater pathway will be marked as potentially complete for future receptors and the text revised to note this; however, based on the information presented in the document, the migration to surface water pathway will remain incomplete until additional information indicates it should be changed.	pathway must be retained as potentially complete. ADEC agrees with the groundwater ingestion pathway being retained as potentially complete for future receptors. **USACE Response**: Noted. The MTG pathway will be marked as potentially complete.
7	Page 3-2, Section 3.3, Third Paragraph	Text states that no individual drums were identified near surface water. Please clarify what 'near' means in terms of distance between the individual drums and surface water bodies.		The closest permanent surface water body to a feature is approximately 135 feet. Please note that the purpose of this document is to evaluate remedial alternatives and identify the best approach based on that evaluation. Additional site-specific details will be addressed as part of the Work Plan preparations prior to beginning NTCRA activities.	Agree.
8	Page 3-2, Section 3.3, Third Paragraph	Text states: "Additionally, although there are no individual drums known to be directly within surface water features, surface water near drum piles may be impacted; however, the pathway is considered insignificant due to limited contact with surface water features from potential receptors." Text in		Agreed. The surface water pathway for drum piles will be marked as potentially complete for current and future receptors.	Agree.

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

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		Appendix B, however, notes that some drum dumps are located either in or near marsh areas of streams. Due to the lack of analytical data, potential for contamination, and potential current and future exposure, ADEC disagrees with the 'insignificant' finding. Significance of this pathway may be determined following additional investigation and evaluation. Please revise.		The text will be updated to read: "…surface water near drum piles may be impacted. This pathway is considered potentially complete for current and future receptors."	
9	Page 3-3, Section 3.4	Text states: "Exposure is insignificant for all current and future site visitors, trespassers, and recreational users because of the remote site locations and site visitors are expected to spend little time onsite." Due to the potential for future development and residential use, ADEC disagrees with the assumption that exposure is insignificant for these receptors. Significance to the receptors may be determined following additional investigation and evaluation of exposure pathways. Please revise.		Agreed. Exposure to future receptors will be changed to potentially complete; however, will remain insignificant for current receptors based on current site use. The text will be updated to read: "Exposure is insignificant for all current site visitors, trespassers, and recreational users because of the remote site location and site visitors are expected to spend little time onsite. Exposure is potentially complete for future receptors based on the potential for future development and residential use. Ecological receptors…"	Agree.
10	Page 3-3, Section 3.4	Under *Groundwater Ingestion, Dermal Absorption of Contaminants in Groundwater, and Inhalation of Volatile Compounds in Tap Water*, text states that the free-flowing spring used for drinking water by Bering Pacific Ranches is 300 feet from the nearest drum feature. Is this spring upgradient or downgradient of the drum features?		Based on the aerial imagery, topography suggests the nearest drum feature is cross-gradient from the Bering Pacific Ranches. Unfortunately, no additional information is available in the previous reports.	Agree.
11	Page 3-3, Section 3.4	Under *Groundwater Ingestion, Dermal Absorption of Contaminants in Groundwater, and Inhalation of Volatile Compounds in Tap Water*, text states: "Groundwater ingestion is an incomplete pathway for the isolated,		Agreed. Please see response to comment #6. Text will be updated to read: "Groundwater ingestion is an incomplete pathway for current receptors for the isolated individual drums because no	The migration to groundwater pathway is not dependent on

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		individual drums because no environmental impacts were indicated from field screening results and no visual signs of contamination were noted, additionally, the land where the isolated, individual drums have been identified is uninhabited." Please see ADEC's Comment #4, above. If all individual drum locations have not been sufficiently screened/sampled, migration to groundwater should be retained as a potentially complete pathway until additional investigation is conducted. Currently uninhabited land cannot be used to rule out future exposure, as this site has the potential for development and residential use. Additionally, text at the end of this paragraph states: "Given the area's wilderness setting and NHL designation, future residential development in the area is unlikely including the development of groundwater as a residential drinking water source." ADEC notes that due to the potential for future development and residential use, all groundwater use scenarios must be retained. Please revise.		environmental impacts were indicated from field screening results and no visual signs of contamination were noted; however, this pathway is considered potentially complete for future receptors based on the potential for future development and residential use. Groundwater ingestion is a potentially complete pathway for the drum piles because…" The last sentence of this paragraph will be updated to read: "Although the area's remote setting and NHL designation makes future residential development in the area very unlikely, including the development of groundwater as a residential drinking water source, it is retained as a potentially complete pathway for future receptors to be protective of the potential for future development and residential use."	human receptors; if all individual drum locations have not been sufficiently screened/sampled, the migration to groundwater pathway must be retained as potentially complete. ADEC agrees with the groundwater ingestion pathway being retained as potentially complete for future receptors. **USACE Response**: Noted. The MTG pathway will be marked as potentially complete.
12	Page 3-4, Section 3.4	Under *Inhalation of Indoor Air*, text states that future development is not anticipated due to the remote nature of the site and that indoor air is considered an incomplete pathway for both current and future receptors. ADEC notes that COCs at the site include volatile compounds and that there is a potential for future		Agreed. The pathway will be considered potentially complete for future receptors. The text will be updated to read: "No other occupied buildings are currently present at the drum piles and isolated, individual drums; therefore, indoor air exposure is considered an incomplete	Agree.

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

DOCUMENT: Draft EE/CA Report

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		development and residential use of the site. Therefore, future exposure through this pathway must be retained until additional investigation is conducted. Please revise.		pathway for current site conditions. Although future development of these areas is not anticipated, this pathway is considered potentially complete for future receptors to be protective of the potential for future development and residential use."	
13	Page 5-1, Section 5.2, Third Paragraph	Text states: "Soil removal actions will be conducted to meet the remedial goals (Table 5-1). The remedial goals are defined as the ADEC 18 AAC 75 Table B1 Over 40-Inch Zone for human health and the most conservative of the ADEC Table B2 Over 40-Inch Zone for inhalation or ingestion (ADEC 2020)." ADEC notes that per 18 AAC 75.340(j)(1), migration to groundwater (MTGW) cleanup levels must also be met in surface and subsurface soils. If this removal action leaves soil contamination in place above MTGW cleanup levels, additional cleanup may be required.		Noted. Please see response to comment #2. The text will be updated in Section 5.2 as appropriate in response to comment #2.	Please see ADEC response to Comment #2.
14	Page 5-3, Section 5.3	Does USACE have any idea of when this removal action will likely be conducted?		FUDS program planning is tentatively looking at 2022-2023 to implement an action.	Agree.
15	Page 6-5, Section 6.3	Since Project 02 is limited to the cleanup of petroleum contaminated soil and associated drums not regulated under CERCLA, the identification of Applicable or Relevant and Appropriate Requirements (ARARs) is not appropriate for this project. The Project 02 removal action must be conducted in accordance with State of Alaska statutes, regulations, and guidance. Additionally, ADEC disagrees with the list of ARARs stated in Table 6.2; please let ADEC know if USACE would like additional information on this.		USACE is following the CERCLA process for this project for the reasons described in Comment #1 and because soil source removal is not limited to POL contamination (which includes CERCLA and non-CERCLA compounds), although it is anticipated that most contamination present will be POL-contaminants. FUDS policy allows for conducting any project in accordance with CERCLA, which streamlines coordination requirements under NEPA and NHPA. If non-	In the absence of confirmed CERCLA contaminants and presence of confirmed petroleum within the bounds of this project, it is inappropriate to

REVIEW COMMENTS

PROJECT: Fort Glenn 02 Project (Drum Piles)

DOCUMENT: Draft EE/CA Report

U.S. ARMY CORPS OF ENGINEERS CEPOA-EC-EE	DATE: February 12, 2021 REVIEWER: Sammi Castle, ADEC PHONE: (907) 269-0298	Action taken on comment by:

Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	REVIEW CONFERENCE A - comment accepted W - comment withdrawn (if neither, explain)	CONTRACTOR RESPONSE	USAED RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
				POL contaminants of concern are identified, they may be addressed under this project or a determination made in the future to delineate into a different project. This will be clarified in the text throughout the document. For ARARs: • For the Alaska state soil cleanup levels (Table 6-2, line 3), the cleanup levels for HH could be considered an ARAR for non-POL compounds as a preliminary remediation goal. This entry will be changed to "PA", and the rationale revised to "If non-POL contaminants are identified, the ADEC soil cleanup levels for human health would be applicable as preliminary remediation goals; however, it is unknown at this time if non-POL contaminants are present. For POL-contaminants, these are considered for remedial goals for the NTCRA but are not applicable as an ARAR." • The line for groundwater cleanup levels rationale will be revised to "Not applicable since only source soils are being addressed as part of the NTCRA." Additionally, the text of 6.3.2 will be revised to: "A review of the regulations indicated there are no potential federal chemical-specific ARARs for any of the alternatives being considered in this	conduct this removal action under CERCLA. Because this removal action cannot be conducted under CERCLA, USACE must comply with all State of Alaska laws and regulations. Under state law, cleanup will have to meet cleanup levels for the migration to groundwater pathway, as well as ingestion and inhalation. If USACE wishes to conduct the removal action under a CERCLA-like process that meets the requirements of 18 AAC 75, ADEC is amenable. As a "CERCLA-like process" though,

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				EE/CA document for the media and COPCs. If non-POL contaminants are present, Alaska state human health cleanup levels would be applicable as preliminary remediation goals." Please advise on other ARARs requiring discussion.	ARARs are not applicable, and the action must comply with state law. **USACE Response:** Noted. USACE will continue to coordinate with ADEC throughout the cleanup process.
16	Page 6-17, Section 6.4.3.3	Under *State Acceptance*, text states that ADEC acceptance is anticipated. Text in the following paragraph, under *Community Acceptance*, states that community acceptance is not anticipated. ADEC disagrees with the statement that State acceptance is anticipated. ADEC will only accept ICs with landowner concurrence.		Agreed. The text under *State Acceptance* in Section 6.4.3.3 will be updated to read: "As stated in the ADEC *Guidance on Using Institutional Controls in Oil and Other Hazardous Substance Cleanups* (ADEC 2011), state acceptance is anticipated if landowner concurrence is received. The state has accepted ICs as the implemented remedy for similar sites, as long as periodic reviews are conducted to ensure site conditions and use will not change." Additionally, the ADEC *Guidance on Using Institutional Controls in Oil and Other Hazardous Substance Cleanups* document will be added to the references (Section 9.0).	Agree.
17	Page 6-22, Section 6.4.4.1 & Page 6-39,	Text states: "Grab samples would be collected beneath each individual drum feature and composite samples would be collected from each drum area and drum dump feature. The		Thank you for the clarification. Project 02 soil source removal is not limited to POL contamination, although it is anticipated that most contamination present will be POL-	Agree.

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	Section 6.4.6.1	samples would be analyzed for GRO, DRO/RRO, VOCs, PAH, RCRA metals, PCBs, and pesticides." Although the COPCs listed for this project are limited to petroleum, ADEC supports the investigation and sampling of the non-petroleum compounds listed above. If these compounds are found, follow-on investigation will be required under CERCLA.		contaminants. Non-POL compounds identified may be addressed separately or under this NTCRA, based on the pre-excavation sampling results; this will be clarified throughout the document.	
18	Appendix B, CSM Scoping Form, Drum Piles	Under Question 1, why is 'Sediment' not checked as a potentially impacted media? Table 3-4 depicts sediment contamination above RBSLs, and Section 3.3 states that drum piles near surface water bodies potentially impact sediment. Please reconcile.		Agreed. Sediment will be checked as a potentially impacted media, with revisions to the text and CSM graphic and scoping forms.	Agree.
19	Appendix B, CSM Scoping Form, Drum Piles	Under Question 2, Inhalation of Indoor Air, text states: "There are no occupied building within the project area and future development is not anticipated due to the remote nature of the site; thus, this pathway is incomplete." Due to the presence of volatile compounds in soil and the potential for future development and residential use, this pathway must be retained as potentially complete for future receptors until additional investigation is conducted. Please revise.		Agreed. The scoping form will be updated to agree with response to comment #12.	Agree.
20	Appendix B, CSM Scoping Form, Drum Piles	Under Question 4, text states: "Exposure pathways for site visitors, trespassers, and recreations users are considered potentially complete but insignificant due to current and future land use and site remoteness." Due to the potential for future development and residential use, ADEC disagrees with the assumption that exposure is insignificant for these receptors. Significance to the receptors		Agreed. The text will be updated to read: "Exposure pathways for current site visitors, trespassers, and recreational users are considered potentially complete but insignificant due to current land use and site remoteness. Exposure pathways for future receptors are considered	Agree.

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		may be determined following additional investigation and evaluation of exposure pathways. Please revise.		potentially complete to be protective of future development and residential use."	
21	Appendix B, CSM Scoping Form, Drums	Groundwater must be retained as a potentially impacted media until sufficient screening/sampling has been conducted at all drum locations. Please amend Question 1 – Impacted Media, Question 2(b) – Ingestion of Groundwater, and Question 3 – Dermal Exposure to Contaminants in Groundwater and Surface Water. Please revise.		Agreed. The scoping form will be updated to reflect groundwater as potentially impacted media. Text in the 2b comment will be updated to read: "COPCs are potentially present in soil. Although there were no visual signs of contamination and field screening results indicated no environmental impacts at multiple lone drum locations, additional information is necessary and this pathway will be maintained as potentially complete for future receptors to be protective of human health and environment." Text in the Dermal Exposure comment will be updated to read: "There are not contaminant transport pathways to surface water at the isolated, individual drum locations; thus, this pathway is incomplete. However, groundwater impacts may be present. Dermal exposure to groundwater will be maintained as a potentially complete pathway to be protective of human health and the environment until additional information indicates otherwise."	Agree.
22	Appendix B, CSM Scoping Form, Drums	Under Question 3, Ingestion of Wild and Farmed Foods, text states that the exposure pathway is complete but insignificant due to site remoteness. ADEC notes that this site is in an area that could be reasonably used tor hunting, fishing, or harvesting of wild or farmed foods, and that bioaccumulative compounds are present. Additionally, this site has the potential for development and residential use. This exposure		Agreed. This pathway will be marked as potentially complete, with revisions to the text and CSM graphic and scoping forms. Text in the "Ingestion of Wild and Farmed Foods" comment of the scoping form will be updated to read: "Potentially complete pathway because some drums are partially buried and are	Agree.

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		pathway must be retained for current and future receptors until additional investigation is conducted. Please revise.		in areas that could be used for hunting or harvesting of wild foods. However, this pathway is likely to be insignificant since a household is unlikely to obtain all their subsistence resources from that location (due to remote location, logistical challenges, accessibility, probability of infrequent visits, etc.) for a chronic lifetime exposure in their diet (RAPM 2018) and previous investigations indicated no observations of stressed vegetation, visual staining, or odors." The last sentence of the last paragraph of section 3.4 will be updated to read: "Due to these observations of the isolated, individual drums, the ingestion of chemically impacted foods is considered a potentially complete pathway. However, this pathway is likely to be insignificant since a household is unlikely to obtain all their subsistence resources from that location (due to remote location, logistical challenges, accessibility, probability of infrequent visits, etc.) for a chronic lifetime exposure in their diet (RAPM 2018)	
23	Appendix B, CSM Scoping Form, Drums	Under Question 4, text states: "Additionally, exposure routes to current and future site visitor/trespasser/recreational user receptors are considered complete but insignificant due to site remoteness." Due to the potential for future development and residential use, ADEC disagrees with the assumption that exposure is insignificant for these receptors. Significance to the receptors		Agreed. The text will be updated to read: "Exposure pathways for current site visitors, trespassers, and recreations users are considered potentially complete but insignificant due to current land use and site remoteness. Exposure pathways for future receptors are considered potentially complete to be protective of future development and residential use."	Agree.

REVIEW COMMENTS

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		may be determined following additional investigation and evaluation of exposure pathways. Please revise.			
24		--- END OF COMMENTS ---			

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THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources
DIVISION OF PARKS AND OUTDOOR RECREATION
Office of History & Archaeology
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3561
907-269-8700
http://dnr.alaska.gov/parks/oha

February 12, 2021

File No.: 3130-1R COE-E / 2019-01225

Jeremy Craner
Project Manager
USACE Alaska District
Joint Base Elmendorf-Richardson, Alaska
Jeremy.D.Craner@usace.army.mil

Subject: Fort Glenn CON/HTRW FUDS (02 project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report

Dear Mr. Craner:

The Alaska State Historic Preservation Office (AK SHPO) received your email requesting comments (dated January 13, 2021) regarding the subject project and draft Engineering Evaluation/Cost Analysis Report (EE/CA). Our office has reviewed the draft EE/CA pursuant the National Historic Preservation Act (NHPA), and we offer the following comments for your consideration.

The proposed project will be taking place within the designated Fort Glenn National Historic Landmark, as well in the surrounding areas that were part of military development and use during WWII. Section 110(f) of the NHPA, in addition to Section 106, charges federal agencies to undertake "such planning and actions as may be necessary to minimize harm to such Landmark." Our office believes that this requirement should be considered substantive under the CERCLA process and that this standard has not been met by the draft EE/CA.

Our office strongly recommends that the proposed resolution of effects be improved to be more commensurate with the adverse effect that is necessary to conduct contaminants removal at Fort Glenn NHL. We believe that it would be appropriate to complete a pre-RA documentation report, require that any archaeological monitor meet the Secretary of the Interior's Standards, include notification of the Office of History and Archaeology/AK SHPO during the inadvertent discovery of cultural resources, and develop public interpretation that would explain the need to remove contaminants from the NHL and the rest of Fort Glenn, while documenting Fort Glenn's pre- and post-FUDS actions condition.

Our office also noted that the identification of historic properties, a substantive requirement of NHPA, has not been completed, as our office has no record for determinations of National Register of Historic Places (NRHP) eligibility for the sites noted as present within the area of potential effects. We strongly recommend that USACE define UNL-00317, the AHRS designation for the portions of Fort Glenn that were not included within the NHL at the time of designation, as well as completing determinations of NRHP eligibility for the other sites.

We strongly encourage USACE to consult with our office, the National Park Service, and other interested stakeholders regarding this important project and the historic properties that will be adversely affected by the current and future proposals. We look forward to working with your agency as you carry out the project and we thank you for the opportunity to comment. Please contact Sarah Meitl at sarah.meitl@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner

Judith E. Bittner
State Historic Preservation Officer

JEB:sjm

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 6898
JBER, AK 99506-0898

CEPOA-PM-ESP

APR 2 1 2021

Ms. Judith Bittner
State Historic Preservation Officer
Office of History and Archaeology
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3565

Dear Ms. Bittner,

The U.S. Army Corps of Engineers, Alaska District, Formerly Used Defense Sites (FUDS) Program received your emailed response (Subject: Fort Glenn CON/HTRW FUDS (02 project, Drum piles): Draft Engineering Evaluation/Cost Analysis Report) File Number 3130-1R COE-E/2019-01225 on February 12, 2021. We have taken your comments into consideration and offer the following response.

The USACE acknowledges that the project is taking place partially within the Fort Glenn National Historic Landmark (UNL-00201) and believes that it is working to take the appropriate measures necessary to minimize and mitigate potential adverse impacts to the National Historic Landmark (NHL) during this stage of the project planning process. The current USACE stance is that the National Historic Preservation Act (NHPA) of 1966, as amended, is procedural and administrative; it has no legally substantive aspects. As such, the NHPA will not be addressed under this proposed CERCLA project. Please note, however, that this stance does not preclude the USACE from incorporating appropriate planning for cultural resources identification, evaluation, avoidance, minimization, and mitigation measures. The USACE, Alaska District is fully committed to minimizing impacts to the NHL and any other significant cultural resources that exist within the project area.

The comments you provided will help the USACE craft more responsive measures in current and future Engineering Evaluation/Cost Analysis Report (EE/CAs). For the purposes of the Project 02 Drum Piles EE/CA and future Fort Glenn FUDS EE/CAs, the USACE assumes that all cultural resources within its project areas are significant historic properties, either individually or as contributing elements to the NHL. The USACE appreciates your recommendations on appropriate resolution of adverse effects and in response we offer the following. In 2017, the USACE contracted SRB&A to conduct archaeological monitoring and document pre project conditions of the site. Information from the SRB&A 2017 report will be used in conjunction with documentation collected by archaeological monitors during the course of the project. Both pre- and post-Remedial Action documentation of project areas will be included in project

requirements and be compiled in a final archaeological monitoring report. Emphasis will be placed on documenting changes to the historic fabric of Fort Glenn as a result of USACE actions. Archaeological monitors will meet the Secretary of Interior's Standards. A formal communication plan will be developed as part of the project work plan and will include notification of the Office of History and Archaeology/Alaska SHPO during inadvertent discoveries. The USACE is developing mitigation recommendations for the development of a book or other publication that would explain the need for the project and cover the World War II history of Fort Glenn. Data sources for the material are expected to include reports of previous Site Investigations, Remedial Action documentation, archival sources, and if possible, informant interviews with personnel formerly stationed at Fort Glenn. The overall intent of the proposed mitigation is to be applicable to not only Project 02 Drum Piles but also Project 15 Tanks with Pipelines and Pump Stations, Project 16 Transformers, and Project 17 Miscellaneous Abandoned Machinery.

The Environmental Engineering Cost Analyses are intended to present arrays of alternatives to support the selection for a remedial action for non-time-critical removal actions. The goal of the EE/CA is to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy the objectives such as cost, effectiveness, and implementability. The next steps in the process are to hold a public comment period, select a remedy, development of the removal design, and then the removal action. The EE/CA is in the process of comments and we are planning to hold public meetings in early May with a final selection of alternatives for the Project 02 EE/CA likely to occur in the Fall of 2021. Eventual implementation of the selected alternative may occur as early as 2022 but likely will be 2023 or later. Identification and evaluation of cultural resources within the project areas will be completed prior to implementation of the chosen remedial actions. For example, the USACE is in the process of preparing documentation to delineate and evaluate the eligibility of UNL-00317 and contributing sites encompassed within its boundaries.

The USACE looks forward to continuing working with you and our other stakeholders on the development of future EE/CAs for the Fort Glenn FUDS. Your recommendations have been thoroughly considered and many are being added to the Project 02 Drum Piles EE/CA. This EE/CA is part of a larger environmental remediation effort at the Fort Glenn FUDS which consists of four different projects (02, 15, 16, and 17). Please expect future communication regarding two additional EE/CAs for Project 15 Tanks with Pipelines and Pump Stations, and Project 16 Transformers/ Project 17 Miscellaneous Abandoned Machinery.

If you have any further questions or concerns please contact me by phone at 907-753-2736 or by email at Forrest.J.Kranda@usace.army.mil. Or you may contact the Project Manager for the Fort Glenn FUDS, Jeremy Craner, by phone at 907-753-2628 or by email at Jeremy.D.Craner@usace.army.mil.

Sincerely,

Forrest J. Kranda
Archaeologist
Environmental and Special Programs

cc:
Janet Clemens, National Register Historian, Alaska Region, NPS
Justin Hays, Archaeologist, Southcoast Region, ADOT&PF

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United States Department of the Interior

NATIONAL PARK SERVICE

Interior Region 11 • Alaska
240 West 5th Avenue, Room 114
Anchorage, Alaska 99501

IN REPLY REFER TO:
1.B (AKRO-CR)

February 18, 2021

VIA ELECTRONIC MAIL – NO HARD COPY TO FOLLOW

Mr. Jeremy Craner, P.G.
Project Manager
Formerly Used Defense Sites (FUDS)
USACE Alaska District (PM-ESP)
Joint Base Elmendorf-Richardson, Alaska
Jeremy.D.Craner@usace.army.mil

Subject: Fort Glenn CON/HTRW FUDS (02 Project, Drum Piles): Draft Engineering Evaluation/Cost Analysis Report. [within Fort Glenn NHL]

Dear Mr. Craner:

Thank you for your email correspondence received on January 13, 2021 regarding the above referenced draft report with planned activities taking place at Fort Glenn, Umnak Island, Alaska, in 2022-2023.

As you know, the National Park Service (NPS) administers the National Historic Landmark (NHL) program for the Secretary of the Interior. As such, the NPS provides historic preservation technical assistance including review of federal agency led projects within NHLs. Since the referenced project will take place within the Fort Glenn NHL, we appreciated learning about USACE's planning for removal of environmental contaminants, as well as about the known historic properties, and the potential effects to the NHL.

Based on the report information, in particular Section 4.0 Cultural Resources Evaluation and associated figures (showing Subareas 2 through 7) in connection with identification tables, it is clear that the planned remedial actions (RA) will impact numerous contributing elements of the NHL. As also pointed out in the report, the NHL 1994 nomination (page 8) states that "All World War II period construction infrastructure, objects, and landscape features are contributing resources of national significance to the Fort Glenn National Historic Landmark." Therefore, we agree with the finding that the RA will be an adverse effect to the NHL.

We understand that the USACE intends to work within the NHL with care, and we are interested in seeing those specifics with regards to how the work will take place to avoid or minimize impacts as much as possible.

Given the scale and scope of the RA to take place within the NHL, we agree with the report recommendations including documentation prior and after the work is conducted. As the RA has the potential for dramatic changes to the World War II landscape, we would appreciate receiving a final professional report for our files that includes a series of images, both close up as well from a distance and different perspectives, to provide a visual understanding of the NHL specific features and within the broader landscape, both before and after work is completed. In addition, we recommend you consider producing content for the public about the NHL and this project.

We appreciate the opportunity to review the USACE's Fort Glenn work plans and continue to be available to discuss ways to minimize harm to NHL historic properties and related mitigation.

If you have any questions about our comments, please contact Janet Clemens at janet_clemens@nps.gov.

Sincerely,

JENNIFER PEDERSON WEINBERGER

Digitally signed by JENNIFER PEDERSON WEINBERGER
Date: 2021.02.18 16:54:42 -09'00'

Jennifer Pederson Weinberger
Cultural Resources Program Manager

cc: Sarah Meitl, SHPO Review and Compliance Coordinator (sarah.meitl@alaska.gov)