



Hilcorp Alaska, LLC

Kathryn Kaufman
Liberty Development Permitting
Lead

Post Office Box 244027
Anchorage, AK 99524

3800 Centerpoint Dr.
Suite 1400
Anchorage, AK 99503

Phone: 907/777-8329
Email: kkaufman@hilcorp.com

December 4, 2014

Dr. Bill Ingersoll
Chief, Plans Section
Bureau of Ocean Energy Management
Alaska OCS Region
3801 Centerpoint Drive, Suite #500
Anchorage, Alaska 99503-5823

**RE: Request for Approval for Ancillary Activities
Liberty 2015 Geotechnical Survey, Beaufort Sea**

Dear Dr. Ingersoll

Hilcorp Alaska, LLC requests approval to conduct a 2015 Winter Geotechnical Investigation in support of the Liberty Development project. The project scope includes two areas of investigation: onshore and offshore, which extends into state and federal waters of the Beaufort Sea. The purpose of the onshore geotechnical investigation is to provide soil and permafrost information for evaluating the proposed pipeline routing from the coastline to the Badami pipeline, and evaluating the off shore to onshore (coastline) transition zone for the proposed pipeline routing. The purpose of the offshore geotechnical investigation is to provide soil and permafrost information for the possible future offshore island location and evaluating proposed subsea buried pipeline routing.

This Ancillary Activity notice is submitted in accordance with 30 CFR 550.208 (b)(1). In support of this request, the following is attached:

- Project Description/Plan of Operations, including figures
- Project Spill Response Plan
- Northern Land Use Research Alaska Cultural Resources Report

Hilcorp has approval or is currently seeking approval from the following agencies:

- Alaska Department of Natural Resources, Division of Mining, Land and Water
- Alaska Department of Natural Resources, Office of History and Archeology
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- North Slope Borough Planning and Community Services Department
- North Slope Borough Inupiat History, Language, and Culture Division

If you have any question or need additional information regarding this project, please contact me at (907) 777-8329 or via email at kkaufman@hilcorp.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Kathryn Kaufman". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Kathryn Kaufman
Liberty Development Permitting Lead

Liberty Development: 2015 Winter Geotechnical Investigation

Introduction

Hilcorp Alaska, LLC (Hilcorp) has prepared this project description to describe proposed geotechnical investigation activities on the North Slope of Alaska in support of the Liberty Development project. The project scope includes two areas on investigation: onshore and offshore, extending into state and federal waters of the Beaufort Sea.

Purpose

The purpose of the Liberty geotechnical investigation is to provide soil and permafrost information to evaluate locations and provide design criteria for the following proposed project features:

- Onshore proposed pipeline routing from the coast line to the Badami pipeline
- Offshore to onshore (coastline transition zone for the proposed pipeline routing).
- Future offshore Liberty island location within the Beaufort Sea (Alaska OCS)
- Proposed subsea buried pipeline routing

Onshore Investigation Scope of Work

The onshore geotechnical investigation includes two programs; an initial reconnaissance of the proposed travel route and the geotechnical drilling field work.

The primary travel route for the onshore geotechnical field work will be either via the Badami ice road (construction performed by others) or on the sea ice from SDI. In the unlikely event that these two routes are unavailable, a tundra route may be needed which will include crossing the Sagavanirktok (Sag) River. The ice conditions and water depths at the river crossings will be examined prior to mobilization of project equipment. The travel corridor will be approximately 100 ft. either side of the pipeline alignment onshore. It is anticipated that this late in the winter season, sufficient natural ice conditions will be found and ice thickening will not be required. The onshore route reconnaissance will take approximately 1 to 2 days.

Details of the Onshore Reconnaissance and Route Selection program include:

- A local native Alaskan Subsistence Advisor will assist the field crew in selecting the appropriate travel routes based on snow and ice conditions by traveling the proposed pipeline route and island locations and identifying any possible seal lairs in the event off-shore travel is required. Data from forward looking infrared radar (FLIR) will be utilized to avoid identified polar bear den locations.
- A RD85 Rolligon (Rolligon) or Snowcat (Tuckers) will be utilized for route assessment.
- Ice thickness at possible river crossings will be assessed by using a thermal probe mounted to one of the vehicles. The probe will use hot water to melt a 1 inch diameter hole through the ice to the mudline. A weighted cloth tape will be lowered through the hole to determine ice thickness.
- If the ice thicknesses along the proposed travel route do not meet minimum requirements, the route will be moved slightly to find areas that do meet ice thickness requirements.
- Equipment refueling will be conducted in accordance with all federal, state, and local regulations.

Details of the Onshore Geotechnical Investigation Field Work program include:

- A smooth track Tucker equipped with thermal probe will be used to monitor river ice conditions for safety, transport soil samples, and serve as a personnel carrier, when needed.
- A geotechnical drill rig specifically configured for shallow soils exploration will be used for this project. The drill will be mounted in an enclosed and lighted rubber tracked or ski mounted trailer, so that the drill and work area are protected from the weather and elevated off the ground by

about 6 feet. A roller-driven Rolligon will pull the enclosed trailer. A second Rolligon will support the drill operation, assist with drill moves, and provide fuel. A generator and all support tools will be carried on the trailer or accompanying Rolligon.

- Approximately 25 boreholes, each approximately 120 feet deep, will be drilled throughout the project to identify soil and permafrost conditions. The locations are based on the terrain, geology, and pipeline alignment.
- The completed boreholes will have a diameter of approximately 8 to 10 inches.
- Sealed PVC pipe will be placed in select boreholes, and will remain in the ground when the boreholes are backfilled. Soil cuttings will be used to backfill the borehole around the PVC. After ground disturbance from drilling has dissipated (approximately 20 to 30 days), stabilized ground temperatures will be recorded. A Tucker will be used to access the sites for ground temperature measurements. After temperature readings are collected, PVC will be removed, provided it is not frozen in place and will not cause disturbance to tundra to remove it. Otherwise, PVC will be cut below grade and left in place.
- A GPS track log will be recorded for all tundra travel.

Offshore Investigation Scope of Work

The offshore geotechnical investigation includes two programs; an initial reconnaissance to determine appropriate travel route, and the geotechnical drilling field work.

The offshore geotechnical investigation will require reconnaissance by a field crew to determine the best route for travel based on sufficient ice thickness and wildlife considerations. The ice conditions will be examined and thickened (as needed using sea water) prior to mobilization of geotechnical project equipment. The travel corridor will be approximately 200 ft. either side of the pipeline alignment / borehole locations. The offshore travel route activities are scheduled to begin, depending on weather, in February or March 2015. Existing ice roads such as the Badami and SDI ice roads will be utilized to the extent practicable.

Details of the Offshore Reconnaissance and Route Selection program include:

- A local native Alaskan Subsistence Advisor will assist the field crew in selecting the appropriate travel routes based on snow and ice conditions by traveling the proposed pipeline route and island locations and identifying any possible seal lairs etc. Data from forward looking infrared radar (FLIR) will be utilized to avoid identified polar bear den locations.
- The crew will utilize two all-terrain vehicles for transport, either a Tucker or Rolligon. Both vehicles will work concurrently and within close proximity of each other and one vehicle will have an individual designated to observe for polar bears or other wildlife in the area.
- Ice thickness will be assessed by using a thermal probe mounted to one of the vehicles. The probe will use hot water to melt a 1 inch diameter hole through the ice to the mudline. A weighted cloth tape will be lowered through the hole to determine ice thickness.
- Although it is not anticipated, if ice is of insufficient thickness for personnel and equipment, the crew will utilize a Tucker (or similar vehicle used for conventional ice road construction) equipped with auger and pumper to thicken the ice as necessary. Natural seawater will be used if needed to thicken the ice for the offshore work.

Details of the Offshore Geotechnical Investigation Field Work program include:

- A geotechnical drill rig specifically configured for shallow soils exploration will be used for this project. The drill will be mounted in an enclosed and lighted rubber tracked trailer, so that the drill and work area are protected from the weather and elevated off the sea ice by about 6 feet. A RD85 will pull the enclosed trailer within the project area. A second RD85 will support the drill

operation, assist with drill moves, and provide fuel. A generator and all support tools will be carried on the trailer or accompanying RD85.

- The second Rolligon will be equipped with two 500 gallon fuel tanks to re-supply drilling equipment working on the sea ice. Fuel transfers occur within the drilling enclosure. No refueling will be conducted directly on the sea ice.
- The field team will drill a total of approximately 30 geotechnical boreholes from the sea ice to depths of approximately 100 feet below the ground seafloor to explore the subsurface conditions.
- Only sea water will be used for circulation during drilling or casing activities. Drilling fluids or additives will not be used for the geotechnical program.
 - Up to 10 geotechnical boreholes are planned to be advanced in federal waters. Four inch diameter casing will be used and cuttings will be brought to the sea ice surface using sea water for circulation. After borehole completion, the soil cuttings will be containerized and transported to a shore based facility for disposal. Casing will be removed after completion of borehole. No cuttings are anticipated to be deposited to the seafloor or in the water column.
 - Up to 20 geotechnical boreholes are planned to be advanced in state waters. Eight inch diameter hollow stem auger will be used and sea water will be used for circulation. When drilling through floating ice, soil cuttings typically do not return to the ice surface. In near-shore areas where the sea ice is bottom fast or near bottom fast, some cuttings may come to the ice surface. This material, generally less than 0.5 cubic yard, will remain on the ice surface over the borehole location.
- Sealed PVC pipe will be placed in select boreholes. Temporary equipment placed in the PVC pipe will be used to measure the ground temperature profile. After ground disturbance from drilling has stabilized, about 20-30 days, final ground temperature will be recorded and the PVC will be cut at the mudline.
- Cone Penetrometer Tests (CPT) will be used to further characterize the subsea soil conditions. The 1-inch diameter cone will be advanced from the mudline to select depths. Hollow stem auger or casing will be used to stabilize the cone as it is advanced, but no soil is retrieved nor cuttings generated during CPT. The cone system records tip resistance, sleeve friction, dynamic pore pressure, temperature, cone inclination. The CPT holes are separate from the geotechnical soil boreholes; however they are placed within close proximity of the soil boreholes for correlation. Less than 50 CPT's will be performed.
- Fueling will occur over state and federal waters per approved fueling plan.

Monitoring and Mitigation

Wildlife Considerations

Hilcorp will consult with the National Marine Fisheries Service (NMFS) regarding mitigation and methods for avoiding seal lairs. Based on seal structure densities multiplied by the area of the footprint and a buffer zone, the travel areas are small enough that a seal encounter is expected to be highly unlikely. The route of travel will be minimized to further reduce likelihood of seal lair encounters. A Subsistence Advisor will be hired to identify, and, where possible, avoid areas of snow accumulation that could support resting lairs and birth lairs. The Subsistence Advisor will be utilized during the initial site reconnaissance and additionally as needed to evaluate the offshore travel corridor.

The project will be covered under a Letter of Authorization (LOA) from the U.S. Fish and Wildlife Service (USFWS) for conducting activities in polar bear habitat and appropriate mitigation efforts will be taken to avoid polar bear dens. All travel routes and areas of geotechnical investigation will be surveyed with FLIR prior to commencement of activities to identify and avoid potential polar bear den locations.

Archeological Clearance

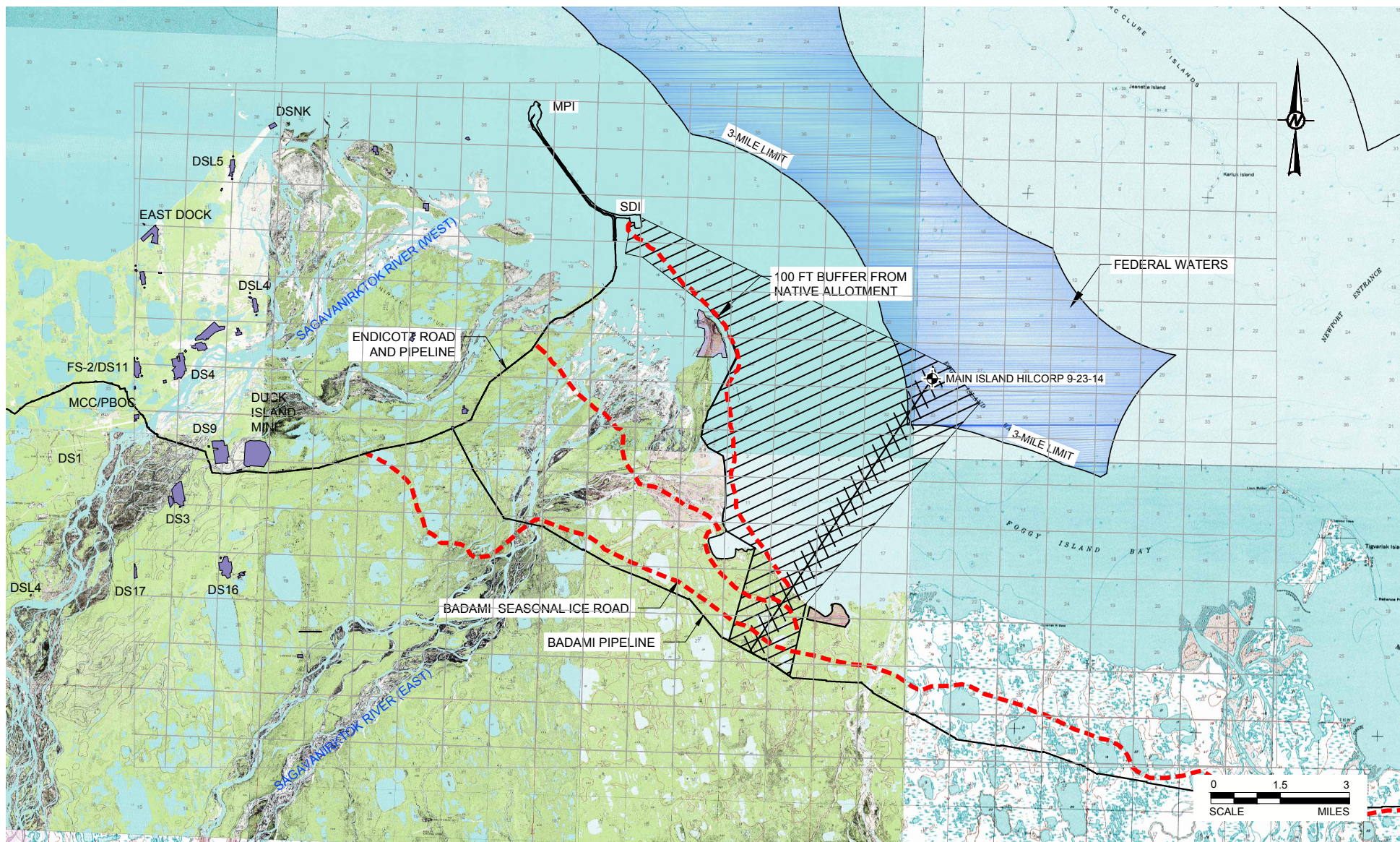
As provided in Dr. Richard Reanier's report Entitled "Cultural Resources in the Liberty Seismic Program Area, North Slope, Alaska" submitted to the State Historic Preservation Office March 17, 2008, for the Liberty Shallow Water Seismic Survey, there are no reported submerged sites (including prehistoric and shipwrecks) within the Liberty Seismic Program Area. The area for the proposed 2015 Winter Geotechnical Investigation is within a portion of the Liberty Seismic Program Area.

Northern Land Use Research (NLUR) has researched the existing archeological clearances and verified the investigation areas are within clear areas. A copy of their Cultural Resources Report is enclosed.



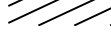
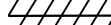
Schedule

The route reconnaissance and route selection will begin by the end of February or first week of March 2015 depending on ice and weather conditions. The offshore reconnaissance phase will be approximately 3 days long.

The geotechnical investigation is scheduled to begin in March or April 2015 pending ice and weather conditions and completion of the reconnaissance work. The geotechnical investigation and temperature measurements phase will be approximately 45 days and are expected to be complete by early May.



LEGEND

-  ALTERNATE TRAVEL ROUTES
-  PRIVATE PROPERTY / NATIVE ALLOTMENT
-  ON-ICE TRAVEL AREA (ACTUAL TRAVEL ROUTE WILL BE SELECTED BASED ON SEA ICE CONDITIONS)
-  GEOTECHNICAL INVESTIGATION AREA

NOTES

1. BACKGROUND IS COMPOSITE OF USGS 1:25K AND 1:63K TOPO MAPS.

CLIENT

HILCORP ALASKA, LLC

PROJECT

LIBERTY DEVELOPMENT PROJECT

TITLE

2015 GEOTECHNICAL EXPLORATION



1.0 SPILL PREVENTION AND RESPONSE

Secondary containment (duck ponds, etc.) will be used under stationary vehicles/ equipment, petroleum/ chemical containers (tanks, drums, cans, etc.), and ancillary equipment such as pumps, heaters, and generators. Fueling of the Tuckers or Rolligons will be conducted by certified fueler. The fueling operations will be conducted both on pad and on sea ice. Drip pans will be used and shovels and collection bags will be available to contain any small spills. Clean-up will include double bagging absorbent pads separately from snow. Bags should not be overloaded and easily picked up with one hand (i.e., less than 50 pounds) and double bagged. Bags shall be taken to Endicott Environmental or as directed.

All spills are reportable:

- **ALL spills must be immediately reported to Endicott security, 659-6800.**
- **Security will contact Endicott Environmental who performs spill reporting to the applicable agencies.**
- **Following the Golder's Incident Notification and Reporting Procedures**

Three systems will be available for emergency communication with and by Golder personnel when traveling off site:

- Primary system is the harmony radio network. The ice safety crew will have a harmony as well as each Rolligon operator during geotechnical operations. In addition, the team lead will also have a harmony.
- Secondary system is the Cruz radio network during the ice reconnaissance and the Peak Network during the geotechnical operations. Peak radios are installed in the LATV or RD-85's and in the Sled. This allows for communication with Peak Base, which is operated on a 24-hour basis, and between the Sled and the Rolligons.
- Third system is local cellular phone service as a back-up communication system. The Tucker will have a 3-watt cell booster and the Rolligons will have 3-watt bag phones.



2.0 FIRE RESPONSE

The Rolligons and Tuckers are equipped with Ansul style fire extinguishers. Endicott Security will be notified immediately.

3.0 INJURY RESPONSE

First aid equipment and eye wash station is provided in the drill sled. The drillers, helpers, and all Golder personnel have current first aid and CPR training. If a serious injury occurs that requires helicopter evacuation, Endicott Security will be notified and they will call for help to transport the injured to the nearest emergency aid station.

4.0 OIL SPILL RESPONSE

The fueling operations will be in accordance with best management practices, and the Golder fueling plan. During fueling operations, drip pans will be used and absorbent pads, shovels and collection bags will be available to contain any small spills. The Rolligon or Tucker will be refueled at a pre-approved location. Peak (Deadhorse) and Endicott Security, will be notified immediately of any fuel spills.

Each pickup truck is equipped with a spill kit and shovel. Each Rolligon and Tucker also have spill response kits that includes portable duck ponds, large quantity of absorbent pads, collection bags, shovels to respond to small spills. Oily waste sorbents/rags and snow/ice will be segregated into separate bags. The bags will be filled and light enough to be picked up by one hand. The bags will be double bagged, properly sealed and labeled.

Endicott Security and the Spill Response Team (SRT) will make requests for additional support as needed. Golder will not make requests for outside spill response support unless specifically instructed to do so.

For immediate spill response needs:

- **Hilcorp Spill Response Team (SRT): 659-6800**
- **Alaska Clean Seas (ACS): 659-2405**



NORTHERN LAND USE RESEARCH ALASKA, LLC

Specialists in Cultural Resource Management

1225 E. International Airport Road, Suite 220, Anchorage, Alaska 99518
Phone: 907.345.2457 Fax: 907.339.2457 www.northernlanduse.com

November 5, 2014

Kate Kaufman
Hilcorp Alaska, LLC
3800 Centerpoint Drive, Suite 100
Anchorage, Alaska 99503

RE: Cultural Resources Review, Liberty 2015 Geotechnical Exploration

Dear Ms. Kaufman,

Hilcorp Alaska, LLC proposes to conduct geotechnical exploration in the Foggy Island Bay area of the Alaskan Beaufort Sea during the winter season of 2015 in support of the Liberty Resource Development. The project corridor is approximately 7 miles long by 200 feet wide, and is located in state and federal waters, and on state lands (Figure 1). The offshore area lies within the Liberty Unit as well as non-unit areas. The onshore area is located at the mouth and on the west bank of the Kadleroshilik River. In the offshore area, field teams will drill approximately 30 geotechnical boreholes from sea ice to depths of approximately 100 feet below the seafloor to explore subsurface conditions. Onshore, field teams will drill up to 25 boreholes up to 120 feet deep to identify soil and permafrost conditions. Borehole locations will be based on terrain, geology, and potential pipeline alignment.

The primary travel routes to the geotechnical work area will be on the Badami ice road. A contingency tundra route across the Sagavanirktok River has been identified as a backup plan.

Northern Land Use Research Alaska, LLC (NLURA) archaeologists have undertaken a review of previous reports, surveys, and consultation documents to assess potential impacts to cultural resources within the project area. This memorandum provides a summary of the assessed materials, and recommendations for the proposed project.

Offshore investigation area:

The principal resource containing information on potential and specific submerged shipwreck sites in the region is the US Department of the Interior, Bureau of Ocean Energy Management (BOEM) Alaska Shipwreck Database (BOEM 2013). The BOEM database contains no records for shipwrecks with locational information within the project area. The nearest wreck site recorded in the shipwreck database is that of the whaler *Reindeer*, which ran aground in 1894 in

the vicinity of Reindeer Island, about 14 miles northwest of the project area. There are no recorded shipwrecks in Foggy Island Bay, and no potential shipwreck materials have been noted in remote-sensing surveys of the area.

Several remote-sensing and geotechnical drilling investigations have specifically targeted Foggy Island Bay and the Liberty project area (summarized in Rogers 2013). These data have been used to ascertain the potential for buried or relict terrestrial landforms in the vicinity, as well as submerged historic resources such as shipwrecks or aircraft.

Marmaduke and Watson (1999) identified a number of buried and near-surface distributary channels and channel fragments, identified as remnants of the Sagavanirktok delta front complex from a lower sea level stand. However, the MMS (cited in Darigo et al. 2007) suggested that smaller channel fragments could be buried strudel-scour depressions. Subbottom profiles also show a depression-like feature, lying adjacent to a possible buried island or other geomorphic high point. The authors interpret this as a “narrow terrace or floodplain”, which was an active drainage before ca. 10,000 BP (Marmaduke and Watson 1999). Marmaduke and Watson (1999) concluded that: “The eastern margin channel is the only readily identifiable terrestrial feature in the near surface sediments in the Liberty Project survey area. None of the sediments associated with the channel indicate preservation of landforms likely to contain archaeological remains of terrestrial origin.”

Reanier (2008), on the basis of previous remote-sensing data as well as the Minerals Management Service’s database of known Alaskan shipwrecks, concluded that “...there are no presently known cultural resources on the sea floor in the Liberty Development Project area” and that the potential for buried terrestrial landforms was “highly unlikely”.

Remote-sensing data and geotechnical cores from the Liberty project area acquired in the summer of 2013 were also analyzed for potential cultural resources (Rogers 2013). No cultural resources, of either historic or prehistoric origin, were identified in any of the materials recovered for analysis or in remote-sensing data.

On-shore investigation area:

Numerous archaeological surveys have been undertaken in the vicinity of the 2015 Liberty geotechnical onshore area since the 1970s (i.e., Campbell 1974; Lobdell 1980, 1987, 1998a, 1998b; Reanier 2004, 2008), resulting in the identification of a number of cultural resources. In addition, the area was extensively surveyed by NLURA in late summer of 2013 (Higgs 2013). Known cultural resource sites in the area were relocated, and no new sites were identified.

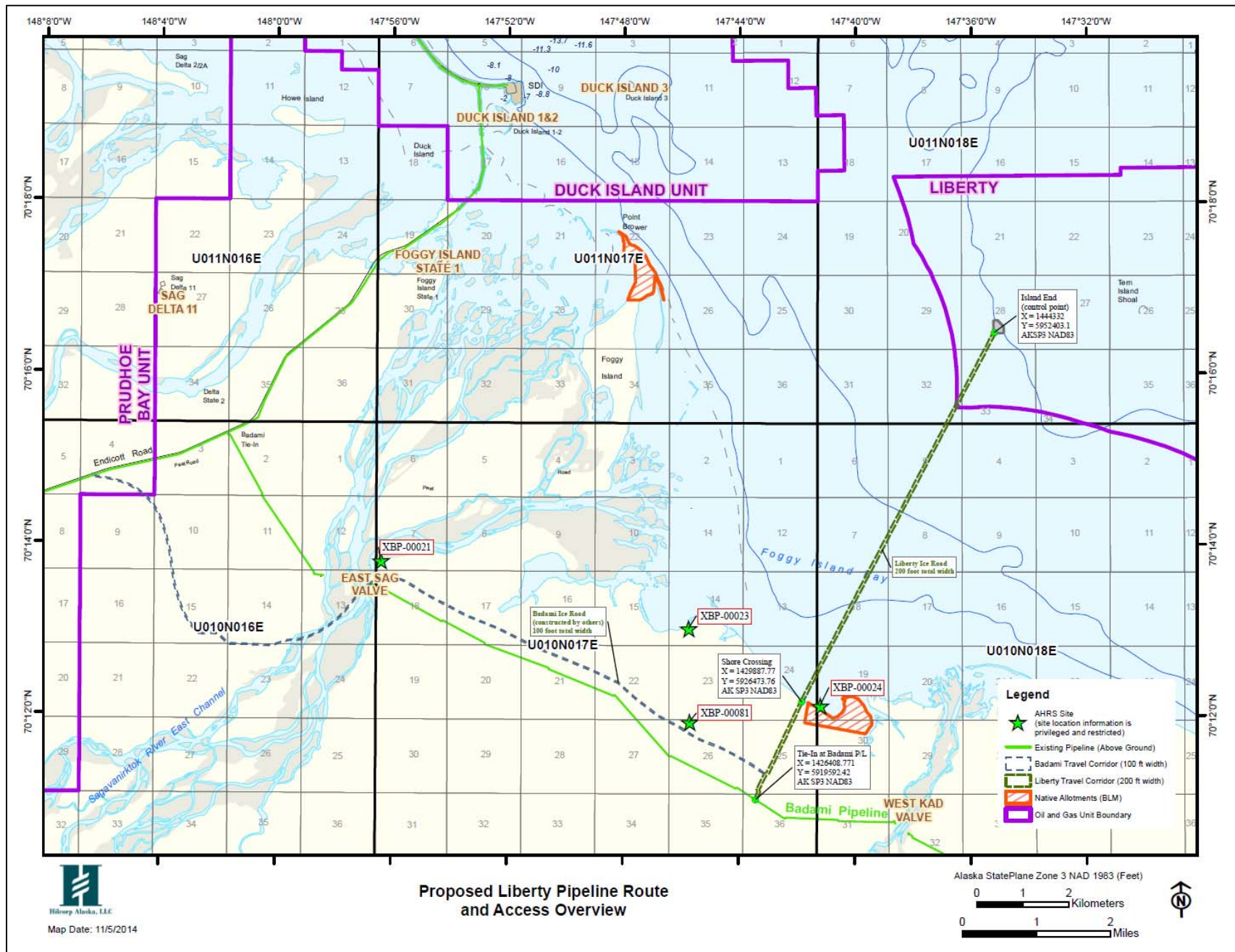


Figure 1. Liberty 2015 Winter Geotechnical Investigation Project Area, showing cultural resource sites.

Sites within or near the project APE:

Three cultural resource sites are located near the project APE; all within the on-shore investigation area, (presented in Table 1, and shown in Figure 1).

Table 1. AHRS sites in the vicinity of 2015 Liberty winter geotechnical investigations.

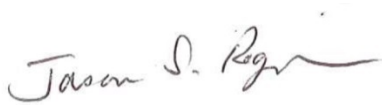
AHRS#	Site Name and/or Description	Site in Relation to APE*
XBP-00023	Foggy Island Bay House Ruin	Approximately 3 km (1.9 mi.) from investigation area corridor
XBP-00024	Foggy Island Bay #2 (two sod house ruins, and grave)	Approximately 450 m (1470 ft.) from investigation area corridor
XBP-00081	Sako (survey monument and prehistoric site)	Approximately 1.6 km (1 mi.) from investigation area corridor

*Site locations are based on coordinates given in UTM NAD 83, Zone 6, as recorded in the AHRS database.

Conclusion and Management Recommendations:

No cultural resources, of either historic or prehistoric origin, have been identified in off-shore areas of the project APE. Several previously identified on-shore cultural resources are located in or near the project area (see Table 1; Figure 2). All previously identified sites should be protected with 100-foot buffer zones to ensure that they remain unaffected by field operations.

Sincerely,



Jason S. Rogers, PhD
NLURA Senior Project Archaeologist

References cited:

Bureau of Ocean Energy Management (BOEM)
2013 Alaska Shipwrecks Database. Electronic inventory maintained by BOEM, Anchorage.

BPXA (BP Exploration (Alaska), Inc.)
2007 Liberty Development Project Environmental Impact Analysis. Report submitted to US Minerals Management Service, Alaska OCS Region, by BP Exploration (Alaska), Inc., Anchorage.

Campbell, J.
1974 Report on Archaeological Reconnaissance of the Arctic Coast of Alaska and Neighboring Islands between the Mouths of the Colville and Canning Rivers in 1974. Report on file, Northern Land Use Research Alaska LLC, Anchorage.

Darigo, Nancy, Owen K. Mason, and Peter M. Bowers

2007 Review of Geological/Geophysical Data and Core Analysis to Determine Archaeological Potential of Buried Landforms, Beaufort Sea Shelf, Alaska. Report prepared for U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region, by Northern Land Use Research, Inc., URS Corporation, and GeoArch Alaska. OCS Study MMS 2007-004.

Dixon, E. James., G.D. Sharma, and Sam W. Stoker

1978 Beaufort Sea Cultural Resources Study, Final Report. University of Alaska Museum, Fairbanks. Prepared for the U.S. Bureau of Land Management, Alaska Outer Continental Shelf Office, Anchorage. Contract AA550-CT7-40.

Golder Associates

2013a Geotechnical Exploration Report – Proposed Offshore Buried Pipeline Routes and Offshore Islands (Main and Relief). Report prepared by Golder Associates, Inc. for BP Exploration (Alaska), Inc., Anchorage.

2013b Draft 2013 Liberty Sub-Bottom Profiler Investigation – Proposed Offshore Buried Pipeline Routes. Report prepared by Golder Associates, Inc. for BP Exploration (Alaska), Inc., Anchorage.

Higgs, Andrew

2013 Cultural Resources Survey – BP Liberty On-Shore Fall 2013 Archaeological Reconnaissance for Potential Gravel Resources, North Slope, Alaska. Report prepared by Northern Land Use Research Alaska, LLC, for SLR International Corporation and BP Exploration (Alaska), Inc., Anchorage.

Lobdell, John

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1998b Supplemental Report: Liberty Project Archaeological and Cultural Resources Reconnaissance, North Slope, Alaska. Report prepared by Lobdell & Associates, Inc., for BP Exploration (Alaska), Inc., Anchorage.

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1999 Liberty, Cultural Resource Assessment, Foggy Island Bay in Stefansson Sound, Alaska. Report prepared by Watson Company, Inc. for BP Exploration (Alaska), Inc., Anchorage.

Reanier, Richard E.

2004 Archaeological and Cultural Resources Reconnaissance for the Jacob's Ladder Prospect, North Slope, Alaska, for the Year 2003. Report prepared for Anadarko Petroleum Corporation by Reanier and Associates, Seattle.

2008 Cultural Resources in the Liberty Development Project Area, North Slope, Alaska.
Report prepared by Reanier and Associates, Seattle, on file, Alaska Office of History and
Archaeology, Anchorage.

Rogers, Jason S.

2013 Submerged Cultural Resources Assessment, Liberty Development Project, Beaufort
Shelf, Alaska. Report prepared by Northern Land Use Research Alaska, LLC, for SLR
International Corporation and BP Exploration (Alaska), Inc., Anchorage.