Environmental Review
Kivalina Evacuation and School Site Access Road

January, 2017
Fed. Project No. 0002384/State Project No. NFHWY00162

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LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AHRS	Alaska Heritage Resources Survey
ANCSA	Alaska Native Claims Settlement Act
APDES	Alaska Pollutant Discharge Elimination System
ATVs	all-terrain vehicles
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CGP	Construction General Permit
CKNHL	Cape Krusenstern National Historic Landmark
CWA	Clean Water Act
DCCED	Department of Commerce, Community, and Economic Development
DMLW	Division of Mining, Land, and Water
DMTS	DeLong Mountain Transportation System
DNR	Alaska Department of Natural Resources
DOT&PF	Department of Transportation and Public Facilities
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FHWA	Federal Highway Administration
ft	feet
HGM	Hydrogeomorphic Classification system
IRA	Indian Reorganization Act
K-Hill	Kisimigiuqtuq Hill
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
NAB	Northwest Arctic Borough
NANA	NANA Regional Corporation
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NWI	National Wetland Inventory
QEP	Qualified Environmental Professional
ROW	right-of-way

SHPO	State Historic Preservation Office
Stantec	Stantec Consulting Services, Inc.
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDOI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WAH	Western Arctic Herd

1 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA), in partnership with the Northwest Arctic Borough (NAB), Native Village of Kivalina, and the City of Kivalina, are proposing to improve community safety in Kivalina, Alaska by constructing an evacuation road between Kivalina Island and a site on Kisimigiuqtuq Hill (K-Hill) where a school planned for construction by the NAB would also serve as a safe emergency evacuee assembly site. The following section describes the purpose and need and project description provided during the public and agency scoping period in November and December, 2016.

1.1 Project Location

Kivalina is situated on the southeast tip of a barrier island located between the Chukchi Sea (Arctic Ocean) and Kivalina Lagoon. The proposed road project origin would be at the City of Kivalina, which lies within the Kotzebue Recording District and is located in Section 21, Township 27 N, Range 26 W, of the Kateel River Meridian. The desired project terminus at K-Hill is located in Section 19, Township 28N, Range 25W, of the Kateel River Meridian. The feasibility of several potential route alignments is currently being evaluated within a project Study Area encompassing Kivalina Island, the southern portion of Kivalina Lagoon, and the lower Wulik and Kivalina River drainages in Townships 27N and 28N, Ranges 25W, 26W and 27W of the Kateel River Meridian (Figure 1).

1.2 Project History/Background

The community of Kivalina has been working for decades with a variety of local, state, and federal agencies to address threats of coastal erosion and flooding. Numerous study, concept, and planning documents exist on potential solutions, which range from: erosion protection around the city; to relocation of the entire community; to a new mainland site. Options involving community relocation have been problematic, as they are neither culturally preferable nor fiscally practical in the foreseeable future. Accordingly, Kivalina has turned to a locally approved approach of facilitating a safe, reliable, and direct means of community evacuation to an acceptable mainland location on K-Hill.

2 PURPOSE AND NEED

The Kivalina Evacuation and School Site Access Road project would provide Kivalina residents a safe and reliable evacuation route in the event of a catastrophic storm or ocean surge, allowing evacuees to mobilize to safe refuge at a site on K-Hill also dedicated by the NAB as the preferred new location for the community school. Upon its anticipated construction, the school will augment the undeveloped evacuation site by serving as a full-service community emergency shelter with all-season, longer-term support capabilities.

Recent climate data has indicated that arctic sea ice is forming later in the season, increasing fall and winter storm duration and intensity along the Northwest Arctic coast. Consequently, residents of Kivalina face significant and increasing risks to safety, life and property by storm systems predicted to further intensify over time. The need for a concerted effort to mitigate these risks became more evident during an evacuation event in October 2007 when debris-laden storm waves overtopped the barrier island. The event resulted in the need for helicopters to carry evacuees off the island and illustrated the fact that Kivalina currently has no method of evacuation in the event of a catastrophic storm surge.

To facilitate community safety in the face of this increased threat, Kivalina needs a safe, stable, and reliable evacuation infrastructure (routing, transportation, shelter) in the event of impending catastrophe. To provide the routing component of this infrastructure will require construction of a safely routed road that allows emergency response vehicles to access a secure location capable of supporting evacuees in times of need.

3 PROPOSED ACTION

The proposed action would establish a safe, reliable, all-season evacuation route between the community of Kivalina and the selected school site on K-Hill. There are three existing, preliminary route options (discussed further in Section 4), but common to all, are the following actions:

- Establishment of a safe, reliable, all-season Kivalina Lagoon crossing during evacuation mobilization. Concepts previously studied for their feasibility include construction of an earthen causeway across the lagoon that variously incorporates hydraulic and boat passage options including bridge(s), culvert(s), or both.
- Construction of an all-season gravel access road between Kivalina Island and the desired K-Hill evacuation site. The road would be designed to accommodate both general purpose and emergency evacuation vehicles over a two-way road with shoulders, multiple turnouts, and safe side slopes that include guard rails or other safety features as required.
- Identification of material sources. Although project materials would be specified as contractor furnished and development of material sources would not be included in the Proposed Action, analyses of material locations proximate to potential routes would be conducted to determine their feasibility and evaluate environmental impacts of their development.

Construction methods to support these three proposed actions vary depending on the timing of construction.

Lagoon Crossing

The lagoon crossing would have varying construction methods depending on the selected alternative. Regardless of design, the crossing would include in-water work. Construction of lagoon crossing components may include in water filling, driven piers, culverts, and/or other hydraulic passage options. Placement of fill is generally done during ice-free conditions, but several construction components associated with crossing the lagoon could be completed in the winter. Winter construction is often preferred to avoid temporary impacts to water quality, fish, marine mammals, aquatic birds and terrestrial wildlife during active periods. Implementation of best management practices to avoid water quality and habitat impacts during spring break up are important, and some of those practices may need to be installed in the fall prior to freeze up to ensure correct installation.

Road

Arctic road construction in areas dominated by tundra typically begins in the winter after the ground freezes, and is completed prior to spring break up. The Kivalina evacuation road would likely be

constructed on a base layer of geotextile fabric placed over undisturbed tundra. While in some areas a leveling course of gravel may be required under the geotextile depending on local ground conditions, the existing organic mat would not be removed. Vegetative clearing would be limited to brush removal within the roadway footprint. While the ground is frozen, embankment material would be placed on the fabric. After the embankment material thaws in the spring, the road would be compacted and leveled with additional material, and a surface layer of crushed aggregate would be placed. A dust palliative surface treatment may be applied. Stream crossings would include appropriately sized drainage structures, with cross culverts installed along the roadway as needed to equalize drainage areas. Except where required (i.e. fish passage), excavation would be avoided to minimize thermal degradation of the subgrade permafrost. Insulation would be installed under the road bed where needed for additional thermal protection.

Material Sites

Material would likely be supplied from one or more local material sites determined feasible for the project; although a portion of the material may be barged in from other regional material sources outside the Study Area and stockpiled. Methods and means used to develop material sources within the Study Area in support of the proposed project would be determined by the selected construction contractor. In general, access to and development of material sites would likely occur at least in part during the winter months when the ground is frozen. Potential material sites, such as K-Hill, that are sited within uplands may be developed in the summer months. Access roads to potential material sites will likely be temporary, however permanent access roads may be developed if longer term access and need is identified. The desire would be that potential material sites within relic river channels and gravel bars be temporary and used solely for construction of the project road and lagoon crossing. It is likely that at least a portion of excavated material would be stockpiled either at the excavation site, a designated staging area in Kivalina, or at the school site. Except to augment existing materials available on river gravel bars, drilling and blasting would not be required unless necessary to produce sufficient quantities of materials for complete embankment construction.

4 ALTERNATIVES

DOT&PF and FHWA are currently reviewing the feasibility of three existing, preliminary route options independently proposed by Kivalina and the NAB within the project Study Area, (Figure 2). While these routes may provide a useful basis for alternative development during National Environmental Policy Act (NEPA) documentation, additional draft alternatives are anticipated to be identified and considered as a result of agency and public scoping.

Over the last decade, Kivalina and the NAB have evaluated the feasibility of numerous local road routings that could potentially provide for evacuation, school access, or material site development. Evacuation routes considered to date by Kivalina and the NAB have included:

- An alignment referred to as a Northern Route approximately 9.1 miles in length that would originate at the south end of the Kivalina Airport runway, parallel the runway on its east side northward for approximately 1.5 miles, cross the lagoon eastward via a causeway and/or bridge, and follow high ground between the Wulik and Kivalina Rivers to its terminus at K-Hill.
- An alignment considered a Southern Route approximately 6.9 miles in length that would begin at the south end of the Kivalina Airport runway, immediately cross the lagoon eastward via a causeway and/or bridge, and follow lowlands and relic channels of the Wulik River to K-Hill.
- A Combined Route approximately 8.6 miles in length that would follow the Northern route before merging with the Southern route via a one-mile long connecting segment.

Four locations in the project Study Area known to contain potentially viable project materials and currently being evaluated by Kivalina and the NAB include:

- K-Hill: K- Hill geology is characterized by exposed limestone and rock rubble at the ground surface. It is anticipated that below the surface, larger frost-fractured rocks and boulders may also exist.
- Wulik River Deposition Zone: The Wulik River Deposition Zone is characterized by visible gravel bars and beaches along the river banks that would contain suitable materials to construct the proposed project.
- Wulik River Relic Channel: The Wulik River Relict Channel is characterized by visible gravel and sand at the ground surface. The fluvial material in these areas was likely deposited when the Wulik River was located north of its present location.

- Kivalina River Deposition Zone: The Kivalina River is also being evaluated for potential material sources on the basis of areas visible on gravel bars and beaches that appear to contain suitable material.

4.1 Past, Present, and Potential Future Actions

Cumulative impacts to the natural and human environment occur as a consequence of other past, present, and potential future actions taking place within the same geographic area of a proposed project.

For the subject project, no past actions need consideration as no recent actions have taken place within the Study Area. Other actions presently occurring within the Study Area include:

1) implementation of erosion control measures at the existing Kivalina airport;

2) development of a school and evacuation center at the proposed evacuation road terminus; and,

3) development of gravel sources near to and along the proposed road alignment options.

No potential future actions beyond those associated with the proposed project are identified at this time. While community relocation has been a topic of discussion for some time, relocation is currently not considered fiscally viable and there are no foreseeable future plans for community relocation. Although the evacuation road may encourage future discussions of relocation, no administrative or fiscal pathway for community relocation is currently identified, and it is not considered reasonably foreseeable at this time.

Secondary (Induced) impacts could occur as a result of developing the proposed project. Several NANA Regional Corporation (NANA) shareholder allotments lie adjacent to the project Study Area, and development of these lots may occur consequent to road development. In addition, temporary material sites developed in support of this project may become permanent sources the community could use for development of as yet unidentified projects in Kivalina. Potential secondary impacts include future development and/or expansion of project material sites.

5 POTENTIAL ENVIRONMENTAL IMPACTS

5.1 Overview

This section describes the existing environment that would be affected by the Proposed Action and establishes a baseline for the comparison and selection of alternatives as organized by resource categories identified in the DOT&PF Alaska Environmental Procedures Manual (DOT&PF, 2014).

This section also analyzes environmental impacts of preliminary route options in terms of direct, indirect, and cumulative effects. Direct effects are caused by an action and occur at the same time, whereas indirect effects are caused by an action and occur later in time or farther removed in distance. Cumulative impacts are impacts on the environment resulting from incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what entities (agencies or persons) undertake such other actions.

This Environmental Review is issue-based, meaning that only resource categories that were identified as potential issues through public and agency involvement are evaluated in detail. Table 1 summarizes resource categories that were identified as non-issues and not discussed further in this document:

Table 1 – Non-issue Resource Categories

Resource Category	Evaluation
Air Quality	• The project area has no Non-Attainment areas for national air quality criteria pollutants, and does not have a State Implementation Plan for any air quality concerns. • FHWA does not require the project to undergo a transportation conformity analysis for carbon monoxide or particulate matter with an aerodynamic diameter of 10 microns or less because the Study Area is not located in Non-Attainment or Maintenance areas (40 Code of Federal Regulations [CFR] Parts 51 and 93). • Temporary impacts from construction would be minimized through compliance with the Alaska Pollutant Discharge Elimination System (APDES) which would include development of dust control Best Management Practices associated with the project's Stormwater Pollutant Prevention Plan.
Farmlands	• There are no prime or unique farmlands in the project Study Area, as defined by the Farmland Protection Policy Act of 1981, Public Law 97-98.

Resource Category	Evaluation
Natural Resources and Energy Supply	• The proposed evacuation and school site access project would not change the energy requirements for the city of Kivalina. Additional energy requirements at the evacuation facility/new school such as water/sewer/electricity would be self-contained and not draw on Kivalina's current energy resources. • Fill material, construction materials, and natural resources are required for construction. Adequate supplies are expected to be available within material sites identified as part of this project, with some material being imported. • Energy resources needed for construction camps and temporary facilities associated with construction are expected to be relatively small, and would be predominantly self-contained. • The proposed project would not cause demands exceeding available or future natural resource or energy supplies. The project would likely increase access and accessibility to additional natural resources.
Coastal Resources	• The Alaska Coastal Management Program expired on June 11, 2011 and is no longer in effect. Although a state coastal consistency determination is no longer required, the NAB Coastal Management Plan was evaluated for "Important Resource Use Areas" to ensure no impacts within the project area.

5.2 Land Use and Transportation

5.2.1 Affected Environment

The community of Kivalina lies on an island and with no access road, relying on supplies solely delivered by air and barge. Year-round air service is available to Kivalina if weather is favorable, although severe weather often prevents air travel in and out of Kivalina (United States Army Corps of Engineers [USACE], 2006). Community residents use all-terrain vehicles (ATVs), snow machines, and boats as personal modes of transportation within the community and to access subsistence use areas. Warmer and shorter winters have made surface transportation across winter ice increasingly difficult, and evacuation areas are problematic to access during storm surge events (USACE, 2006).

Land ownership within the Study Area includes NANA, Native Allotments, DOT&PF, and the Alaska Department of Natural Resources (DNR) which owns the subsurface tidelands within Kivalina Lagoon. The undeveloped Study Area is within a NAB Subsistence Conservation zoning district (NAB, 2011), and determined through project community outreach to be of high importance to Kivalina residents for subsistence resources and activities. Subsistence Conservation zoning districts are designated for natural ecosystem conservation, subsistence resource access, and subsistence harvest lands (NAB, 1993).

The Northwest Arctic Borough Comprehensive Plan, (NAB, 1993) contains language specifying that the NAB needs to develop a system of managing lands in the best interest of Borough residents, and needs to assist communities and regional organizations with identifying and solving problems with infrastructure development. Additionally, the Plan states that the NAB will work with villages to identify transportation priorities for the region.

The Northwest Alaska Transportation Plan (DOT&PF, 2004) recommended the community of Kivalina either move inland to avoid storm surges or to fortify its surrounding shoreline. However, relocation is not deemed financially feasible at this time and the proposed evacuation route is being evaluated as an alternative means to provide safety during increasingly frequent storm surges.

The DNR Northwest Area Plan (DNR 2008) states that permanent roads should be routed, to the extent feasible and prudent, to avoid long-term adverse effects on water quantity and/or quality, and surface access routes should be sited and designated to accommodate future development and avoid unnecessary duplication (DNR, 2008). There are two 17(b) easements within the Study Area sponsored by the Alaska Center, Bureau of Mines, Bureau of Land Management (BLM) District Office, Alaska Division of Mining, Land and Water (DMLW), and Alaska Department of Fish and Game (ADF&G) (U.S. Department of the Interior [USDOI], BLM, 2016). 17(b) easements provide access to public lands, public resources, and groups of private inholdings sufficient in number to constitute public use. One 17(b) easement within the Study Area traverses the winter trail northward along the mainland coast of Kivalina Island, and appears to overlap a portion of the potential northern and combined route options northwest from Kivalina along the island. Another 17(b) easement within the Study Area heads east from Kivalina towards the mouth of the Wulik River before heading south outside the study area towards the Cape Krusenstern National Monument.

The Study Area is located entirely within the Cape Krusenstern National Historic Landmark (CKNHL), managed by the National Park Service (NPS) (NPS, 2016), and established to preserve extensive archeological resources in the area. Section 4(f) of the US Department of Transportation Act would apply to the CKNHL. Two cultural resources surveys were completed for the potential evacuation route options in 2016 (see Section 6.7 for more information) and it is not anticipated any other Section 4(f) resources are within the area of potential evacuation routes or material sites.

Kivalina Lagoon includes a small portion of the Alaska Maritime National Wildlife Refuge (Chukchi Sea Unit) consisting of two islands, totaling 75 acres, owned by the Kivalina Sinuakmeut Corporation and located directly east of Kivalina at the mouth of the Wulik River

(http://fws.maps.arcgis.com/apps/webappviewer/index.html). Another 116 acres of the Refuge, also owned by the Corporation, is located 4 miles south of the community and effectively constitutes the land spit separating Imikruk Lagoon from the Chukchi Sea.

5.2.2 Potential Impacts

The proposed new school/evacuation shelter site is located above the 100-year floodplain on K-Hill, approximately 6 miles inland from Kivalina Lagoon. During storm surge events, access to the evacuation shelter may be problematic if attempted solely via ATVs or snow machines, and especially so for infants and the elderly. Improved community transportation options should be explored by Kivalina and NAB to determine what transit modes would be most beneficial and financially feasible for use in the event of an emergency.

DOT&PF will need to assure that the final route selection area has land interest sufficient for dedicated public right of way, either through DOT&PF acquisition from NANA (surrounding private land owner) or NANA's conveyance to the City of Kivalina. Additionally, crossing Kivalina Lagoon tidelands would require an easement from the State of Alaska DNR, DMLW (DMLW and DNR, 2016). Necessary coordination and approvals would take place between DOT&PF, NANA, various Native allottees, the City of Kivalina, and DNR. Additionally, coordination with the Bureau of Indian Affairs would be necessary to gain approvals from private owners if the selected evacuation route lies within a Native allotment. Construction of an evacuation route would allow increased owner access to adjacent Native allotments for subsistence use and possible development.

As the entirety of the Study Area outside of the community of Kivalina is designated as a Subsistence Conservation District (NAB, 2011), an evacuation route would need to be permitted as a conditional use under Title 9 of the NAB Code. Title 9 provides NAB the authority to control and regulate future land development within the borough in accordance with its land use policies. The NAB Planning Commission considers conditional use permit applications, and either rejects or approves them after public notice and a formal hearing. As the Study Area is not within a NAB Resource Development Zone or Transportation Corridor, an evacuation route corridor would need to be rezoned by the NAB Planning Commission (Title 9, Article VIII, Section 9.28.220) prior to construction.

The proposed Kivalina Evacuation Route is consistent with local land use and transportation plans, including the Northwest Arctic Borough Comprehensive Plan (NAB, 1993), and the State of Alaska Northwest Area Plan (DNR, 2008) which allows for transportation facility authorization across State-

owned waterbodies. Additionally, local government resolutions in favor of an evacuation route were passed by NAB, the Native Village of Kivalina, and the City of Kivalina.

If either of the northern or combined route options is selected, a portion of the 17(b) easement that traverses the winter trail along the coast from Kivalina north along the island may be impacted. Landowners along that route within the study area include NANA and DOT&PF (USDOI, BLM, 2016), and coordination with 17(b) trail users and landowners should occur to address trail markings and crossing details.

Since the entire Study Area is within the CKNHL, coordination with the NPS would be needed to complete a Section 4(f) Evaluation and to develop a Memorandum of Understanding for construction of an evacuation route.

5.3 Social Environment

5.3.1 Affected Environment

5.3.1.1 Socioeconomics and Environmental Justice

According to the most recent State of Alaska data, Kivalina is a community of approximately 412 residents (Department of Commerce, Community, and Economic Development [DCCED] 2016). The majority of Kivalina's residents are Inupiat; 96.3% percent of the population identifies their race as American Indian or Alaska Native; and over half of Kivalina's residents are under the age of 20 (U.S. Census Bureau, 2010).

Kivalina is designated as a Second-class city in the Northwest Arctic Borough with a mayoral form of government, a seven-member city council, twelve-member school board, and two municipal employees (DCCED, 2016; Himes-Cornell et al., 2013; WHPacific, 2014). The current town site became a permanent settlement in 1905 when the Bureau of Indian Affairs built a school on the barrier island on the west side of Kivalina Lagoon and mandated compulsory attendance of the local school-age children (Haley et al. 2009). NANA is the Alaska Native Claims Settlement Act (ANCSA) chartered regional corporation representing Kivalina, and the Native Village of Kivalina Indian Reorganization Act (IRA) Council serves as the federally recognized tribal government. There is no village corporation for Kivalina, as NANA has assumed that role for villages in the region. NANA serves as both the regional and village corporation for the community.

The Alaska Village Electric Cooperative (AVEC) provides electricity to the community via diesel generators. A three-mile surface line carries water from a pump station on the Wulik River to a pair of holding tanks near the center of the community where the water is treated and stored for use during the winter months. Few households in the community have full plumbing and water is hauled from the storage tanks to many residences. Residential sewage is hauled from residences in "honey buckets" to disposal bunkers located throughout the community, and a public washeteria is operated by the City. Public facilities include the washeteria, the City/Tribal Office, the U.S. Post Office, the AVEC power plant, a heavy equipment building, the airport snow removal equipment building, an armory, two churches, a bingo hall, community hall and the Boys & Girls Club (NANA, 2016). In addition, the Maniilaq Association operates the Kivalina Clinic, which provides basic medical services. The McQueen School provides instruction from preschool through 12th grade and online post-secondary courses are available locally through the Chukchi Campus, a rural division of the University of Alaska (Himes-Cornell et al., 2013).

Economic opportunities in Kivalina are limited, with many of the wage labor job/positions being part-time or seasonal. The Alaska Department of Labor and Workforce Development (2014) revealed almost two thirds (62%) of the available workforce was employed in local government, education, health and social services, resource extraction industries, and other service sectors. Local employers include the City, Village Council, school district, Maniilaq Association, NANA Regional Corporation, the Red Dog Mine, and the local stores. Commercial fishing offers limited seasonal employment outside of Kivalina; the sale of Native ivory carvings brings additional revenue to the community (Himes-Cornell et al. 2013:93-94; WHPacific 2014). In 2010, per capita annual income was estimated at $13,425, and the median household income was $59,375 (U.S. Census Bureau 2010). It is estimated that 31% of people in the community of Kivalina live below poverty level (DCCED, 2016).

There are no roads connecting Kivalina with other communities in the region. Air freight services are provided by commercial carriers operating between Kotzebue and Kivalina and heavy freight, including fuel, automobiles, and general supplies, are transported by barge to the community between July and August (Himes-Cornell et al. 2013:98). Nearly all of Kivalina is dependent, to varying degrees, on subsistence fish and game resources.

5.3.1.2 Subsistence

Subsistence activities are an integral part in the lives of Kivalina's residents (Braem and Kostick, 2014; Burch, 1985; SRB&A, 2009; Himes-Cornell et al., 2013; Magdanz et al., 2010; Satterthwaite-Phillips et

al., 2016). The last comprehensive subsistence survey, conducted by the ADF&G in 2008, revealed that over 88% of respondents reported using fish, land mammals, marine mammals, birds and eggs, berries and greens; all surveyed households reported using at least one kind of wild food, and 95% reported harvesting at least one kind of wild food (Magdanz et al., 2010). Kivalina residents made use of at least twelve fish species, five species of large land mammals, six species of small land mammals, eight species of marine mammals, nine species of migratory birds, three resident bird species, as well as bird eggs and shellfish (Magdanz et al., 2010). When quantified by edible weight, bearded seals, Dolly Varden (locally referred to as "trout") and caribou contributed 78% of the total community harvest (Magdanz et al., 2010). Four types of berries and at least six types of greens were also harvested (Magdanz et al., 2010). Search and harvest areas reported by Kivalina residents extended along the coast from Cape Krusenstern north to Cape Thompson and inland to the Noatak River, Red Dog Mine and the headwaters of the Wulik, Kivalina and Kukpuk Rivers (Magdanz et al., 2010).

A recent project focused on mapping the subsistence harvest areas of the residents of the Kotzebue Sound region, and recorded Kivalina residents' harvest locations and targeted resources (Satterthwaite-Phillips et al., 2016). Kivalina residents reported harvesting marine mammals along the coast from Cape Krusenstern to Chariot in spring and summer, and offshore from the Kivalina barrier islands in the fall (Satterthwaite-Phillips et al., 2016). Birds were taken in the winter around Kivalina Lagoon, the mouth of the Kivalina River, and the lower reaches of the Wulik River, while spring and summer bird harvest locations were reported throughout the Study Area (Satterthwaite-Phillips et al., 2016). Egg collection locations were reported throughout the Study Area in the spring, and along the middle and lower Wulik River drainage, and in the lowlands south and east of Kivalina Lagoon during the spring and fall (Satterthwaite-Phillips et al., 2016). Fishing areas were reported in Kivalina Lagoon and along the Kivalina and Wulik Rivers during all seasons (Satterthwaite-Phillips et al., 2016). Large game harvest locations were reported in the middle and upper Kivalina River drainage, in the uplands between the middle and Kivalina and Wulik Rivers in the spring and summer, along the middle Kivalina River and in the middle and lower Wulik River channels in the fall, and throughout the Study Area in the winter (Satterthwaite-Phillips et al., 2016). Small game is hunted or trapped along the middle Wulik River channel in the fall, and along the Kivalina and Wulik River channels and the interior uplands in the Study Area during the winter (Satterthwaite-Phillips et al., 2016). Spring plant harvest locations were reported around the mouth of the Kivalina River, and throughout the Study Area in the summer and fall (Satterthwaite-Phillips et al., 2016). Based on this mapping data and earlier descriptions of local subsistence hunting, fishing and gathering (i.e. Burch, 1985), it is clear that the Kivalina and Wulik

Rivers are currently the two main routes from Kivalina into the interior and that the Study Area is at the center of Kivalina's subsistence harvest area.

5.3.2 Potential Impacts

A proposed evacuation route is anticipated to have a positive socioeconomic impact on the community. Economic advantages would arise from possible employment during construction, improved access to allotments along the Wulik River, and increased opportunities for subsistence activities in portions of the Study Area directly accessible from a proposed evacuation route.

Allotments located along the north bank of the Wulik River, currently only accessible by boat, could be reached most easily from the Southern Route. Seasonal low flow conditions in the Wulik River currently limit when Kivalina residents can access their allotments by boat. Development of a road along the southern route option could expand accessibility of allotments beyond seasons when boat travel is possible along the Wulik River. Additionally, increased allotment access would allow owner development and provide the opportunity for expanded residential areas within individual allotments.

Since the entire Kivalina population would be affected similarly, a proposed evacuation route would not result in disproportionately high and adverse impacts to minority or low-income populations. A proposed evacuation route would increase safety of all Kivalina residents by providing a reliable route to a safe evacuation mainland location during emergencies, Therefore, a proposed evacuation route would not result in environmental health or safety risks to Kivalina residents.

An all season road into the interior of the Study Area would provide reliable access to subsistence hunting, fishing and gathering locations during seasons when low river flows prohibit boat travel and during warm winters when thin river and lagoon ice prevents safe snow machine operation. It would also expand subsistence harvest opportunities to Kivalina residents who do not currently have access to boats or other equipment necessary to reach subsistence use areas within the Study Area. Year-round road access to K-Hill would greatly decrease the amount of time and fuel required to reach caribou hunting areas in the foothills and upper reaches of the Kivalina and Wulik River drainages.

5.4 Hazardous Materials, Pollution Prevention, and Solid Waste

5.4.1 Affected Environment

The Alaska Department of Environmental Conservation (ADEC) *Contaminated Sites Program Database* (ADEC, 2016a) identifies only one site in the Study Area, AKARNG Kivalina FSA, listed for petroleum

contamination. The site is in the middle of the community of Kivalina near the Kivalina Lagoon, and is not near proposed evacuation route options or material sites. The ADEC issued a Cleanup Complete determination for AKARNG Kivalina FSA on January 5, 2009. Also, a 6.5-acre Class 3 unpermitted municipal landfill is located within the Study Area, approximately 0.3 miles northwest of the Kivalina Airport runway, bordering the Chukchi Sea to the southwest, and the Kivalina Lagoon to the northeast. Possible contaminants at the landfill include construction and demolition waste, asbestos, and sewage. Honey bucket waste is comingled with solid waste at the landfill (ADEC, 2016b).

5.4.2 Potential Impacts

No known hazardous waste sites, generators, or contaminated sites are identified within the community proposed evacuation route options or proximate material sites. Therefore, contamination or hazardous waste would not likely be encountered during construction, and no impacts would be expected.

Land ownership for any selected evacuation route would be conveyed from NANA to the City of Kivalina, but may need to be transitioned to DOT&PF ownership through ROW acquisition in the future. Completion of a Phase I Environmental Site Assessment for the proposed evacuation route would be required prior to DOT&PF ROW acquisition.

5.4.2.1 Avoidance, Minimization, and Mitigation

- Prior to construction, the contractor would develop a Hazardous Materials Control Plan to address spill response and storage and handling of hazardous materials, including fuel and lubricants. If leaks or spills occur, contaminated material and soils would be contained and disposed of properly.
- The construction contractor would be required to stop work and notify the DOT&PF Project Engineer if suspected contaminated soil or water is encountered. DOT&PF would notify ADEC in compliance with 18 Alaska Administrative Code 75.300. Any contamination encountered would be handled and disposed of in an ADEC-approved manner.
- A plan for disposal of solid waste generated during construction would need to be developed prior to construction. It is anticipated the Kivalina municipal landfill would not have sufficient area to accommodate project construction waste.

5.5 Water Resources and Water Quality

5.5.1 Affected Environment

5.5.1.1 Rivers and Streams

The Kivalina and Wulik rivers define the northwest and southeast boundaries of the Study Area. Associated ponds, sloughs, and a relic channel of the Wulik River are apparent within these boundaries, all of which regularly flood and flow in a southwesterly direction towards the Kivalina Lagoon and eventually to the Chukchi Sea via two lagoon entrances. Neither the Wulik nor Kivalina river is listed as impaired (ADEC, 2010), and water quality is considered good in spite of background bacteria and other natural organisms (WHPacific, 2012a).

Neither the Wulik nor Kivalina river is listed as a Wild and Scenic River by the NPS, though public comments during the 2007 BLM planning process for the Kobuk-Seward Peninsula Resource Management Area indicated that both the Wulik and Kivalina rivers should have suitability studies conducted to determine their eligibility for inclusion in the National Wild and Scenic Rivers Program. The primary reason both rivers were recommended for Program inclusion is the fish habitat they provide, a key subsistence resource in the area (BLM, 2007).

The major surface water sources in the Kivalina area include the Wulik and Kivalina Rivers, Kivalina Lagoon, the Chukchi Sea and various streams and lakes (WHPacific, 2012a). Marine waters in the project area used to be ice-free from early July through late October. However, later freeze-up and earlier melting has resulted in longer ice-free periods during recent years. As a result, Kivalina has been facing significant risks from storms, such as flooding and erosion (ADCCED, 2015).

Wulik River

The Wulik River is approximately 80 miles long, originates in the De Long Mountains, and has an annual average discharge of 1603 cubic feet per second (cfs); with large seasonal variation in surface water flow ranging from a monthly average discharge of 136 cfs in November to 3175 cfs in June (U.S. Environmental Protection Agency [USEPA], 2009). Wulik River is the primary source of Kivalina's fresh water during the summer months, with water pumped from the river via a 3-mile surface transmission line to a pair of storage tanks located on the island. There is a U.S. Geological Survey (USGS) streamflow gauge located 22 miles upstream of the river mouth that has been continuously operating since 1984. Based on flow data from this gauge, the 100-year flow event was calculated to be 55,000 cfs (USACE, 2016).

Kivalina River

The Kivalina River is approximately 60 miles long and also originates in the De Long Mountains. It is neither gauged nor has any hydrologic analysis been performed to estimate peak flows. However, previous studies in the area (USACE, 2016) assumed that this river follows the same general flow pattern as the Wulik River. Based on area ratio and similarities to the Wulik River in its watershed and river slope, the USACE study estimates that the Kivalina River could produce approximately 75 percent of the discharge of the Wulik River, resulting in an estimated 100-year flow of 41,250cfs (USACE, 2016).

5.5.1.2 Lagoon

Kivalina Lagoon is a shallow body of water approximately 10 miles long that ranges in width from 3,000 feet (ft) near the mouth of the Wulik River to 8,000 ft north of the Kivalina River. The lagoon is fed by the Kivalina River at its northern end, and the Wulik River at the southern end; and also by tidal flows from the Chukchi Sea through two inlets that define Kivalina island: Singuak entrance, on the southeastern side of the community of Kivalina, and Kivalik Inlet, approximately 5.5 miles to the northwest. The Kivalik and Singauk Inlets handle the majority of tidal and river ebb flows. Large areas of the lagoon, especially on the northeastern side, are only 1 to 3ft deep, although deeper sections and channels, as deep as 10.4 ft, were measured (USACE, 2016). The lagoon's northeast shoreline is dominated by the deltas of the Kivalina and Wulik Rivers, and sediment transport along the Chukchi Sea occasionally blocks the Singauk or Kivalik Inlets. This blockage elevates the water level in the lagoon until it passes over the opening and a new channel is formed as the flow head cuts through the sand deposits (USACE, 2016).

No measurements of currents have been conducted in Kivalina Lagoon. River currents are assumed to pass directly from the river deltas through river channels in the lagoon visible on aerial photography (USACE, 2016).

Waves from the Chukchi Sea are primarily blocked by the barrier islands and so it is assumed that waves in Kivalina Lagoon are primarily generated by local winds. The USACE carried out wind speed analysis based on data from the Kivalina airport that resulted in an estimated wind-driven wave height of 4.3 ft inside the lagoon (USACE, 2016). Wave energy entering the lagoon through the river openings is dissipated by sand bars of material deposited by the rivers and through interaction with the current of the rivers (USACE, 2016).

5.5.1.3 Floodplains

Flood hazards in Kivalina result almost exclusively from Chukchi Sea storm surges caused by south to southeasterly winds (City of Kivalina, 2015). The 1976 Alaska Division of Community and Regional Affairs Community Map for Kivalina indicates the limit of the 100-year floodplain is the 30-ft contour. However, Kivalina and a portion of the Study Area lie at or below the 25-ft contour, which places them within the floodplain of the Kivalina and Wulik Rivers (WHPacific, 2012a). Based on data collected at the Red Dog Mine dock tide station, the upper limit of a 100-year surge in the Kivalina lagoon is assumed to be 7.3 ft (USACE, 2016).

River Flooding

Analysis using the Wulik River gauging station was performed in 1998 to estimate the 100-year flood water surface elevation on the lower Wulik River using the HEC-2 numerical riverflow model (USACE, 1998a). This analysis found water surface elevation in the lagoon had a much greater effect on flood elevations than river discharge, mainly due to the wide tidal marsh north of the lower Wulik River storing excess river flow. A similar analysis has not been conducted for the Kivalina River, but it is assumed that it floods in a similar manner, although its steeper riverbanks may allow for more flood storage than is provided in the Wulik River.

Lagoon Flooding

Kivalina Lagoon exhibits a straight seaward shore alignment, and its steep beach profile at the waterline indicates an active transport of beach material during the ice-free season. The lagoon side of Kivalina Island is marked with intermittent spits, indicating active deposition. Based on prior analysis, the Singuak Entrance transports the majority of the tidal ebb flows from the Kivalina and Wulik Rivers (USACE, 1998b). Erosion is a particular concern for the Singuak Entrance, as storm events in 2004, 2005 and 2006 resulted in significant erosion on the seaward side of the inlet from wind driven tidal surges (USACE, 2006).

The size of the lagoon and the low ground elevation on the mainland provide a large are for storage when the rivers rise out of their banks. Also, the lagoon drains directly into the ocean and inflow is passed through to the ocean with little change in water surface elevation (USACE, 2016). As a result, high flows on the rivers are anticipated to be distributed over the surface of the lagoon and available volume of the floodplain causing only minor changes to the lagoon water level during flood events.

5.5.2 Potential Impacts

5.5.2.1 Water Quality

Minor, short term impacts to water quality would likely result from construction of an evacuation route within the Kivalina and Wulik river drainages and Kivalina Lagoon. These impacts would primarily be associated with construction-related sediment releases during culvert placement, drainage structure construction, and stormwater runoff on disturbed road embankments before final stabilization is completed. Other potential impacts to water quality would be associated with accidental spills or leaks from vehicles or heavy equipment operating adjacent to wetlands and water bodies during either construction or subsequent use of the evacuation route.

5.5.2.2 Floodplains

Any potential lagoon crossing as well as parts of the evacuation road and would be constructed within areas susceptible to storm surge flooding, but would not be located within a regulatory floodway or Federal Emergency Management Agency (FEMA) mapped 100-year floodplain. An evacuation route built within the Study Area would not likely increase the 100-year floodplain backwater elevation of either the Kivalina or Wulik rivers. However, analyses of any proposed lagoon crossing methods and their associated considerations for maintenance of flow would be necessary to quantify potential impacts to storm surge elevations and erosion of the Singuak Entrance. The USACE (2016) study estimated that the storm surge for Kivalina would not be materially affected by the presence of a bridge and causeway structure across the Kivalina Lagoon.

5.5.3 Avoidance, Minimization, and Mitigation

Avoidance and minimization measures to reduce impacts on water quality, sediment transport and hydrology, including flow regimes in rivers and the lagoon, are suggested based on state or federal regulations and policies, management practices and guidelines, and relevant peer-reviewed literature.

5.5.3.1 Water Quality

Measure to minimize releases of sediment to water bodies would be implemented during construction as part of compliance with the APDES Construction General Permit (CGP). Compliance with the CGP includes preparation of a Storm Water Pollution Prevention Plan (SWPPP) and implementation and monitoring of erosion and sediment control best management practices (BMPs). Additional measures to avoid impacts to water quality include:

- Sequence work to reduce unnecessary exposure of disturbed land to wind and precipitation erosion mechanisms.
- Minimize disturbance of existing vegetation within the project limits, particularly vegetation in existing surface drainage flow pathways.
- Consider current and past forecasted weather conditions prior to initiating key project activities in areas where erosion or sediment transport risks may be elevated.

5.5.3.2 Hydrology

Measures to avoid, minimize or mitigate hydrological impacts from the presence of a road and lagoon crossing should be considered.

Roads

- Stream and wetland crossings should be kept to a minimum.
- Where crossings are needed, properly designed and sized crossing structures (fords, culverts, bridges) would be used. Culverts used for this purpose should be placed at locations allowing free downstream flow. If a road segment is built in stagnant wetlands, cross flow culverts should be placed to allow for hydrologic balance.
- Roadway and causeway embankments should be protecte from erosional forces to prevent sediment transport to adjacent habitats.

Lagoon crossing

- The proposed lagoon crossing, whether a causeway and/or bridge and/or culverts, should be designed to allow sufficient water circulation, sediment transport and tidal flushing to retain as close to natural flow and current regimes as possible.
- Reduction of cross area flows may increase respective flow velocities in areas of the lagoon where potential crossings are constructed. Flow retarding features, such as apron or rock rip rap structures, should be considered to maintain velocities below critical levels. Another option to reduce current velocities includes dredging a basin beneath all bridge spans to increase conveyance of water during a storm event (USACE, 2016).
- The USACE has estimated the upper limit of a 100-year surge at Kivalina at 7.3 ft; consequently any bridge deck height or causeway travel surface should be higher than 7.3 ft to take into account tides and waves along with the storm surge (WHPacific, 2012a).
- A sediment stream in the lagoon, which travels from north to south along the eastern shoreline of the island, resupplies sediment to narrow lagoon beaches just north of the Singuak inlet mouth

(USACE, 2016). Any proposed causeway should incorporate at least one opening within this natural sediment transport pathway to maintain current sediment transport processes in this area and reduce erosion potential near Singuak inlet. An impermeable barrier or fill located too close to the community, could lead to a narrowing of protective shoreline, and accelerate erosion of the bluff surrounding Kivalina.

5.6 Wetlands and Vegetation

5.6.1 Affected Environment

5.6.1.1 Wetlands

The Study Area falls within the Wulik-Kivalina Rivers Watershed (EPA/USGS hydrologic catalog unit 19050404 (https://cfpub.epa.gov/surf/huc.cfm?huc_code=19050404)), which is comprised primarily of dwarf shrub and graminoid herbaceous tundra, located immediately adjacent to Kivalina Lagoon and the Chukchi Sea. Subsurface conditions of the Study Area are characterized primarily by continuous permafrost at varied depths (ASRC, 2015). The National Wetland Inventory (NWI) shows several wetland types within the Study Area (U.S. Fish and Wildlife Service [USFWS], 2016a). Within the inland portion of the Study Area, consisting of lands on the northeast side of the lagoon to K-Hill and between the Kivalina and Wulik rivers, the dominant wetland types include Palustrine Scrub Shrub (PSS) and Palustrine Emergent (PEM) wetlands as well as Riverine (R), Palustrine Unconsolidated Bottom (PUB), and Lacustrine (LUB) wetlands and waters. The inland portion of the Study Area also contains Uplands (UPL), which occur within higher elevations at K-Hill and a few higher elevation areas between the Kivalina and Wulik rivers. Within the marine influenced portions of the Kivalina Lagoon and its adjacent habitats, several estuarine and marine wetland types and waters occur within the Study area, including Estuarine Intertidal and Deepwater (E1 and E2), as well as Marine Intertidal and Deepwater (M1 and M2).

A recent desktop wetland mapping study encompassed all three potential route options considered by the community of Kivalina previous to DOT&PF involvement in the project (ASRC, 2015). The study verified and refined the NWI boundaries, and provided more detail and differentiation of wetland types using the Cowardin classification system (Cowardin et al, 1979). The ASRC data revealed more Uplands within the Study Area than previously identified, including a larger portion of the footslopes of K-Hill. In September and October 2016, Stantec biologists completed a reconnaissance survey of the Study Area to collect ground photography of wetlands and habitats that could be cross referenced to ASRC and NWI wetland data and verify mapping accuracy (Stantec, 2016a). In general, the reconnaissance survey

photography verified many of the ASRC and NWI mapped wetlands, however, wetland mapping and ground photography should be reconciled prior to submittal of a wetland permit application. Additionally, cultural resource survey data also collected in September and October 2016 provided detailed soil information within the Study Area that can be further used to determine depth to permafrost and verify mapped wetland/upland boundaries with ground data (Stantec, 2016b).

5.6.1.2 Vegetation

Vegetation types within the Study Area were mapped by ASRC using the Viereck classification system (Viereck et al, 1992). Results indicate that the majority of the Study Area is comprised of wet graminoid herbaceous vegetation, willow dwarf scrub, and areas of more mesic graminoid herbaceous species (ASRC, 2015). These classifications closely tie with the Palustrine Scrub Shrub and Palustrine Emergent designations made for these wetlands, however, ground photography taken in September and October 2016 should be cross references with vegetation mapping to verify consistency with ground data prior to permitting. Vegetation observed during the Stantec 2016 reconnaissance effort showed herbaceous areas dominated by sedges and grasses including cottongrass (*Eriophorum chamissonis*) and polar grass (*Arctagrostis latifolia*), interspersed with large areas of scrub shrub vegetation dominated by lingonberry (*Vaccinium vitis-idaea*), blueberry (*Vaccinium uliginosum*), willow species (*salix sp*.), and Northern Labrador tea (*Rhododendron tomentosum*) (Stantec, 2016a).

5.6.1.3 Wetland hydrology and connectivity

Using a combination of ground photography taken during the Stantec 2016 reconnaissance survey, Stantec cultural resource survey soils data, and NWI and ASRC wetland data, assumptions can be made about hydrology and connectivity of water bodies within the Study Area.

Wetland hydrology within the Study Area appears to be driven by a restrictive permafrost layer perching water on the surface. Soil data collected during the fall 2016 cultural resource survey, showed that in low lying areas, permafrost was encountered between 4 and 10 inches below ground surface. In contrast, depth to permafrost was greater than 10 inches in relic channels or on the outer bends of oxbow lakes (Stantec, 2016b). Vegetation differences are apparent on aerial photography where these slight elevation differences occur. While most of the higher elevation areas within relic channels had deeper permafrost, the ground surface remained saturated at or near the surface, or standing water was observed, with hydrophytic plants dominating the landscape. Uplands were observed however in areas of deeper permafrost within some elevated areas, including the foot slopes of K-Hill, as well as some remnant

levees and point bars preserved along relic channels. In these areas, well drained gravels were visible at the surface and dominated by larger willow species (Stantec, 2016a).

All wetlands and waters within the Study Area appear to have a surface water connection to either the Kivalina River, Wulik River (or it's relic channel), and an apparent hydrologic connection to the Chukchi Sea via Kivalina Lagoon. While many of the lakes, ponds, and sloughs appear to be isolated from these waterbodies, as observed during the 2016 reconnaissance survey, it is assumed they are connected via surface saturation on permafrost. Two-foot contour data available for this area should be evaluated to verify any potential channel connectivity that was not apparent during ground surveys.

5.6.1.4 Wetland Functional Value

The ASRC wetlands mapping study included evaluation of wetland functions and values. Sample points representing a range of Cowardin classes and topography within the Study Area were selected and assigned functional categories based on Cowardin type and Hydrogeomorphic Classification system (HGM) (Magee, 1998). HGM classes identified in the Study Area included tidal fringe, riverine, flats, depressional, and slope (ASRC, 2015). Most of the wetlands and waters were considered to be highly functioning and classified as Category I, with only one Cowardin type classified as functioning as a Category II wetland. Due to the large majority of wetlands falling into Category I classification, a further category, higher functioning wetlands (I+), was introduced. Category I+ wetlands generally consist of the riverine, tidal, estuarine and lacustrine water bodies within the Study Area, as well as the permanently, semi-permanently, or seasonally flooded palustrine wetlands (ASRC, 2015). Category I wetlands consist of the Saturated or Seasonally Flooded Palustrine Scrub Shrub, and Palustrine Emergent wetlands in the Study Area. Category II wetlands within the Study Area consist of Seasonally Flooded Palustrine Scrub Shrub wetlands (ASRC, 2015). The study noted that some scrub shrub wetlands located along the fringes of water bodies may hold greater categorical value than the same wetland type located near Uplands, although their desktop assessment method did not evaluate each polygon individually. Further refinement of scrub shrub wetland values may be warranted within the Study Area prior to initiation of permitting.

The wetlands and waters within the Study Area are generally very high value, and provide several important functional characteristics. The three highest functions these wetlands contribute are nutrient and toxicant removal, native plant richness, and production and export of organic material. These wetlands are either seasonally inundated or permanently flooded, and have high surface water connectivity to the Wulik and Kivalina rivers. The dominance of shrub vegetation in these areas also provides high quality toxicant removal and buffering capabilities during flood events. Other wetland

functions in the Study Area include sediment removal, erosion control, and shoreline stabilization (ASRC, 2015). Many of the sloughs and oxbow lakes adjacent to the river systems were also shown to provide high value fish habitat functions, although more information about the depth of these waterbodies and frequency of connectivity to the main river systems is needed to understand if these areas are actively used by fish.

5.6.2 Potential Impacts

Impacts to wetlands would likely include a reduction of the overall habitat within the Study Area. Given the ubiquity of high value wetlands in the Study Area and surrounding landscape, the relative loss of habitat due to the road and material extraction is expected to be minor. Any final, proposed project design within the Study Area is not expected to change area drainage patterns or the surrounding area's ability to retain floodwaters.

New road access within the Study Area may encourage owners of Native allotments adjacent to the alignment to develop portions of their land. Because most the Study Area is wetlands, it would likely be necessary to fill wetlands to support such new development. Indirect impacts to wetlands could also result from development of nearby land within the proximity of a new road. There would also be indirect cumulative impacts to wetlands from development of area material sites as part of the proposed project. These impacts may be ongoing if these sites are kept open after construction is complete, resulting in potential cumulative impacts to wetlands in the future. The impacted wetlands would no longer provide wetland functions, including habitat for various fish and wildlife; however, this impact is expected to be minimal due to the abundance of similar surrounding habitat.

5.6.3 Avoidance, Minimization, and Mitigation

Executive Order 11990, "Protection of Wetlands," issued May 24, 1977, requires there be no practicable alternative to the Proposed Action if such action affects wetlands, and that any proposed federally funded action include all practicable measures to avoid and minimize harm to wetlands. Given the majority of the Study Area is dominated by highly functioning wetlands and waters, construction of an evacuation route from Kivalina to K-Hill would involve some degree of impacts to high value wetlands and a USACE Section 404/10 Individual Permit would be required.

Avoidance, minimization, and either compensatory or sponsor-proposed mitigation are the primary measures available to offset wetland losses for the proposed project. The following avoidance and minimization measures are recommended to reduce the unavoidable impacts to wetlands:

- Routing the proposed alignment to avoid and minimize impacts to waters of the U.S and the higher Category I+ wetlands, as well as routing the road within the small number of Upland areas within the Study Area, would reduce the overall acreage of wetland impacts.
- Project elements (e.g. road width, vehicle turn outs) designed with minimal dimensions while serving subject function, with side slopes designed as steep as safely as geotechnical considerations for slope stability allow, would minimize the fill required within wetlands.
- Staking or otherwise delineating the evacuation road embankment footprint prior to construction, and maintaining that marking for the duration of the project would avoid disturbance and sedimentation to wetlands from construction activities outside of permitted fill slopes.
- Stockpiling construction materials within existing fills and/or developed staging areas would minimize construction disturbance and avoid impacting additional wetland acreage.
- Maintaining setbacks from water channels and standing water for refueling and vehicle maintenance activities would reduce the likelihood of hazardous substances entering waterbodies from accidental spills or releases.
- An Erosion and Sediment Control Plan, SWPPP, and Hazardous Material Control Plan would be required as part of this project, and their implementation would protect streams and wetlands, and minimize the introduction of sediment and runoff to adjacent waterbodies.
- Using only clean fill with 10 percent fines or less, and armor rock placed in the Kivalina Lagoon, would minimize sedimentation to these waterbodies. A turbidity curtain placed in the lagoon to trap sediments, and silt fencing along areas of road construction, would further reduce impacts to water quality.

5.7 Fish and Fish Habitat

5.7.1 Affected Environment

The Wulik and Kivalina Rivers are listed as anadromous waters by the ADF&G (ADF&G, 2016a), meaning that they, along with the Kivalina Lagoon, are considered Essential Fish Habitat (EFH) (NMFS, 2005; USACE, 2007). These systems support spawning, rearing, and overwintering of both anadromous and resident species (USACE, 2007), although there is little publicly available information describing the specific locations and extent of such habitats within the two rivers or lagoon.

5.7.1.1 Wulik and Kivalina Rivers

The Wulik River supports chum salmon (*Oncorhynchus keta*), Chinook salmon (*O. tshawytscha*), sockeye salmon (*O. nerka*), coho salmon (*O. kisutch*), and pink salmon (*O. gorbuscha*). Studies of the Ikalukrok Creek, an upstream tributary of the Wulik River, found small numbers of spawning Chinook (Tetra Tech, Inc., 2009). Chum salmon have been observed spawning in the lower portion of Ikalukrok Creek in late July and August (Scannell and Ott, 2002).

Dolly Varden char (*Salvelinus malma*) are a main source of subsistence fish for people in Kivalina (USACE, 2007). Juveniles emerge in the spring after fall spawning in the Wulik River (Ott and Morris, 2007); adults typically enter the lagoon in later summer (USACE, 2007). Annual surveys conducted between 1979 and 2015 as part of ongoing monitoring for the nearby Red Dog Mine estimated between 22,000 and 144,000 Dolly Varden in the Wulik River in a given year (Ott et al., 2016). From late August to September, young-of-year and adult Arctic grayling (*Thymallus arcticus*) move downstream from spawning habitat in Red Dog Creek to overwinter in the Wulik River (Ott and Morris, 2007; Tetra Tech, Inc., 2009). Several species of whitefish (Bering cisco, *Coregonus laurettae*; least cisco, *C. sardinella;* broad whitefish, *C. nasus*; humpback whitefish, *C. pidschian*; round whitefish, *Prosopium cylindraceum;* and sheefish, *Stenodus nelma*) all make use of the lower Wulik River (USACE, 2005 cited in Tetra Tech, Inc., 2009; USACE, 2007).

The Wulik River estuary (confluence of the Wulik River with the Kivalina Lagoon) is located immediately east of Kivalina. The estuary is characterized by a series of small, low gradient tributary channels across the Wulik River floodplain. A number of relic channels to the Wulik River and isolated lake/pond features are also located in the estuary (northwest of the river confluence). The relic channels appear to have lost connectivity to the mainstem of the Wulik River, however they are directly connected to the Kivalina Lagoon. Estuary habitat is critical for outmigrating juvenile salmon, Dolly Varden, and numerous marine fish and invertebrate species discussed further in Section 5.7.1 and 5.7.2. The relic channels are anticipated to provide high value rearing habitat for juvenile salmon (specifically coho salmon) before their outmigration to the Chukchi Sea. Fish bearing status of various isolated lake/pond features is unknown at this time.

The Kivalina River is considered anadromous EFH and supports all five species of salmon, Dolly Varden, whitefish, and Arctic grayling (WHPacific, 2012b), although this drainage has been much less studied than that of the Wulik River.

5.7.1.2 Kivalina Lagoon

Algal communities in nearshore marine habitats of the region are typically made up of pelagic phytoplankton, sediment dwelling benthic algae, and sea-ice-associated algal mats (USACE, 2005). The relative proportion of these algae depends on the season and extent of sea ice. During the summer season of sustained daylight and warmer temperatures, benthic algae cover bottom substrates while phytoplankton are prevalent in deeper waters (USACE, 2005).

Muddy and sandy substrates in the region provide habitat for invertebrates such as polychaete worms, clams, tunicates, sponges, and burrowing anemones (USACE, 2007). Sea stars (*Evasterias echinosoma*, *Asterias amurensis*, *Leptasterias polaris acervata*, and *L. nanimensis*), the basket star (*Gorgonocephalus eucnemis*) and shrimp from the Family Crangonidae were all captured during surveys to the south of the lagoon for the DeLong Mountain Transportation System (DMTS) project (USACE, 2005). Brackish water tolerant amphipods and clams have been noted inside Kivalina Lagoon (USACE, 2007).

Several invertebrate species of probable subsistence importance were also captured during the DMTS surveys and could be locally and seasonally present in the Kivalina Lagoon. Consistent catch of helmet crabs (*Telmessus cheiragonus*) suggests year-round presence in nearshore habitat while sporadic or seasonal catches of king crabs (Family Lithodidae), and lyre crabs (*Hyas* spp.) (USACE, 2005) could indicate offshore summer migrations or low habitat suitability of shallow nearshore environments for these taxa.

Marine EFH for six species groups is found near Kivalina (NMFS, 2005; USACE, 2007). The marine taxa with known EFH near the Kivalina Lagoon are the five species of Pacific salmon, Alaska plaice (*Pleuronectes quadrituberculatus*), yellowfin sole (*Limanda aspera*), sculpins (Family Cottidae), snow crab (*Chionoecetes opilio*), and Arctic cod (*Arctogadus Glacialus*) (USACE, 2007; NMFS, 2011).

In addition to the salmon and Dolly Varden that pass through the lagoon, various species of demersal associated fish can be found during summer months including yellowfin sole, Bering flounder (*Hippoglossoides robustus*), starry flounder (*Platichthys stellatus*), and sculpins. Schooling Pacific herring (*Clupea pallasii*), capelin (*Mallotus villosus*), and rainbow smelt (*Osmerus dentex*) are all caught seasonally while Arctic cod (*Boreogadus saida*) and saffron cod (*Eleginus gracilis*) are present year-round (USACE, 2007).

5.7.2 Potential Impacts

Details on construction methods (timing, equipment use, material site locations, etc.) have been assumed based on typical construction practices, BMPs and knowledge of the area. The intent of the discussion below is to scope potential interactions with the freshwater and marine environment, and present typical avoidance and mitigation measures (at a high-level). Information needs to quantify the significance of probable effects are identified in Section 7 below.

5.7.2.1 Freshwater Fish and Fish Habitat

Potential Project activity interactions with the freshwater environment are attributed to construction and operation of the road and include:

- culvert or bridge waterbody crossings
- material site development and access
- roadway construction

Culvert and Bridge Waterbody Crossings

Each of the three current route options are anticipated to require the design and placement of waterbody crossings (i.e., culvert or bridge structures) and would therefore interact with instream freshwater fish and fish habitat. Following final route selection and prior to construction, it would useful to complete a fish habitat assessment at each required crossing location to determine fish bearing status and to identify potential high value spawning or rearing habitat (specifically for salmon, Arctic grayling, and Dolly Varden). Should high value spawning or rearing habitat be identified, final placement of the structure would attempt to avoid key habitat areas as best as possible. Should alteration of the structure location not be feasible (e.g., engineering restrictions, geotechnical issues), an appropriate structure would be considered to minimize potential impacts. Additionally, the design and installation of any crossing structure would not constrict flow such that velocities exceed the prolonged swim speed of fish or impede fish migration.

Should a culvert crossing structure be installed, placement of the structure would require the temporary dewatering of a section of stream to allow ground preparation activities to be completed in the dry. During this time, fish migration would be temporarily altered. Depending on construction timing, the effects to fish would vary. Winter construction would result in minimal effects to fish as they are predominately sedentary during this time. Should construction occur during salmon migration/spawning or juvenile salmon outmigration, alteration of migration patterns and timing could result in risks to fish.

During critical timing windows, appropriate measures would be implemented (e.g., construction of a diversion channel) to allow fish passage or the selected construction contractor would coordinate with ADF&G to identify appropriate migration measures.

Bridge structure crossings would be designed to limit potential effects to instream habitat and maintain the structural integrity of the stream channel banks. Depending on structure design, temporary dewatering of a section of instream habitat may be required to facilitate placement of concrete footers. Appropriate measures would be implemented to allow fish migration during the construction period.

Construction of all crossing structures would adhere to appropriate BMPs for instream works to minimize potential effects to fish and fish habitat from sediment mobilization and transport and accidental spills. During instream construction activities, a QEP may be required onsite to ensure the construction contractor adheres to any prescribed site specific BMPs and other potential permit requirements.

Material Site Development and Access

Construction of the Kivalina evacuation and school access road would require considerable quantities of aggregate material for fill. Potential sources of aggregate materials have been identified within the Study Area (Figure 2).

Construction of access roads to the potential material sites and extraction of aggregate have the potential to interact with freshwater fish and fish habitat. Typical effects associated with extraction of aggregate materials near a waterbody include increased levels of turbidity, sediment transport and deposition, and increased potential for hydrocarbon releases.

Access to and development of material sites near the Wulik River and its relic channels would likely occur, at least in part, during the winter months when the ground is frozen. Material sites within relic channels and river bars of the Wulik River would likely be temporary, and no drilling or blasting would occur. Regardless of material site location, the BMPs for gravel and rock extraction should be considered. Should instream aggregate extraction be proposed by the selected construction contractor, an ADF&G Title 16 permit would be required subsequent to DNR DMLW designation of the site as a material site/source, and the site-specific BMPs outlined in the permit would be adhered to (e.g., no drainage depressions left on gravel bars potentially resulting in fish stranding). At a minimum, the BMPs would maintain river flow continuity, not impact the morphology of the stream, and avoid critical timing windows and spawning habitat for salmon, Arctic grayling, and Dolly Varden.

Roadway Construction

Roadway construction has the potential to interact with freshwater fish and fish habitat. Winter construction would minimize the potential for sediment-laden water generation and transport into adjacent freshwater resources. Once constructed however, heavy rainfall or meltwater events may result in the generation of sediment-laden water, which could discharge into nearby freshwater resources. Effects of sediment-laden water runoff following construction are anticipated to be temporary and of short duration. Additionally, compliance with the APDES CGP and implementation of the required SWPPP and BMPs during construction would reduce the potential for sediment laden storm water runoff during construction. Stabilization of side slopes with vegetation or non-erodible material would also be implemented as part of CGP compliance to further reduce the potential for sedimentation of nearby streams.

During road construction, water would be required for creating of temporary ice/snow roads, dust control and to support road compaction. Water associated with construction would likely be sourced from local waterbodies, along the final selected route alignment. Water withdrawal activities could result in risks to various fishes depending on both the withdrawal location and type (pond, river, smaller stream), whether pump intake velocities entrain fish, or if volume of uptakes result in dewatering a waterbody to the degree that fish are stranded. Water withdrawal activities would be conducted under appropriate permits with stipulations on seasonal timing, pump size, end of pipe screen mesh sizes, and approach velocities to minimize potential for fish impingement on the screen. Through appropriate BMPs, minimal effects to fish are anticipated due to water withdrawal activities.

Construction of the primary project road and various temporary access roads to aggregate material sites would improve overall access to the lower reaches of the Wulik River. The Wulik River is currently fished by residents of Kivalina for subsistence, and sites are accessed via boat. Although access to the Wulik River would be improved and could increase fishing activities, a consequent measured effect to fish populations is not expected.

5.7.2.2 Marine Fish and Fish Habitat

Potential project activity interactions with the marine environment would be attributed to the crossing of Kivalina Lagoon and include:

- construction of the bridge or causeway and associated drainage structures
- operation of the completed project

Construction of the Bridge or Causeway and Associated Drainage Structures

The lagoon crossing is currently a component of all preliminary route options and would require in-water work in the marine environment. Construction of lagoon crossing components may include in-water aggregate placement, pile or pier driving, installation of culverts, and boat activities. These activities would interact with marine fish and fish habitats as well as anadromous fish.

There are likely to be temporary and localized increases in both noise and vibration in the lagoon during construction, with the latter re-suspending sediments and increasing water turbidity. Increased turbidity and suspended sediment deposition patters could temporarily affect characteristics and distribution of lagoon epipelagic habitats. Noise and hydraulic forces from causeway construction or pile driving could influence fish and invertebrate use of nearby marine habitats.

To minimize potential effects during construction, in-water works associated with the lagoon crossing should be scheduled to reduce impacts to fish. Winter construction is preferred as the diversity of fish species proximate to the project is seasonally lower, and sensitive life-stages (e.g., outmigrating juvenile salmon) are typically not present. In addition to construction scheduling, contract specifications should be tailored to minimize environmental impacts and require implementation of BMPs to avoid or minimize adverse impacts to water quality and marine habitats.

The proposed bridge or causeway area could provide habitat for invertebrates such as polychaete worms, clams, tunicates, sponges, and burrowing anemones (USACE 2007). Several invertebrate species of potential subsistence importance have been documented near the Study Area and may be seasonally present in the lagoon, including helmet crab and lyre crabs. Even with implementation of appropriate BMPs, mortality of invertebrates or fish present during placement of the aggregate fill is possible, although mortality is anticipated to be limited and predominantly restricted to sessile, infaunal, and slow moving invertebrates and demersal fish (e.g., starry flounder). If material is placed along the seafloor of the lagoon, these species may become buried or crushed, although mortality of invertebrate and demersal fish is not expected to have a measurable effect on the sustainability and success of local fishery species. DOT&PF would coordinate with ADF&G to determine fish low risk work windows to minimize potential for fish mortality.

Operation of the Bridge or Causeway and Associated Drainage Structures

Operation of a bridge or causeway would require consideration of effects associated with the ongoing presence of the structure across the Kivalina Lagoon, including:

- habitat alteration

- loss of habitat
- changes in species' access to habitat

Placement of aggregate materials and/or crossing structures in the Kivalina Lagoon would result in the alteration of soft sediment and sand habitat to a coarse aggregate habitat. Given the localized placement of these structures and the abundance of both soft sand and sediment habitat types in the lagoon, the overall effect to fish is anticipated to be minimal. In fact, the alteration of this habitat to coarse aggregate along the crossing could increase species richness and overall biological utility of the lagoon in this area. Sessile invertebrates would use coarse aggregate habitat for attachment and fish species would use it for cover. It is anticipated that sessile invertebrates would begin to colonize the aggregate material within one to five years of placement and fish species (including crab) would use the habitat immediately. Therefore, introduction of placed aggregate material into the Kivalina Lagoon would likely have a positive effect with respect to habitat diversity and function.

The addition of a causeway in Kivalina Lagoon may result in habitat fragmentation by blocking or restricting passage from the southeastern part of the lagoon, adjacent to the Wulik River estuary, to the northeastern part where most of the estuarine habitat is located. This type of fragmentation may create a bottleneck for salmonids migrating to and from the Wulik and Kivalina Rivers, concentrating fish and increasing vulnerability to consumption by prey species, and potentially impacting these populations.

5.7.3 Avoidance, Minimization, and Mitigation

The following measures are identified to avoid, minimize or mitigate potential effects to fish and fish habitat in project area freshwater and marine environments. An EFH Assessment would be completed for the proposed project. Proposed conservation measures to avoid and minimize impacts to EFH would be proposed in consultation with NMFS, and may include the following measures;

- The final route selection and alignment of the Kivalina evacuation and school access road should minimize interactions or crossings with waterbodies wherever feasible. If these impacts cannot be avoided, an appropriately designed crossing structure would be installed with the road alignment approaching a waterbody perpendicularly to minimize impacts to the riparian zone, channel, and stream banks.
- A detailed fish habitat survey may be required at each waterbody crossing to properly design structures that minimize impacts to fish, fish habitat, and maintain passage.
- Material sites would be developed to maintain an appropriate distance from the ordinary high water level of all nearby fish bearing waterbodies as required by applicable permits.

- A causeway across the Kivalina Lagoon would incorporate structures to allow fish passage and access to habitats throughout the entire lagoon. The bridge or causeway would be designed to maintain, as much as possible, current tidal and lagoon flow patterns, sediment settlement patterns, water depths, turbidity, and nutrient flow. Structure design would also consider flows during periods of tidal exchange.
- During instream construction activities, a QEP may be required to ensure the construction contractor adheres to prescribed, site-specific BMPs and other potential permit requirements.

5.8 Aquatic and Terrestrial Birds

5.8.1 Affected Environment

Many of the freshwater systems in the Study Area support benthic invertebrates, as well as resident and anadromous fish, that serve as prey for shorebirds, waterbirds, and waterfowl. Coastal habitats in the Study Area are comprised of grass-dominated gravel beaches that divide the Chukchi Sea from the Kivalina Lagoon. The wetlands surrounding the community of Kivalina include shrub scrub, emergent, riparian, and intertidal areas. The Kivalina and Wulik rivers flow into the Kivalina Lagoon, creating brackish water conditions. The near-shore marine environment experiences seasonal ice build-up, with ice deposits accumulating between mid-November and late May. Polynyas (i.e., open water areas surrounded by sea ice) can occur under the right sea conditions and provide important migration, feeding, and reproduction areas for arctic birds (ADF&G, 2016b).

More than 100 species of birds, primarily waterfowl and shorebirds, migrate from southern latitudes of North, Central and South America to breed in the Study Area (Tetra Tech, 2009; Audubon Alaska, 2016). The following sections describe the occurrence, abundance, richness, and distribution of terrestrial and aquatic bird species in the Study Area. Data were compiled from existing literature, other regional and government sources, and previous environmental assessments.

5.8.1.1 Terrestrial Birds

Most terrestrial birds in the Study Area are transitory, or seasonal breeders, and their abundance and diversity are relatively low during winter months (USACE, 2016). Inland shrub and tussock tundra, riparian, and wetland habitats provide foraging, breeding, staging, molting, and year-round habitat for raptors, ptarmigan, shorebirds, waterfowl, and migratory and resident songbird species (WHPacific, 2012b).

Within the Study Area, riparian corridors of willow and alder shrubs likely support the highest diversity of terrestrial bird species. Coastal tundra provides breeding habitat for northern pintail (*Anas acuta*), long-tailed duck (*Clangula hyemalis*), American golden-plover (*Pluvialis dominica*), red-necked phalarope (*Phalaropus lobatus*), lapland longspur (*Calcarius lapponicus)*, Baird's (*Calidris bairdii*), stilt (*Calidris himantopus*), and buff-breasted sandpipers (*Calidris subruficollis*) (ADF&G, 2016b; USACE, 2016; USGS, 2016). Rock ptarmigan (*Lagopus muta*) breed on hilly or mountainous tundra throughout Alaska (ADF&G, 2016c). In winter, most male rock ptarmigan move to the lower edge of their breeding range whereas the hens move to the hills where they spend the winter in shrubby, open habitat. In western Alaska, willow ptarmigan (*Lagopus lagopus*) prefer riparian areas that support abundant willow and other tall bushes (ADF&G, 2016d). In winter, willow ptarmigan remain close to shrubby slopes and valleys, but seek out areas at lower elevations compared to the breeding season. Willow and rock ptarmigan are a regionally important subsistence resource.

Higher elevation cliffs, rock outcrops, and hill outcroppings in the region provide suitable breeding habitat for cliff-nesting raptors such as rough-legged hawk (*Buteo lagopus*), gyrfalcon (*Falco rusticolus*), and peregrine falcon (*Falco peregrinus*). In the Study Area, potential raptor nesting habitat for these species is limited to K-Hill near the proposed project terminus, as well as to other rock outcroppings northeast of K-Hill near the Study Area boundary. Hawk and gyrfalcon nests were previously recorded within or near the Red Dog Mine footprint and transportation corridor (Tetra Tech, 2009; ADF&G, 2016b), and signs of other species were noted in the fall 2016 reconnaissance survey (Stantec, 2016a). Arctic peregrine falcon nests have been recorded historically in the Wulik and Kivalina river drainages (USACE, 2006).

5.8.1.2 Aquatic Birds

Near-shore coastal waters and the Kivalina Lagoon are situated along the Pacific migratory route and provide important staging habitat for thousands of seabirds, shorebirds, waterfowl, and waterbirds (USACE, 2006; USACE, 2016). During the spring migration, thousands of ducks, geese, loons, and other aquatic bird species migrate north, flying low along the barrier islands or over the near-shore ice (USACE, 2005). Notable numbers of Canada geese (*Branta canadensis*), greater white-fronted goose (*Anser albifrons*), brant (*Branta bernicla*), tundra swan (*Cygnus columbianus*), northern pintail, and all four species of loon migrate through coastal habitats in the Study Area (USACE, 2005; Tetra Tech, 2009; WHPacific, 2012b; Audubon Alaska, 2016). Spectacled (*Somateria fischeri*) and Steller's eiders (*Polysticta stelleri*) are recorded infrequently in the Study Area during their migration to breeding habitats in northern latitudes (WHPacific, 2012b). The spectacled eider and Steller's eider (Alaska breeding

population) are listed under the ESA as Threatened, primarily due to the alteration or destruction of habitat, contaminant exposure, predation, and climate change effects on marine habitat and resources (USFWS, 2002; USFWS, 2010).

The Study Area is located approximately 45 miles south of a much larger portion of the Alaska Maritime National Wildlife Refuge, which provides globally significant breeding habitat for various auklets, red-legged kittiwakes (*Rissa brevirostris*), Aleutian terns (*Onychoprion aleuticus*), and red-faced cormorants (*Phalacrocorax urile*) (USFWS, 2016b). Coastal lagoons in Cape Krusenstern National Monument, 8.5 miles south of the Study Area, provide breeding habitat for rare species, including spectacled eider, Steller's eider, and yellow-billed loon (NPS, 2016). The Krusenstern Lagoon, within the Cape Krusenstern National Monument has been identified by Audubon as an Important Bird Area, supporting significant summer populations of black scoter (*Melanitta Americana*). Coastal habitats north of the community of Kivalina also support regionally large colonies of murres, gulls, and terns (Audubon, 2016).

The Wulik and Kivalina river deltas and the Kivalina Lagoon, support brackish-tolerant fish and invertebrates. Accordingly, these areas provide important spring and fall staging habitats for migrating seabirds, waterfowl, waterbirds, and shorebirds (Tetra Tech, 2009; Audubon, 2016). Due to the combination of open water and emergent vegetation, low-lying sedge marshes and riparian habitat along the Kivalina River also serve as breeding habitat for Canada goose, northern pintail, and American wigeon (*Anas americana*) (WHPacific, 2012b).

The lagoon and fish-bearing lakes in the Study Area have potential to support breeding habitat for yellow-billed loon (*Gavia adamsii*), a species previously petitioned for listing under the Endangered Species Act (ESA).

5.8.2 Potential Impacts

Construction and use of the lagoon crossing (via bridge or causeway) and proposed road could potentially impact terrestrial and aquatic birds through:

- Change to habitat
- Change in mortality risk
- Change in movement

5.8.2.1 Change in Habitat

Terrestrial Birds

Loss or alteration of terrestrial bird habitat is likely to result from construction of the project, material site extraction (including temporary road access), and the stockpiling of materials at various locations. The extent of potential habitat loss for terrestrial birds will depend on specific routing and material site options selected and has not been projected in this review. Construction activities that result in the clearing of vegetation or other terrain alteration (e.g., excavation or leveling) have potential to remove suitable breeding, staging, or foraging habitats used by waterfowl, raptors, and resident or migratory songbirds. There is further potential for physical disturbances from the operation of equipment, sedimentation, or in-fill of watercourses or wetlands to affect the abundance or health of aquatic prey resources of terrestrial bird species (see Section 5.7 Fish and Fish Habitat).

Winter construction would limit the effects of construction on loss or alteration of terrestrial bird habitat to species that occupy coastal tundra during winter months, such as ptarmigan and bunting. Activities that carry over to spring or summer months are more likely to affect species that use inland tundra and wetland habitats for staging during migration or for breeding. Summer construction may disturb nesting raptors in the vicinity of K-Hill. Overall, while some terrestrial bird species (e.g., ptarmigan) would likely be temporarily displaced during construction activities, they would be expected to relocate to other nearby suitable habitats available in the Study Area.

Aquatic Birds

Construction of a bridge or causeway and drainage structures across Kivalina Lagoon would likely result in a direct loss of select feeding habitats due to placement of fill, piers, or culverts. Culvert installation has the potential to alter or constrict patterns of lagoon tidal flows, resulting in changing sedimentation patterns, water depths, and nutrient dynamics. Collectively, these changes could influence the distribution and availability of various lagoon habitats used for staging and feeding by aquatic birds.

Construction activities within and adjacent to the lagoon also have potential to affect aquatic birds through the physical alteration of habitat components and associated loss of marine vegetation, benthic invertebrates, and fish. Changes in the presence, abundance, and distribution of these habitat components can reduce foraging opportunities and success for species that feed in Kivalina Lagoon (e.g., geese, swans, waterfowl, and shorebirds). Construction could also temporarily result in changes to the physical,

chemical, or acoustic parameters of the lagoon, further reducing the abundance or health of prey resources.

Winter construction of a bridge and/or causeway would avoid temporary construction impacts as most aquatic bird species are not present in the Study Area during that time. Construction activities that carry through to spring or summer months, however, would likely have a larger effect on aquatic species that rely on the lagoon for staging and breeding (Audubon, 2016). While these permanent alterations of habitats would potentially impact spring migrants upon their arrival, it is anticipated the effect on individuals and populations would be minimal as the ubiquitous nature of Study Area habitats would easily facilitate their relocating to other nearby areas of suitable habitat.

5.8.2.2 Change in Mortality Risk

Terrestrial Birds

Terrestrial birds, and their nests and eggs, are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Construction of the road and excavation of material sources has potential to result in direct mortality of birds, nests, and eggs if these activities coincide with the breeding period for terrestrial species. Persistent noise disturbances in proximity to active nests can also cause adult birds to abandon active nests (Carney and Sydeman, 1999), resulting in mortality of young due to starvation, exposure to weather (i.e., rain or cold), or predators (Malt and Lank, 2009).

Construction traffic has potential to result in mortality of terrestrial birds through collisions with project-related vehicles and by traffic resulting from increased land access. Vehicle and hunting-related mortality are expected to be highest for species that are less mobile or are a traditional subsistence food resource (e.g., waterfowl, ptarmigan) (USACE, 2016).

Poor waste management and disposal practices during project construction could attract wildlife to the Study Area, and increased presence of some attracted species (e.g., bear, fox, various gulls) could increase the potential for increased predation on local populations of terrestrial breeding birds.

Aquatic Birds

There is limited potential for construction of a bridge or causeway through the Kivalina Lagoon to result in mortality of aquatic birds. However, as with terrestrial species, birds, nests, and eggs of aquatic species are protected under the MBTA. Shoreline habitats at either end of the bridge or causeway would likely be lost or altered during construction, which could result in instantaneous mortality if construction activities

coincide with the breeding window for birds nesting in those areas. Long term, it is anticipated that mortality would be minimal due to widespread and nearby availability of suitable habitats throughout the Study Area. Aquatic birds using the lagoon for staging or foraging are anticipated to avoid active construction areas and are not expected to interact with construction equipment. Construction and use of the project could potentially disrupt breeding activity of yellow-billed loon (WHPacific, 2012b).

As with terrestrial birds, predation on aquatic bird species nesting in shoreline habitats adjacent to the lagoon may increase if waste and its disposal is not managed appropriately during construction.

5.8.2.3 Change in Movement

Terrestrial Birds

Construction and use of the project has potential to cause changes in movement for terrestrial birds by creating a physical barrier or causing sensory disturbances, although the sensitivity and degree of response is expected to vary by species (Barber et al., 2009; Ortega, 2012). The construction and use of the road can alter use of known movement corridors (e.g., daily or seasonal migratory routes, dispersal routes) or access to preferred habitats (e.g., foraging, breeding, molting, and staging sites).

Sensory disturbances created by clearing, construction, and road operation can also result in avoidance behavior for terrestrial birds. Although the response varies by species, birds tend to avoid habitats subjected to high sensory disturbance (Bayne et al., 2008). Winter construction would reduce such potential impacts due to seasonally reduced species diversity and abundance.

Aquatic Birds

As with terrestrial birds, construction and use of the project can alter aquatic bird movement by creating a physical barrier or causing sensory disturbances to the Kivalina Lagoon environment. The presence of a causeway or bridge may also result in habitat fragmentation by restricting passage from the southern part of the lagoon and Wulik River estuary to the northern part of the lagoon. Fragmentation of the lagoon also has potential to alter the distribution of prey resources, causing aquatic birds to adjust movements based on the availability of prey. Aquatic species may adjust movement patterns in response to sensory disturbances during construction and use of the bridge or causeway. The frequency, intensity, and duration of in-air and underwater acoustic emissions from pile driving can result in temporary displacement from suitable foraging, breeding, molting, and staging habitats.

5.8.3 Avoidance, Minimization, and Mitigation

Mitigation measures to avoid, minimize, or mitigate potential changes in habitat, mortality risk, or movement of terrestrial and aquatic birds were selected based on state or federal regulations and policies, management practices and guidelines, and relevant peer-reviewed literature, and include:

- **Route Selection**—A final alignment of the Kivalina project road that minimizes interactions with waterbodies (i.e. aquatic bird habitat) wherever feasible is desirable. If an interaction cannot be avoided, an appropriately designed crossing structure should be installed. The road alignment should approach the waterbody perpendicularly to minimize impacts to the riparian habitats.
- **Clearing Boundaries**—Vegetation clearing, grubbing, grading, levelling, construction, and location of temporary workspace or stockpile areas should be limited to within the boundaries of the project footprint to the extent practical.
- **Temporary Workspace**—Temporary workspaces, reclaimed land, and other areas of ground disturbance should be revegetated using certified weed-free native plant species appropriate to Study Area growing conditions where practicable.
- **Waste Disposal**—Project waste disposal practices should be implemented that reduce the potential to attract wildlife to the Study Area. Wastes should be temporarily stored onsite in wildlife-proof containers and disposed of regularly at an approved facility.
- **Speed Limits**—All project personnel should adhere to prescribed speed limits to reduce the potential for collisions with birds and other wildlife. Group transportation options should be considered, where practicable, to reduce traffic volume during construction.
- **Least-risk Windows**—Vegetation clearing, site preparation, and construction activities should adhere to the recommended periods to avoid vegetation clearing for northern Alaska (USFWS 2009), which extends from May 20 through July 20 for species nesting in open or shrub habitats, and April 15-August 15 for cliff nesting raptors. If vegetation clearing, site preparation, and construction occurs within these periods, pre-construction nest surveys should be conducted by qualified personnel and appropriate mitigation developed in consultation with the USFWS.
- **High-disturbance Activities**—High-disturbance project-related activities (e.g., blasting, pile driving) should be avoided where practicable during the breeding window.

5.9 Marine Mammals

5.9.1 Affected Environment

Marine mammals are an essential part of the culture and food security in Kivalina. Marine mammal species that can occur in the coastal waters near Kivalina include: beluga whale (sisuaq, *Delphinapterus leucas*), gray whale (aġviġluaq, *Eschrichtius robustus*), bowhead whale (aġvik, *Balaena mysticetus*), bearded seal (ugruk, *Erignathus barbatus*), ringed seal (natchiq, *Phoca hispida*), spotted seal (qasigiaq, *Phoca largha*), and polar bear (nanuq, *Ursus maritimus*). Of these species, those identified as important subsistence species are bowhead whale, beluga whale, bearded seal and ringed seal (SRB&A, 2009). Walrus are also an important subsistence species, but are typically found farther offshore (Red Dog Mine, 2009).

All marine mammals in the United States are protected under the Marine Mammal Protection Act (MMPA) enacted in response to concerns about population declines caused by human activities. The National Marine Fisheries Service is charged with protecting whales, dolphins, porpoises, seals and sea lions, whereas the USFWS is in charge of walrus, manatees, otters and polar bears (http://www.nmfs.noaa.gov/pr/laws/mmpa/text.htm). One of the policies of the MMPA is to ensure that none of these stocks fall below the level of 'depleted' (population numbers for the species that are below optimum for a sustainable population). In Alaska, given their cultural and dietary importance, marine mammals are co-managed by the federal government and a variety of Alaska Native Organizations such as the Ice Seal Committee, the Alaska Eskimo Whaling Commission, the Alaska Beluga Whale Committee, and the Eskimo Walrus Commission. On a federal level, several marine mammal species have further protection under the ESA.

The seasonal occurrence of marine mammal species found in the Study Area, their typical subsistence hunting seasons (where applicable), population estimates, and status under the ESA and MMPA are summarized in Table 2.

Table 2 – Marine Mammal Seasonal Occurrence in Coastal Waters near Kivalina, Population Estimates and Conservation Listings

Species	Stock	Typical season found in coastal waters near Kivalina	Typical subsistence hunting period for Kivalina[a]	Minimum population estimate[b]	ESA listing	MMPA listing
Beluga whale	Beaufort Sea	Spring	April-May	32,453	not listed	not listed
	Eastern Chukchi Sea	Summer	July	3,710*	not listed	not listed

Bowhead whale	Western Arctic	Spring, Fall	April - May	16,091	endangered	depleted
Gray whale	Eastern North Pacific	Summer	-	20,125[c]	not listed	not listed
Bearded seal	Alaska (Beringia Distinct Population Segment)	Spring-Fall	May - July	273,676	threatened	depleted
Ringed seal	Alaska	Fall-Spring	November - April	300,000*	not listed**	not listed
Spotted seal	Alaska	Spring-Fall	-	391,000	not listed	not listed
Polar bear	Chukchi/Bering Sea	Winter	-	2,000***	threatened	depleted

Note:

Marine mammal presence can vary and sightings of other species not listed may occur.

*not considered reliable as based on surveys from a portion of their range and data >8 years old

**ESA listing is currently being appealed in the U.S. District Court; National Oceanic and Atmospheric Administration (NOAA) Fisheries published a final rule listing the Arctic subspecies as threatened

***not considered reliable

Sources: [a]Red Dog Mine (2009), [b]Muto et al. (2016), [c]Carretta et al. (2015)

Marine mammals typically seen in Kivalina Lagoon include bearded seals, ringed seals and spotted seals (Stantec, 2016c; Huntington et al., 2016). Although numerous observations of marine mammals within Kivalina Lagoon have been documented through sampling of local Traditional Knowledge; to date, no systematic marine mammal surveys have been conducted in the lagoon. Bearded seals are seen in Kivalina Lagoon in the summer foraging (Huntington et al., 2016), and have typically been sighted at the north entrance to the lagoon (Stantec, 2016c). Juvenile bearded seals have been observed foraging up river channels in the fall (Huntington et al., 2016, Stantec 2016c). Ringed seals are observed year-round in Kivalina Lagoon (Huntington et al., 2016; Stantec, 2016c), are known to use both entrances into the lagoon (Stantec, 2016c), and forage in the lagoon. Spotted seals are seasonally present within the lagoon, arriving after the ice leaves (Huntington et al., 2016). They have been observed at both the north and south entrance to the lagoon (Stantec, 2016c).

5.9.2 Potential Impacts

Project activities that may impact marine mammals include construction of the lagoon crossing and the presence of a permanent lagoon crossing structure. Potential consequences for marine mammals may include changes in behavior, habitat and injury.

Specific construction activities, methods, and design of the crossing have yet to be determined. As a result, the following sections assume that construction of the lagoon crossing structure may include water filling, driven piers, and/or bridge sections or culverts. Construction of structures in the lagoon in winter would limit effects on marine mammals, as ringed seals are likely the only species present in the lagoon during this time.

5.9.2.1 Construction of Lagoon Crossing Structure

Possible effects on marine mammals from construction of the lagoon crossing structure may include:

- Injury and/or disturbance from underwater noise from construction vessels and pile driving
- Decrease in habitat quality due to increases in turbidity from water filling and culvert placement
- Vessel strikes from construction vessels

Injury and changes in marine mammal behavior can result from underwater noise, although potential effects depend on the species, individual, animal activity, and the novelty, type and level of underwater noise (Ellison et al., 2012; Richardson et al., 1995; Southall et al., 2007). Changes in marine mammal behavior due to underwater noise can vary from avoidance, change in vocalizations and change in foraging; although the effects of noise on ice-associated seals such as ringed, bearded and spotted seals, and their auditory capabilities have not been well documented (Sills et al., 2016). Ringed and spotted seals have similar ranges of underwater hearing (Sills et al., 2014; Silles et al., 2015). Both species have a broad range of frequencies they can hear across underwater, and have hearing capabilities similar to harbor seals (Sills et al., 2014). Effects of pile installation on harbor seals has indicated that short-term effects may occur, with fewer animals at haul-outs, compared to periods with no pile installation activity (Edrén et al., 2004), although there was no effect on overall abundance (Teilmann et al., 2004). Construction of an offshore island had minimal effects on the densities of basking ringed seal, comparing spring densities before intensive winter construction of the island and spring densities after (Moulton et al., 2005). The extent to which ringed seals are present in Kivalina Lagoon in winter is not known, nor their distribution. The range of underwater hearing of bearded seals has not been studied, although the frequency range of their vocalizations is very large (up to 11 kHz; Risch et al., 2007), and so similarities to spotted and ringed seals may be assumed.

It is possible for pile driving to result in levels of underwater noise that may exceed National Marine Fisheries Service (NMFS) injury thresholds for pinnipeds (NMFS, 2016). Depending on construction methods and activities, such effects may need mitigation to reduce the potential for injury to seals that may be present in the lagoon during construction. Water filling and placement of culverts also creates underwater noise, but likely at levels below that of vessel noise and pile driving. Specific levels of underwater noise related to water filling or placement of culverts are not known, but it seems unlikely that levels of underwater noise from these activities would result in injury to seals within the lagoon.

Ringed and spotted seals are visual hunters and increases in turbidity from water filling or culvert placement may modify their habitat. A recent study, however, seems to indicate that seals in the lagoon

would likely not be negatively affected by associated turbidity increases (Todd et al., 2015), even though some level of change in behavior for seals present in the lagoon may be expected. If this activity occurred in winter, effects would be minimized as only ringed seals are likely to be present.

Recreational vessels currently use the lagoon and are active when seals are present. Increase in the number of small fast moving vessels during construction could increase the possibility of vessel strikes of seals in the Kivalina Lagoon, and should be considered when conducting in-water vessel-based activities.

5.9.2.2 Lagoon Crossing Structure

Possible effects on marine mammals from operations of the lagoon crossing structure likely include:

- Disturbance from vehicle noise
- Habitat fragmentation and associated restriction of movement

A recent study on spotted seals found that they are able to hear wide ranges of in-air noise, including low levels of noise, and that in-air noise may be of particular concern for this species (Sills et al., 2014; Sills et al., 2015). Vehicle noise would be audible to species present in the lagoon and may result in changes in behavior. Ringed seals have responded to the presence of low flying aircraft (150 m) by leaving the ice (Born et al., 1998), although densities of basking ringed seals in spring during active use of an ice road did not vary between years (Moulton et al., 2005).

The presence of the lagoon crossing structure may result in a division of marine mammal habitat in the lagoon, preventing movement throughout the lagoon. Culverts could provide passage through the structure, but it is unknown if seals would use them, and they may not remain open in the winter when ice is present. A bridge with free water flowing under it would likely not impede passage of marine mammals. All three species of seal are known to enter the lagoon through both the north and south entrance and to forage in the lagoon. It is possible that foraging activity would not be significantly disturbed by the presence of the lagoon crossing structure if seals entering the via the south are foraging on fish associated with the Wulik River, and those entering the lagoon by the north entrance are foraging on fish associated with the Kivalina River. Specific foraging activity and distribution of ringed, spotted and bearded seals in Kivalina Lagoon is currently unknown.

5.9.3 Avoidance, Minimization, and Mitigation

5.9.3.1 Construction of Lagoon Crossing Structure

The following well established measures were identified to avoid, minimize or mitigate identified effects to marine mammals during construction of the lagoon crossing structure:

- Avoid construction during peak periods of marine mammal presence within the lagoon. This would reduce the number of individuals exposed to underwater noise that may result in changes in behavior or injury.
- If pile driving is planned, establish a marine mammal exclusion zone and implement a marine mammal construction monitoring program during this activity to reduce the potential for marine mammals to be exposed to underwater noise that may results in injury.
- Trained marine mammal observers could maintain watch for marine mammals during water filling activities. In this case, activities would cease if marine mammals are within a predetermined distance from the activity, and would commence when the marine mammal has left the area.
- Reduce speed of construction vessel when marine mammals are present in the lagoon to reduce extents of underwater noise from vessels and reduce the potential for vessel strikes.

5.9.3.2 Lagoon Crossing Structure

The following measures were identified to avoid, minimize, or mitigate identified effects to marine mammals during operation of the lagoon crossing structure:

- The lagoon crossing structure would consider seal movement in its design, incorporating passage and structures to minimize habitat fragmentation.

5.10 Wildlife - Terrestrial Mammals

5.10.1 Affected Environment

This section provides an overview of the terrestrial wildlife that have potential to occur in the Kivalina project area and could be affected by the proposed activities to construct and operate the Kivalina evacuation road.

Five species of large terrestrial mammals are known to occur in the Study Area: caribou (*Rangifer tarandus*), moose (*Alces alces*), muskox (*Ovibos moschatus*), Dall's sheep (*Ovis dalli)*, and brown bear

(*Ursus arctos*). Caribou, moose, and Dall's sheep have historically been and continue to be important subsistence resources for Kivalina (SRB&A, 2009). Common furbearers in the project area include wolf (*Canis lupus*), wolverine (*Gulo gulo*), red fox (*Vulpes vulpes*), arctic fox (*Alopex lagopus*), lynx (L*ynx canadensis*), marten (*Martes americana*), and mink (*Mustela vison*). Many of these species are important to hunters and trappers in the region for their pelts, which are used to make traditional Alaska Native crafts and clothing (USEPA, 2009).

There are no threatened or endangered species or federally designated critical habitat for terrestrial mammal species that occur in the Study Area; therefore, the discussion below focuses on other species of concern[1] known to occur in the Study Area including caribou, moose, musk ox, Dall's sheep, and brown bear.

5.10.1.1 Caribou

The project area occurs along the border of caribou summer range and the migratory area of the Western Arctic Herd (WAH) (Western Arctic Caribou Herd Working Group, 2011). The WAH is currently the largest herd in the state with a 2016 estimate of 201,000 caribou (ADF&G, 2016e). Although there are a number of migration pathways connecting the WAH winter range with summer/calving grounds, a portion of the WAH migrate through the Study Area during September as they move south to their winter range located south of the Kobuk River near the Nulato Hills (Joly et al., 2012; WHPacific, 2012b; ADF&G, 2015a). The herd generally crosses the Kivalina and Wulik rivers on the western side of K-Hill during migration and sometimes spends time in the hills to the east of K-Hill (WHPacific, 2012b). Although caribou often move east of the Study Area during spring migration, some caribou do migrate through the Study Area as they head north to calving grounds on the North Slope of the Brooks Range near the Utokuk Hills (USEPA, 2009; Western Arctic Caribou Herd Working Group, 2011; ADF&G, 2015a). Caribou sign (pellets, antlers) was observed on K-Hill during a fall reconnaissance survey (Stantec, 2016a).

Caribou are the principal terrestrial subsistence animal in the region and are hunted in the mainland tundra hills east of Kivalina Lagoon. A subsistence survey conducted in Kivalina by ADF&G in 1992 indicated a harvest of 351 caribou—18.2% of the total subsistence harvest (OCS EIS, 2007; SRB&A, 2009). Most caribou are harvested in the fall when the main migration reaches the Kivalina area, but they are also

[1] Other species of concern include those that have high cultural value, are important subsistence resources, or are important to non-consumptive users (e.g., photographers or viewers) (ADF&G, 2015c).

hunted throughout the winter, as available, and shot opportunistically year-round. Winter distributions, in both numbers and location, are highly variable and may be dependent on local weather conditions.

5.10.1.2 Moose

Compared to other populations in Alaska, moose presence within the Study Area is considered to be of low density (OCS EIS, 2007; USEPA, 2009). Fall and spring surveys conducted between 1992 and 2001 documented low densities, averaging less than 1 moose per square mile (DAU, 2002). During winter, moose are found along the drainages of the Wulik and Kivalina rivers. As snow subsides during the late spring and summer, moose disperse to higher elevation shrub habitats, which they use through the summer and fall.

5.10.1.3 Muskox

Reintroduced in 1970, the Cape Thompson population, ranging from the Noatak River north to Cape Lisburne remains fairly small (around 300 animals), and is generally found within 15 miles of the coast (USEPA, 2009). During spring and calving seasons, muskoxen use riparian areas where there are abundant sources of grasses and willows exposed from melting snow and ice (ADF&G, 2015b). During winter, muskox can be more spread out depending on snow conditions (ADF&G, 2015b) but generally use upland areas with abundant sedges and mosses (Ihl and Klein, 2001). Recent census results indicate that the muskox population that overlaps the project area appears to be stable (ADF&G, 2015b).

5.10.1.4 Dall's Sheep

Dall's sheep are prized for their meat, fat, sinew, skins, and horns and hunted in the upper Wulik and Kivalina river drainages (OCS EIS, 2007). Dall's sheep range is limited to the rolling hills and mountainous terrain of the DeLong and Baird Mountains of the western Brooks Range located northwest of the Study Area. Overall, population densities are relatively low compared to other areas of the Brooks Range that contains more suitable seasonal habitat. Recent population estimates indicate the Dall's sheep populations are declining in the Western Brooks Range (ADF&G, 2014).

5.10.1.5 Brown Bear

Brown bears occur throughout northwestern Alaska including the Study Area but at relatively lower densities compared to parts of southern Alaska (Sterling et al., 1997; USEPA, 2009). Availability of seasonal food resources influences brown bear habitat use. Brown bears in northern parts of Alaska use

tussock tundra and tall shrubland and riparian communities during spring and summer (Phillips, 1987). Tussock tundra provides seasonally important forage plants (e.g., sedges) as well as potential prey or carrion (e.g., caribou calves), whereas riparian areas provide hedysarum roots as well as availability of prey such as moose (Philips, 1987).

Barren-ground grizzly bears in the central arctic excavate their own dens each year with no apparent fidelity to the same den site (McLoughlin et al., 2002). In these areas, bears excavate dens in heath tundra and heath boulder habitats as well as riparian tall shrub and birch seeps. Dens are commonly constructed under cover of dwarf birch with other tundra shrubs nearby (e.g., crowberry). Overall, bear dens are typically found on steep (>25 degrees) slopes, with sandy substrates and warm aspects (McLoughlin et al., 2002). Previous excavations and habitat features identified along the south facing slope of K-Hill may provide potential denning habitat for bears (Stantec, 2016a).

5.10.2 Potential Impacts

Construction of the project, as well as material site development and associated access, would result in habitat loss for terrestrial mammals. The area impacted would depend on the project alignment ultimately selected, and has not been quantified. A winter road construction schedule would reduce mortality risk and potential sensory disturbance (e.g., noise, light) during construction to Dall's sheep and caribou, as their densities are thought to be lower at that time of year. On the other hand, road construction activities during winter might result in sensory disturbance to moose and musk ox that are present in the winter and that use riparian and wetland habitats that intersect, or are in close proximity to, the potential road alignment or material source sites. Winter construction and human activity also have the potential to disturb denning bears in the Study Area (Linnell et al., 2000).

In contrast, summer construction may displace bears from K-Hill or other upland foraging areas that may contain berry-producing shrubs (e.g., crowberry), and other mammals could be temporarily displaced during construction activities. Impact would not be considered substantial, however, as affected species would likely use other suitable habitats available in and nearby the Study Area.

During project operation, potential effects of the road on terrestrial wildlife include increased mortality risk due to vehicle collisions, changes in seasonal migration patterns and timing, as well as a potential increase in mortality due to greater access by subsistence hunters. Some wildlife species may avoid the road area during construction and operation, resulting in reduced habitat effectiveness (i.e., habitat loss), and notably including potential reduced use of K-Hill which provides suitable bear denning habitat.

Road construction and traffic during operation might result in changes to caribou migration patterns and habitat use (Murphy and Curatalo, 1987) as well as in altered movement behavior of the WAH (Wilson et al., 2016). Wilson et al. (2016) studied the WAH response to the Red Dog Mine Road located to the south of the Study Area and, although they found that caribou continued to cross the Red Dog Mine Road during fall migration, they observed some individuals altering their movement behavior by taking longer to cross the road (i.e., delayed crossing time) and increasing their movement rates despite the relatively low traffic volume.

Overall, the potential effects of the project on terrestrial wildlife would depend on species, season, timing and duration of construction activities as well as traffic volume and road maintenance activities during operation (Benítez-López et al., 2010; Northrup et al., 2012; Beyer et al., 2013; Lesmerises et al., 2013; Kite et al., 2016).

5.10.3 Avoidance, Minimization, and Mitigation

A number of mitigation measures could be implemented both to reduce mortality risk to terrestrial wildlife as well as minimize potential changes to wildlife movement in the project area. To reduce potential disturbance to caribou during migration, similar mitigation measures as have been applied at the Red Dog Mine are recommended. Specifically, vehicles traveling the project road would be required to stop when they are within sight of migrating caribou either approaching or actively crossing the road. Vehicles would not be permitted to proceed until all caribou have crossed the road. Road closures may last anywhere from 30 minutes to multiple days depending on the number of caribou and speed of travel (USEPA, 2009; Teck, 2013).

In addition, the following mitigation measures would be implemented to reduce vehicle-animal collisions:

- Reduce speed limit along the project road as well as any temporary access roads
- Install animal crossing signs
- Revegetate road cuts with non-palatable forage species for ungulates and bears (Roever et al., 2008)
- Retain screening vegetation (i.e., shrubs) along the constructed evacuation road (i.e. a visual buffer) to decrease visibility into roadside habitats and thus increase security for bears moving through the area (Roever et al., 2010; Kite et al., 2016).
- If summer construction activities are planned, a bear-human conflict management plan would be developed to reduce potential mortality risk to bears. Such a plan would include, among other

considerations, measures to manage waste disposal and reduce bear attractants at camps or temporary works sites.

5.11 Historic, Architectural, Archaeological, and Cultural Resources

5.11.1 Affected Environment

Over thirty Alaska Heritage Resources Survey (AHRS) sites are currently located within or directly adjacent to the Study Area. Twenty-four of these archaeological sites and potential historic structures are located within the community of Kivalina. Three sites, including the remains of a camp (NOA-311), meat caches and icehouses (NOA-298), and a reindeer corral and processing site (NOA-302), are located within the Study Area south of the mouth of the Wulik River. One site, the Ualliik Trail (NOA-304) is mapped outside of the Study Area but historically followed the east bank of the Wulik River into the Study Area. Additionally, the Study Area is included within the boundary of the Cape Krusenstern Archaeological District and National Historic Landmark, which extends more than 10 miles northwest of the Cape Krusenstern National Monument boundary (NPS, 2016). None of the recorded AHRS sites were reported along the preliminary route options or within the identified potential material sites.

Northern Land Use Research used geospatial modeling techniques to prepare an archaeological predictive model of the Study Area that integrated environmental, archaeological, and ethnohistoric data from the region to rank locations in terms of their probability for containing archaeological resources (Stantec, 2016b). The model predictions suggested that there is a high probability of identifying cultural resources along interior portions of the Kivalina community's desired Northern Route, and at other specific locations including areas along the relic channels of the Wulik River. Elevated areas within the potential material sites are assigned a moderate probability value. Their report recommends that an archaeological survey involving pedestrian survey and shovel testing be conducted to ground-truth the model predictions (Stantec, 2016b).

Stantec conducted a cultural resources assessment and pedestrian surveys along the three preliminary route options identified by residents of Kivalina, as well as within the identified potential material sites at K-Hill, in the Wulik and Kivalina River Deposition Zones, and in the Wulik River Channel of the Study Area in the fall of 2016 (Stantec, 2016b). No buried pre-contact or historic archaeological resources within the three preliminary route corridors or within any of the identified material sites were identified during pedestrian survey and limited subsurface testing.

5.11.2 Potential Impacts

Pursuant to 36 CFR 800.5(b), implementing regulations of Section 106 of the National Historic Preservation Act, DOT&PF, on behalf of FHWA, and in consultation with State Historic Preservation Office (SHPO), will determine a finding of effect to historic properties by the Proposed Action. Consultation with SHPO on identification of an Area of Potential Effect is still pending. No archaeological or historical resources were identified during pedestrian survey and subsurface testing along any of the preliminary route options, or within any of the potential material source locations. Although the field survey efforts in the fall of 2016 did not discover any buried pre-contact or historic archaeological resources, ground surface visibility was generally very poor in survey areas outside of the K-Hill material source area, which greatly reduced the opportunities to identify surface artifact scatters or features. In addition, ethnohistoric descriptions of seasonal settlement and resource use along the Wulik River, combined with the proximity of a named location (*Aunat*) illustrated (Burch, 1998) near the location of the easternmost proposed material source within the Wulik River Deposition Zone, and the number and positioning of allotments along the Wulik River channel, suggests that evidence of temporary camps or winter settlements may be present in elevated areas adjacent to, or within the proposed material sources within the Wulik River Deposition Zone.

5.11.3 Avoidance, Minimization, and Mitigation

It is recommended that DOT&PF consider the following steps in the course of planning for, and development of, the project to ensure that no previously unrecorded cultural resources are affected, and to minimize the potential for costly delays and budget overruns should cultural resources be discovered during construction activities:

- An inadvertent discovery plan should be developed in consultation with and between DOT&PF, FHWA, SHPO, the Native Village of Kivalina, and other consulting parties prior to the beginning of any ground disturbing work.
- An professionally qualified archaeologist should monitor surface sediment removal, construction of access roads, and other ground disturbing activities where permafrost levels have previously prevented archaeologists from testing for deeply buried sites (i.e. on elevated landforms within or adjacent to proposed material sources within the Wulik River Deposition Zone and Wulik River Relic Channel Zone).

6 PERMITS AND AUTHORIZATIONS

The permits and clearances listed in Table 3 are anticipated prior to construction of the proposed project to comply with applicable federal, state, and local regulations:

Table 3– Kivalina Evacuation and School Access Road Permits and Authorizations

#	Permit or Plan; Agency	Why Permit/Clearance is Required
Federal Permits and Authorizations		
1	NEPA Document	NEPA is triggered by a federal action, either by the need for federal permits or use of federal funding. For this project, NEPA is triggered by federal transportation funding from FHWA.
2	Section 404/10 Clean Water Act (CWA) Wetlands Dredge or Fill Permit; USACE	A Section 404/10 permit is required for the placement if fill within jurisdictional wetlands and waters of the U.S.
3	ESA Section 7 Consultation; USFWS	Section 7 consultation is required as part of NEPA when the project may affect a listed Threatened or Endangered species. Section 7 consultation with USFWS would cover potential impacts to Spectacled and Steller's Eiders and Polar Bear Critical Habitat. Based on Agency feedback, informal consultation is anticipated.
4	MBTA compliance; USFWS	Compliance with MBTA USFWS recommended "no clearing" timing windows would reduce the potential for incidental take of protected migratory bird species and their nests. USFWS recommended timing window is May 20-July 20.
5	EFH Assessment (NMFS)	EFH assessment would be prepared by the lead federal agency (FHWA/DOT) to describe potential impacts to EFH and propose conservation measures to reduce those impacts. NMFS would need to concur on the federal agencies findings or recommend additional conservation measures and/or mitigation.
6	Section 7 Consultation (MMPA) Incidental Harassment Authorization (IHA)	Section 7 consultation for MMPA is required as part of NEPA when the project may affect a listed Threatened or Endangered species. Section 7 consultation with NMFS would cover potential impacts to bearded and potentially also ringed seals (depending on court ruling). Based on agency feedback, a determination of formal or informal consultation would be completed once more information about the type of lagoon crossing construction timing and methodology is known. If formal consultation is warranted, an IHA would be completed to document potential species harassment during construction.
State Permits and Authorizations		
7	Cultural, Historical, and Archeological Resources Consultation (Section 106 Review); ADNR, Office of History & Archaeology and SHPO	Section 106 compliance is required as part of NEPA, and provides for the identification and protection of cultural and historic resources that are listed or eligible for listing in the National Register of Historic Places. Consultation is completed with SHPO, Tribes, and other consulting parties, and a determination of effect is issued, with mitigation measures and agreements amongst stakeholders completed as needed, depending on anticipated impacts.

#	Permit or Plan; Agency	Why Permit/Clearance is Required
8	Section 401 Certification – Certificate of Reasonable Assurance; ADEC Division of Water Quality	A 401 water quality certification would be issued concurrently with the USACE 404/10 permit and notify compliance with state water quality administrative code. The USACE 404/10 permit would not be issued until this certification is complete.
9	ROW (State-owned non-marine waters and submerged lands); ADNR, DMLW	An easement would be required from DNR DMLW to cross the state owned tidelands with the lagoon crossing.
10	DNR Material Site Designation	To develop any new material sites within the Study Area, regardless of landownership, DNR DMLW would need to designate those sites as material sites/sources which would require a "disposal of interest" decision.
11	APDES CGP for Stormwater Associated with Large and Small Construction Activities; ADEC, Division of Water	For projects with disturbance of over 1 acre, compliance with the APDES CGP is required. A SWPPP and notice of intent to seek coverage under the CGP would be required prior to construction.
12	Title 16 Fish Habitat Permit; ADF&G	For any work below the ordinary high water of a stream containing fish, a Title 16 permit would be required. Measures to maintain fish passage within these water would be required, as well as measures to avoid and minimize impacts to fish and their habitats.
Local Permits and Authorizations		
13	Title 9 Community Infrastructure and Conditional Use Permit; NAB Planning Department	Development of lands within the Study Area designated as a Subsistence Conservation District, a conditional use permit would be required from the NAB planning department. Also as the Study Area is not within a zoned NAB resource development or transportation corridor, an evacuation route would need to be zoned as such by the NAB Planning Commission prior to construction

7 INFORMATION NEEDS SUMMARY

The following table summarizes information needs identified during this environmental review as well as through public and agency input. These may be clarified through further consultation with agencies and the community, or additional field studies. The list below pertains to anticipated information needed prior to completion of the NEPA document, permitting, and/or construction.

Table 4– Summary of Information Needs

Resource Category	Information Need
Land Use and Transportation	• The type(s) of evacuation vehicles that would be used between Kivalina and the new school/evacuation shelter should be identified in order to design an evacuation route that can accommodate those vehicles. The transportation vehicles would be identified and provided by support from NAB and the community of Kivalina
Hazardous Materials and Solid Waste	• A plan for solid waste disposal generated during construction would need to be developed prior to construction. It is anticipated the Kivalina municipal landfill would not have enough room to accommodate construction waste • A Phase I Environmental Site Assessment would need to be completed for the proposed evacuation route prior to ROW acquisition, should the land be conveyed to DOT&PF
Water Resources and Water Quality	• Hydrodynamic study of the selected lagoon, river and wetland crossing method and considerations for maintenance of flow would be necessary to quantify any impacts to storm surge elevations, sediment transport, habitat impacts and potential for increased erosion of the Singuak Entrance • Coordination with ADEC may be warranted to identify any potential concerns regarding water quality
Wetlands and Vegetation	• Prior to permitting, the USACE should be consulted to determine requirements for compensatory mitigation, and an approved method for compensatory mitigation ratio calculations, if required • Existing wetland and vegetation mapping should be reconciled with ground data (biological recon, cultural test pits, and geotech data) collected in the fall of 2016 to verify desktop mapped boundaries and revised where necessary for accuracy • Two-foot contour data should be evaluated to verify any potential Wulik River or Kivalina River channel connectivity that was not apparent during ground surveys • Existing functional assessment calculations should be refined to determine the value of scrub shrub wetlands in areas adjacent to water bodies in order to accurately calculate value of wetlands lost from unavoidable impacts
Marine Mammals	• Information about distribution, movement and habitat use of seals in Kivalina Lagoon may be needed depending on the proposed design options for the causeway opening and proposed construction methods

Resource Category	Information Need
Fish and EFH	• Information on fish presence and life-stage use of habitats within the relic channels and isolated pond/lake features of the Wulikand Kivalina rivers' floodplains may be needed to properly design water crossings and determine requirements for construction and reclamation for potential material sites • Coordination with ADF&G to determine critical life history timing windows for subsistence species or species of concern to include, at a minimum, outmigrating juvenile salmon, Dolly Varden, saffron cod, Arctic cod, and rainbow smelt • Information on fish presence and life-stage use of habitats within the Kivalina Lagoon (north and south of the potential causeway locations) may be needed to properly design and locate the proposed causeway crossing(s) to accommodate fish passage, protection of EFH and identify other potentially affected species • Fish habitat mapping of the intertidal and deepwater habitat at the potential causeway crossing locations may be needed to complete the EFH assessment
Aquatic and Terrestrial Birds	• Quantitative species-specific data may be needed within material sites and along the road corridor to determine use of the Study Area during the periods of the year for which the causeway/bridge construction is planned. • If construction carries over into spring and requires any blasting in high-elevation cliff/rocky habitat, a survey for nesting raptors would be recommended in advance of construction (this includes material source excavation sites).
Wildlife - Terrestrial Mammals	• Target surveys for small fur-bearing mammals may be required if concerns related to subsistence arise from construction of the project
Historic, Architectural, Archaeological, and Cultural Resources	• If DOT&PF ultimately selects a route that deviates from the three preliminary route options or identified material sources assessed during the 2016 archaeological investigations, then SHPO may require additional archaeological investigations before concurring with the DOT&PF finding of effect.

8 PUBLIC INVOLVEMENT AND AGENCY COORDINATION SUMMARY

8.1 Activities

Public involvement and agency coordination activities for this project are ongoing. Table 5 outlines the public involvement activities and Table 6 outlines agency coordination completed to date. Records of correspondence, meeting materials and summaries are included in Appendix A and B.

Table 5 – Public Involvement Activity Summary

Public Involvement		
Date/Time	**Activity**	**Description**
11/12/16	Publish Newspaper Ad	Public Notice to Conduct NEPA and public meeting invitation
11/11/16	Public Scoping letter	Scoping letter sent to interested public stakeholders
11/15/16	Public Meeting	Kivalina Public meeting
11/16/16	Public Meeting	Noatak Public meeting
11/16/16	Public Meeting	Kotzebue Public meeting

Table 6 – Agency Coordination Activity Summary

Agency Scoping and Coordination		
Date	**Activity**	**Description**
11/10/16	Agency Scoping letter	Scoping letter sent to agencies
11/25/16	Agency Comment	SHPO Scoping comment
11/29/16	Agency Comment	NPS Scoping comment
12/12/16	Agency Comment	DNR Scoping comment
12/12/16	Agency Comment	USFWS Scoping comment
12/19/16	Agency Meeting	USFWS Scoping meeting
12/19/16	Agency Meeting	ADF&G Scoping meeting
12/20/16	Agency Meeting	NPS and SHPO Scoping meeting
12/21/16	Agency Meeting	NMFS Scoping meeting
12/21/16	Agency Meeting	USACE Scoping meeting

8.2 Comments Summary

Public and Agency comments have been collected and dialogue will continue to be ongoing. Comments gathered will serve to shape the development of alternatives to be developed evaluated under NEPA, and will also identify appropriate measures to avoid, minimize, and mitigate adverse effects of the final proposed project. Kivalina residents continue to share local Traditional knowledge of the area and its natural and cultural resources that have contributed to descriptions of the potentially affected environment, and similarly agency coordination and consultation will continue to inform overall project design. Most comments obtained to date were received through public and agency meeting discussions, and have been paraphrased and presented in meeting notes provided in Appendices A and B. Information needs and data gaps identified for Section 7 resources, as well as avoidance, minimization, and mitigation measures noted throughout this document, were also informed by public and agency consultations and comments.

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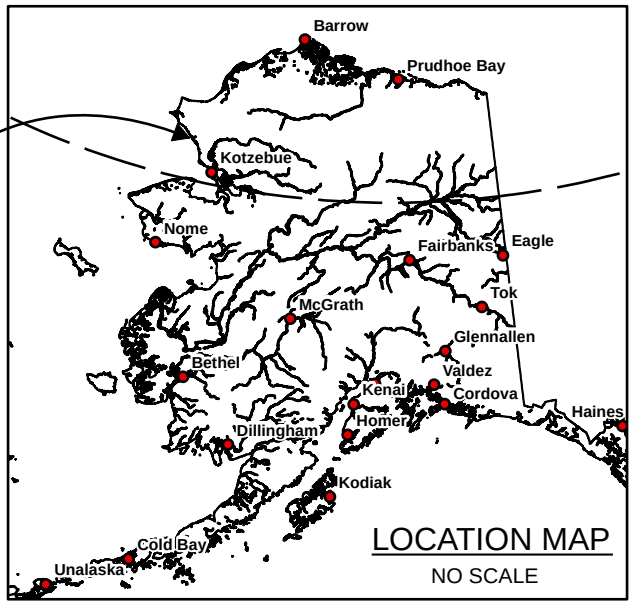
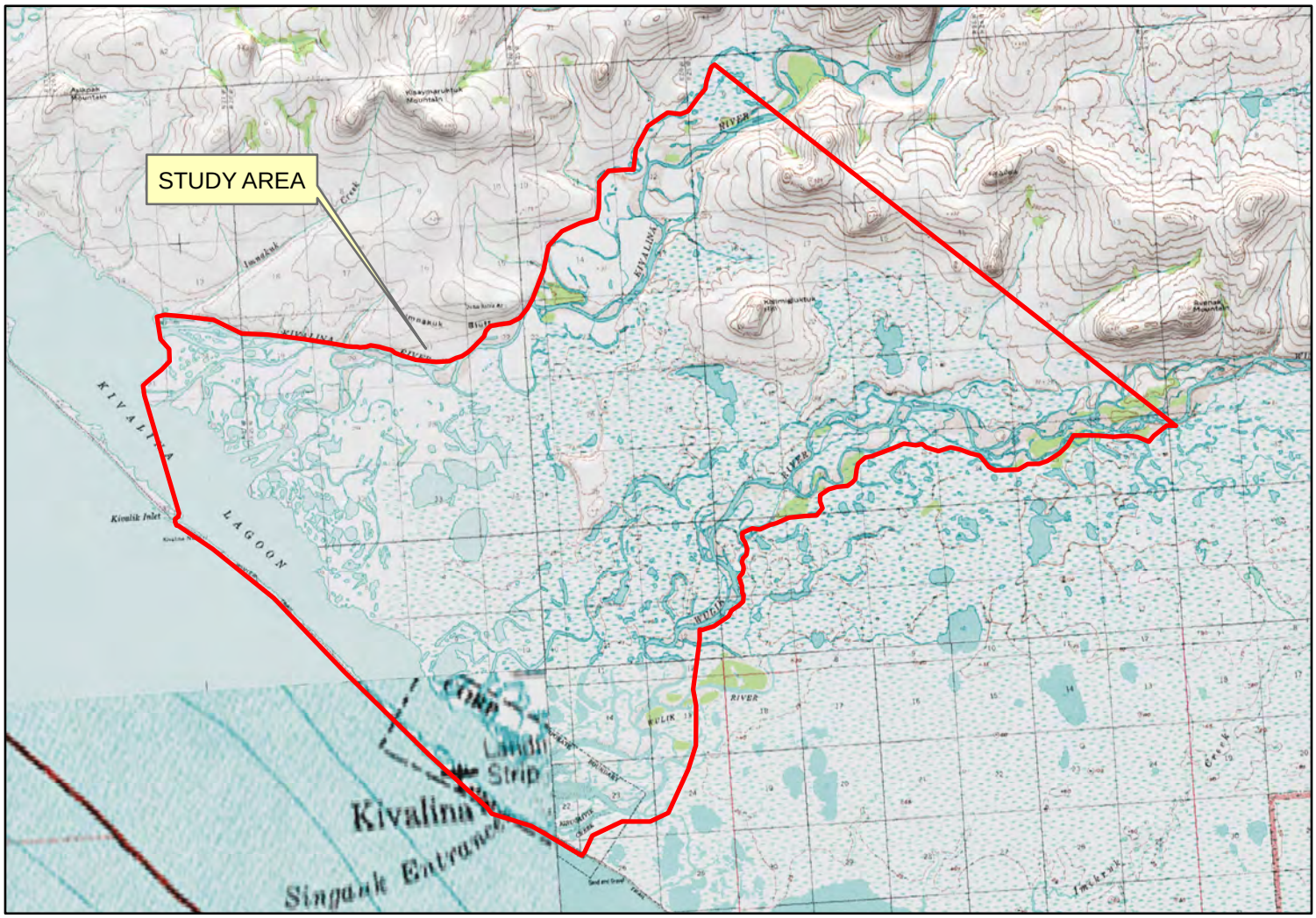
11 FIGURES

PROJECT LOCATION





0 1.25 2.5 5 Miles

Northwest Arctic Borough
Alaska Department of Transportation and Public Facilities - Northern Region

Location & Vicinity Map
Project Number: 0002384/NFHWY00162

DATE: November 2016 | FIGURE 1

N
W E
S

Kivalina River

Kivalina River Depositional Zone

Kisimigiuqtuq Hill

School Site

Simiq Hill

Wulik River Relic Channel

Wulik River Depositional Zone

Wulik River

Kivalina

NOTES:

*Access routes shown are from "Evacuation and School Access Road Project, Kivalina, Alaska, Route reconnaissance Study; submitted to Native Village of Kivalina, submitted by WHPacific (revised June 2014).

The imagery background is WV-2 satelltie imagery from July 2016.

Legend

- North Access Route*
- Combined Access Route*
- South Access Route*
- Native Allotments
- Potential Material Sources
- Project Study Area

0 0.5 1 2 Miles

DATE: November 2016

FIGURE 2

STUDY AREA AND POTENTIAL SITES
PROJECT NUMBER: 0002384/NFHWY00162

APPENDIX A: Public Involvement Records

Kivalina Evacuation and School Site Access Road (Project No. 0002384)

The Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA) in partnership with the Northwest Arctic Borough and the Community of Kivalina are proposing a project to improve community safety in Kivalina, Alaska by providing an evacuation road between the community of Kivalina and a new school, located at a proposed site on Kisimigiuqtuq Hill (K-Hill). Proposed project components include:

- Construction of a bridge and/or causeway across Kivalina Lagoon. Concepts being evaluated include construction of an earthen causeway across the lagoon with varying hydraulic and boat passage options such as a bridge and/or culverts.
- Construction of an all-season gravel access road. The evacuation and school access road would be designed to accommodate both general purpose and emergency evacuation vehicles and include a single travel lane with turnouts at specified locations.

DOT&PF is conducting formal scoping to support preparation of an environmental document for the proposed project in accordance with the National Environmental Policy Act (NEPA). DOT&PF is planning upcoming public meetings in the communities of Kivalina, Noatak, and Kotzebue. These meetings are an important part of the formal NEPA scoping process. A detailed summary of the currently proposed alternatives, as well as supporting studies will be presented at the public meeting. Project team members will be available to discuss the proposed alternatives, answer questions, and document public comments.

Your input at this time is important.

Join us for an Open House Meeting in Kivalina:

Tuesday, November 15, 2016 • 4:00-7:00 PM

McQueen School Gym, Kivalina, Alaska

This project is being developed in accordance with the following special purpose regulations including Sections: 4(f) of the Department of Transportation Act; 106 of the National Historic Preservation Act, 7 of the Endangered Species Act; and Executive Orders: 11988 (Floodplain Protection); 11990 (Wetlands Protection); and 12898 (Environmental Justice).

Persons wishing to submit written comments may deliver them in writing at the meeting or send them to the following address by December 9, 2016:

Sarah E. Schacher, P.E., 2301 Peger Road, Fairbanks, AK 99709

If you have any questions or require additional information, please contact Sarah E. Schacher, P.E., Project Manager at (907) 451-5361 (sarah.schacher@alaska.gov). To correspond by text telephone (TDD), call (907) 451-2363.

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Your input at this time is important.

Join us for an Open House Meeting in Noatak:

Wednesday, November 16, 2016 • 11:00 AM - 1:00 PM

Native Village of Noatak Offices: Noatak, Alaska

This project is being developed in accordance with the following special purpose regulations including Sections: 4(f) of the Department of Transportation Act; 106 of the National Historic Preservation Act, 7 of the Endangered Species Act; and Executive Orders: 11988 (Floodplain Protection); 11990 (Wetlands Protection); and 12898 (Environmental Justice).

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Your input at this time is important.

Join us for an Open House Meeting in Kotzebue:

Wednesday, November 16, 2016 • 4:00-6:00 PM

Northwest Arctic Borough Assembly Room: Kotzebue, Alaska

This project is being developed in accordance with the following special purpose regulations including Sections: 4(f) of the Department of Transportation Act; 106 of the National Historic Preservation Act, 7 of the Endangered Species Act; and Executive Orders: 11988 (Floodplain Protection); 11990 (Wetlands Protection); and 12898 (Environmental Justice).

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AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA } **SS.**
FOURTH DISTRICT

Kivalina Evacuation and School Access Road (Project No. 0002384)

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Join us for an Open House Meeting in Noatak:

Before me, the undersigned, a notary public, this day personally appeared Jenny Nance **, who, being first duly sworn, according to law, says that he/she is an Advertising Clerk of the Fairbanks Daily News-Miner, a newspaper (i) published in newspaper format, (ii) distributed daily more than 50 weeks per year, (iii) with a total circulation of more than 500 and more than 10% of the population of the Fourth Judicial District, (iv) holding a second class mailing permit from the United States Postal Service, (v) not published primarily to distribute advertising, and (vi) not intended for a particular professional or occupational group. The advertisement which is attached is a true copy of the advertisement published in said paper on the following day(s):**

November 12, 2016

Remote Solutions

Acct # 9010

Ad # 38412

Kivalina Evacuation & School Access Road (Project No. 0002384)

and that the rate charged thereon is not excess of the rate charged private individuals, with the usual discounts.

Jenny Nance

Subscribed and sworn to before me on this 14 **day of** Nov **,** 20 16

M. Burnell

Notary Public in and for the State Alaska.

My commission expires DEC 7, 2017

NOTARY PUBLIC
M. BURNELL
STATE OF ALASKA
My commission Expires December 7, 20____

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA } **SS.**
FOURTH DISTRICT

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- Construction of a bridge and/or causeway across Kivalina Lagoon. Concepts being evaluated include construction of an earthen causeway across the lagoon with varying hydraulic and boat passage options such as a bridge and/or culverts.
- Construction of an all-season gravel access road. The evacuation and school access road would be designed to accommodate both general purpose and emergency evacuation vehicles and include a single travel lane with turnouts at specified locations.

DOT&PF is conducting formal scoping to support preparation of an environmental document for the proposed project in accordance with the National Environmental Policy Act (NEPA). DOT&PF is planning upcoming public meetings in the communities of Kivalina, Noatak, and Kotzebue. These meetings are an important part of the formal NEPA scoping process. A detailed summary of the currently proposed alternatives, as well as supporting studies will be presented at the public meeting. Project team members will be available to discuss the proposed alternatives, answer questions, and document public comments.

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November 12, 2016

Remote Solutions

Acct # 9010

Ad # 38411

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Jenny Nance

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M. Burnell

Notary Public in and for the State Alaska.

My commission expires DEC 7, 2017

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THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

NORTHERN REGION
Design and Engineering Services

2301 Peger Road
Fairbanks, Alaska 99709-5316
Main: 907-451-2273
TDD: 907-451-2363
Fax: 907-451-5126

November 10, 2016

Dear Project Stakeholder:

Re: Kivalina Evacuation and School Site Access Road
0002384/NFHWY00162
Request for Scoping Comments

The Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA) in partnership with the Northwest Arctic Borough (NAB), Native Village of Kivalina, and the City of Kivalina, are proposing to improve community safety in Kivalina, Alaska by providing an evacuation road between Kivalina Island and a school to be constructed by the NAB that would also serve as a safe emergency evacuee assembly site on Kisimigiuqtuq Hill (K-Hill). Kivalina is located on the southeast tip of a 5.5-mile long barrier island, located between the Chukchi Sea (Arctic Ocean) and Kivalina Lagoon approximately 80 miles northwest of Kotzebue.

DOT&PF is conducting formal scoping to support preparation of an environmental document for the proposed road project in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended. Please identify any environmental, cultural, historic, or subsistence resources you believe may potentially be impacted by the proposed project, and provide any other information you deem valuable to the environmental documentation process. Your responses will help provide us with the necessary inputs to develop and design a proposed final project that avoids and minimizes as many potential adverse environmental and human impacts as possible.

Background

The community of Kivalina has been working for decades with a variety of local, state, and federal agencies to address threats of coastal erosion and flooding. Numerous study, concept, and planning documents exist on potential solutions, which range from: erosion protection around the city; to relocation of the entire community; to a new mainland site. Options involving community relocation have been problematic, as they are neither culturally preferable nor fiscally practical in the foreseeable future. Accordingly, Kivalina has turned to a locally approved approach of facilitating a safe, reliable, and direct means of community evacuation to an acceptable mainland location on K-Hill.

Project Location

The proposed road project origin would be at the City of Kivalina, which lies within the Kotzebue Recording District and is located in Section 21, Township 27 N, Range 26 W, of the Kateel River Meridian. The desired project terminus at K-Hill is located in Section 19, Township 28N, Range 25W, of the Kateel River Meridian. The feasibility of several potential route alignments is currently being evaluated within a project study area encompassing Kivalina Island, the southern portion of Kivalina Lagoon, and the lower Wulik and Kivalina River drainages in Townships 27N and 28N, Ranges 25W, 26W and 27W of the Kateel River Meridian (Figure 1).

Purpose and Need

The Kivalina Evacuation and School Site Access Road project would provide Kivalina residents a safe and reliable evacuation route in the event of a catastrophic storm or ocean surge, allowing evacuees to mobilize to safe refuge at a site on K-Hill also dedicated by the NAB as the preferred new location for the community school. Upon its anticipated construction, the school will augment the undeveloped evacuation site by serving as a full-service community emergency shelter with all-season, longer-term support capabilities.

Recent climate data has indicated that arctic sea ice is forming later in the season, increasing fall and winter storm duration and intensity along the Northwest Arctic coast. Consequently, residents of Kivalina face significant and increasing risks to safety, life and property by storm systems predicted to further intensify over time. The need for a concerted effort to mitigate these risks became more evident during an evacuation event in October 2007 when debris-laden storm waves overtopped the barrier island.

To facilitate community safety in the face of this increased threat, Kivalina needs a safe, stable, and reliable evacuation infrastructure (routing, transportation, shelter) in the event of impending catastrophe. To provide the routing component of this infrastructure will require construction of a road facility over a safe route that allows emergency response vehicles to access a secure location capable of supporting evacuees in times of need.

Proposed Action

Within the project study area, DOT&PF and FHWA are currently reviewing the feasibility of three existing, preliminary route options independently proposed by Kivalina and the NAB (Figure 2). While these routes may provide a useful basis for alternative development during NEPA documentation, additional draft alternatives are anticipated to be identified and considered as a consequence of agency and public scoping. Common to all anticipated alternatives will be the requirement to support the following actions:

- **Establishment of a safe, reliable, all-season Kivalina Lagoon crossing during evacuation mobilization.**
    - Concepts previously studied for their feasibility include construction of an earthen causeway across the lagoon that variously incorporates hydraulic and boat passage options including bridge(s), culvert(s), or both.
- **Construction of an all-season gravel access road between Kivalina Island and the desired K-Hill evacuation site**.

- The road would be designed to accommodate both general purpose and emergency evacuation vehicles over a two-way road with shoulders, multiple turnouts, and safe side slopes that include guard rails or other safety features as required.

- Over the last decade, Kivalina and the NAB have evaluated the feasibility of numerous local road routings that could potentially provide for evacuation, school access, or material site development. Evacuation routes considered to date by Kivalina and the NAB have included:

  - An alignment referred to as a ***Northern Route*** approximately 9.1 miles in length that would originate at the south end of the Kivalina Airport runway, parallel the runway on its east side northward for approximately 1.5 miles, cross the lagoon eastward via a causeway and/or bridge, and follow high ground between the Wulik and Kivalina Rivers to its terminus at K-Hill.

  - An alignment considered a ***Southern Route*** approximately 6.9 miles in length that would begin at the south end of the Kivalina Airport runway, immediately cross the lagoon eastward via a causeway and/or bridge, and follow lowlands and relic channels of the Wulik River to K-Hill.

  - A ***Combined Route*** approximately 8.6 miles in length that would follow the Northern route before merging with the Southern route via a one-mile long connecting segment.

- **Identification of Material Sources:** Although project materials would be specified as contractor furnished and development of material sources would not be included in the Proposed Action, analyses of material locations proximate to potential routes would be conducted to determine their feasibility and evaluate environmental impacts of their development. Four locations in the project study area known to contain potentially viable project materials, and currently being evaluated by Kivalina and the NAB, include:
  - *K-Hill*: K- Hill geology is characterized by exposed limestone and rock rubble at the ground surface. It is anticipated that below the surface, larger frost-fractured rocks and boulders may also exist.

  - *Wulik River Deposition Zone*: The Wulik River Deposition Zone is characterized by visible gravel bars and beaches along the river banks that would contain suitable materials to construct the proposed project.

  - *Wulik River Relic Channel*: The Wulik River Relict Channel is characterized by visible gravel and sand at the ground surface. The fluvial material in these areas was likely deposited when the Wulik River was located north of its present location.

  - *Kivalina River Deposition Zone*: The Kivalina River is also being evaluated for potential material sources due to the areas visible on gravel bars and beaches that appear to contain suitable material.

To provide you with additional information of project interest, we have made a substantial document cache of previous studies and assessments on the project area, potential development projects at Kivalina, and various natural resources available on the DOT&PF project website at: http://dot.alaska.gov/nreg/KivalinaEvacRd.

Based on additional agency and public input, engineering and environmental analyses and evaluations, and the application of regional Traditional Knowledge, DOT&PF intends to identify issues of environmental, technical and cultural concern, refine the project scope as necessary, and through evaluation of qualified potential routes develop a preferred project alternative that minimizes human and environmental impacts while meeting project purpose and need.

We respectfully request your written comments no later than December 12, 2016. Please mail them to: DOT&PF Attn: Sarah E. Schacher, P.E., 2301 Peger Road Fairbanks, AK, 99709; or you may e-mail comments to me at sarah.schacher@alaska.gov.

Thank you for your attention to this request. If you have any questions regarding the proposed project, please contact me at (907) 451-5361.

Sincerely,

Sarah E. Schacher, P.E.
Preconstruction Engineer

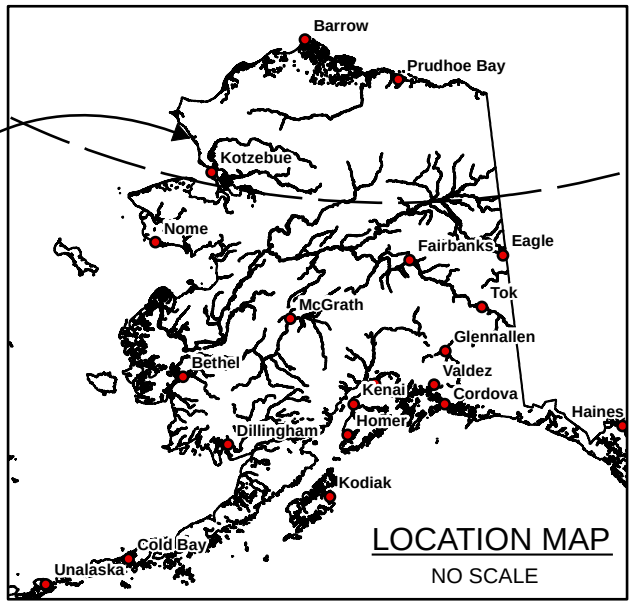
Enclosures: Figure 1 – Location & Vicinity Map
Figure 2 – Study Area and Potential Routes

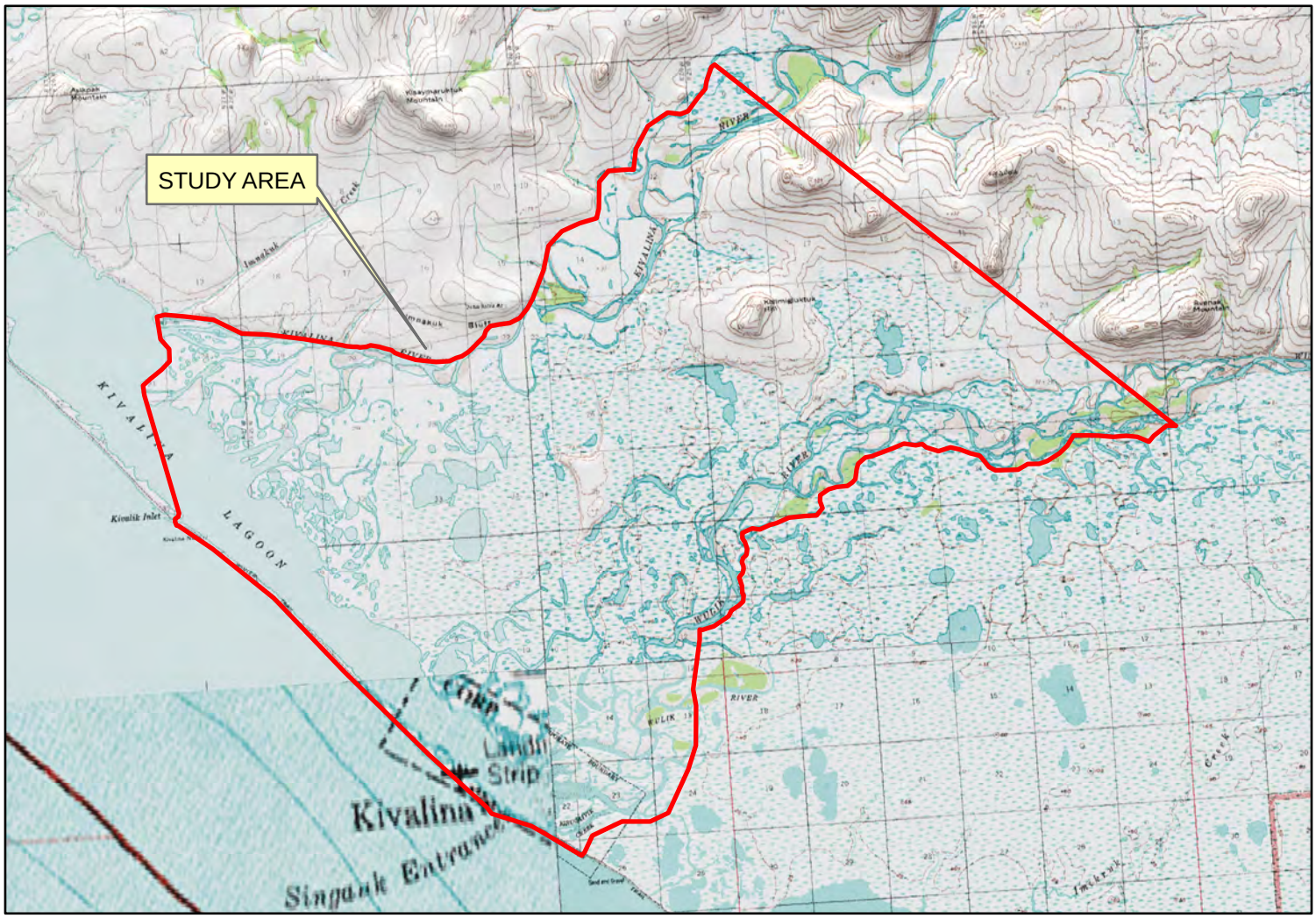
pk/lmc

Distribution by email:
Mayor Vernon Adams, Sr., Native Village of Noatak
Heidi Drygas, Commissioner, Alaska Dept. of Labor & Workforce Development
Millie Hawley, Tribal President, Native Village of Kivalina
Stanley Hawley, Tribal Administrator, Native Village of Kivalina
Dr. Michael Johnson, Commissioner, Alaska Dept. of Education & Early Development
Linda Lee, Secretary, NANA
John Lincoln, Board Chairman, Maniilaq Association
Tim Mearig, P.A., Facilities Manager, Alaska Dept. of Education & Early Development
Janet Mitchell, City Administrator, City of Kivalina
The Honorable Lisa Murkowski, United States Senate
Dr. Annmarie O'Brien, Superintendent, NAB School District
The Honorable Donald Olson, Alaska State Senate
Mayor Clement Richards, Sr., Northwest Arctic Borough
Sandy Shroyer, President, NAB School District
Tim Schuerch, President, Maniilaq Association
Nicole Stoops, Executive Director, Native Village of Kotzebue
The Honorable Dan Sullivan, United States Senate

Mayor Austin Swan, City of Kivalina
Herbert Walton, Tribal Administrator, Native Village of Noatak
Representative-Elect Dean Westlake, Alaska State House of Representatives
Wayne Westlake, President/Chief Executive Officer, NANA
The Honorable Don Young, United States House of Representatives

PROJECT LOCATION





0 1.25 2.5 5 Miles

Northwest Arctic Borough
Alaska Department of Transportation and Public Facilities - Northern Region

Location & Vicinity Map
Project Number: 0002384/NFHWY00162

DATE: November 2016 | FIGURE 1

N
W E
S

Kivalina River

Kivalina River Depositional Zone

Kisimigiuqtuq Hill

School Site

Simiq Hill

Wulik River Relic Channel

Wulik River Depositional Zone

Wulik River

Kivalina

NOTES:

*Access routes shown are from "Evacuation and School Access Road Project, Kivalina, Alaska, Route reconnaissance Study; submitted to Native Village of Kivalina, submitted by WHPacific (revised June 2014).

The imagery background is WV-2 satelltie imagery from July 2016.

Legend

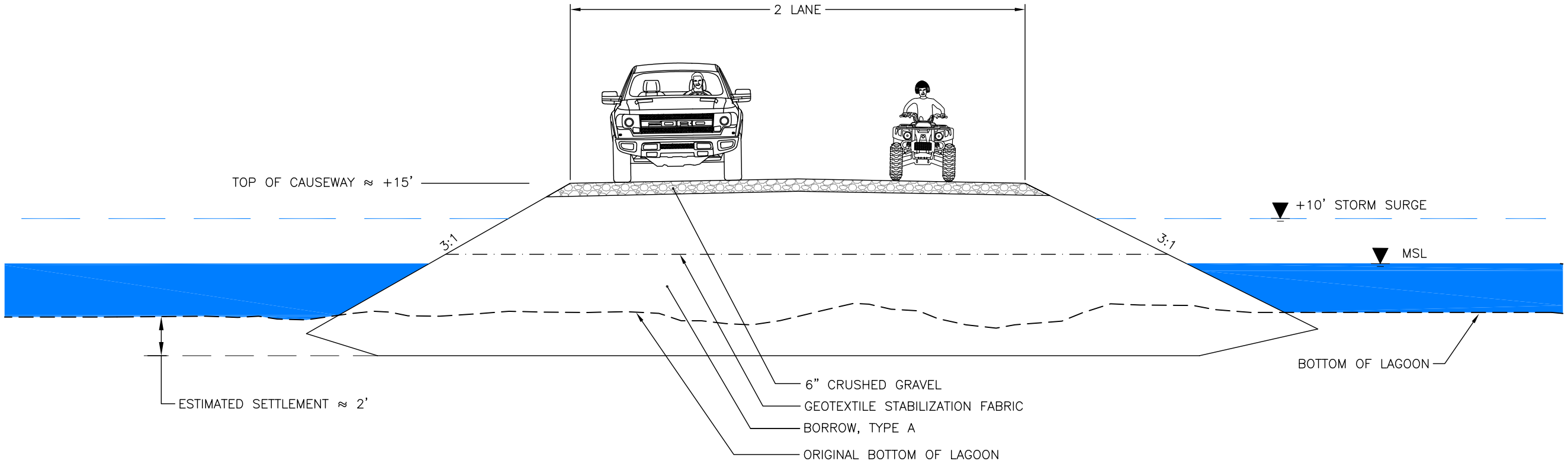
- North Access Route*
- Combined Access Route*
- South Access Route*
- Native Allotments
- Potential Material Sources
- Project Study Area

0 0.5 1 2 Miles

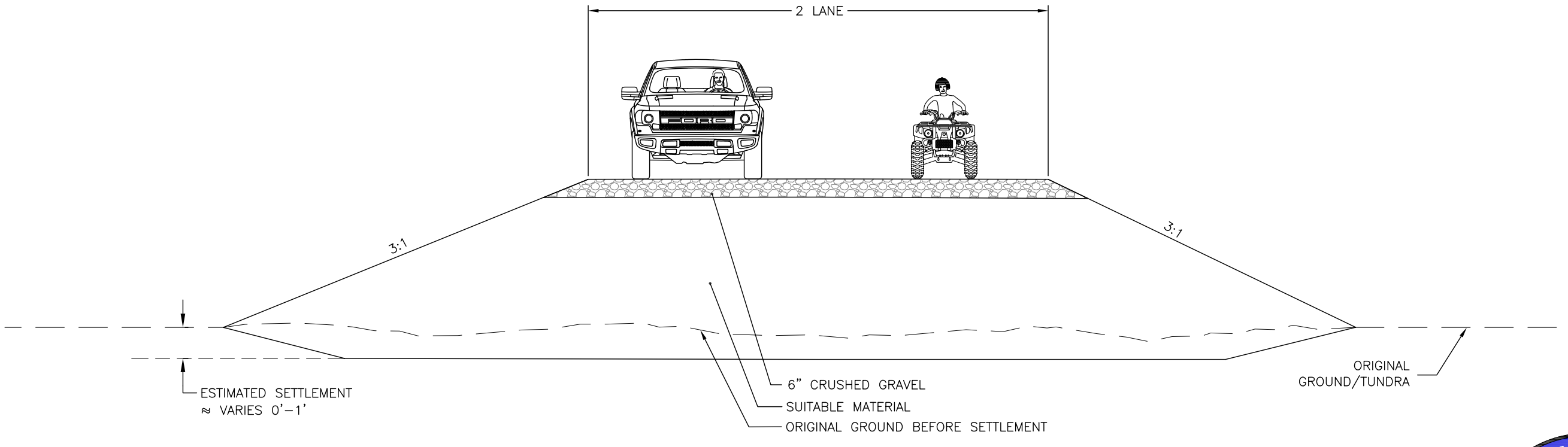
DATE: November 2016

FIGURE 2

STUDY AREA AND POTENTIAL SITES
PROJECT NUMBER: 0002384/NFHWY00162



CAUSEWAY TYPICAL SECTION (LAGOON CROSSING)



UPLAND/WETLAND TYPICAL SECTION

KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD

TRANSPORTATION & PUBLIC FACILITIES
STATE OF ALASKA

ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

KIVALINA PUBLIC MEETING

SIGN IN SHEET

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (see below)
CARLOS HAWLEY	BOX 50004	907-645-5[illegible]		
Alice A Adams	Box 53	645-2433		Esk.
Danny I. Foster	P.O.Box 50074	645-5131	M	Esk
Betty J. Adams	P.O, Box 50029		F	Eskimo
Nerens Adams	P.O, Box 50063	645-5450	M	ESK
Rachael Koonuk	PO Box 72 99750	645-2[illegible]	F	ESK

*This information is **voluntary**. Its purpose is to ensure fair and equal representation by the public in all projects and programs administered by the Alaska Department of Transportation and Public Facilities. **RACE CATEGORIES: WHITE (W), ALASKA NATIVE (AN), NATIVE AMERICAN (N), BLACK (B), HISPANIC (H), ASIAN (A), PACIFIC ISLANDER (P), and OTHER (O)**

effective: December 2004

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Lawrie Adams	Box 72 Kivalina AK 99750	645-2163	F	AN
Clinton Downey	General Delivery		M	AN
Kelly Hawley	Box 50022 Kivalina Ak	4121799	F	AN
~~Alyssa Onatik~~	" "	" "	F	AN
Amos Hawley Jr	" "	" "	M	AN
Lizzie Hawley	Box 50071		F	AN
Evelyn K Adams	Box 512		F	AN
Charley Tinker	Box 50011		M	
Eleanor K. Swan	Box 50042	645-5406	F	AN

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Rhea Barger	Box 50020	645-5149	F	AN
DANIEL Don FOSTER SR	Box 50074	645 5131	M	
Franklin Knox	Box 50045	645-2154	M	AN
Ida Swan	50028	645-5398	F	AN
Josh Swan	Box 60	6455432	M	AN
Joe Swan Sr	Box 17	645-2152	M	AN
[illegible]	Box 30	645-2235	F	AN
[illegible]	P.O. Box 50031	645 2270	F	AN
[illegible]	Box 50026	645 2941	M	AN

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Lona Leigh Swan	P.O. Box 50021 Kivalina AK 99750	(907) 645 2152	F	AN
Rhonda L. Norton	[illegible] KVL AK 99750	6452157	F	AN
Emma L Swan	P.O. BOX 50064	645-2143	F	AN
Angelo Hawley	P.O. BOX 50033	645-5051	M	AN
Lona Adams	BOX 50 KVL AK 99750	645 5814	F	AN
Irene Carter	Box 33 Kvl Ak 99750	645-5037	F	AN
Opal Hawley	Gen Del KVL, AK 99750	5011	M	ESK
[illegible]	Bx 50054		F	AN
Ralph Knox	P.O. Box 50067	5588	M	AN

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effective: December 2004

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Barbara Norton	PoBox50066	645-5066	F	AN
Peter J. Lambert	P.O. Box 91	412-0644	M	AW
Leroy J. Adams Jr.	P.O. Box 50012 Kivalina, AK 99750	(907) 645-5113	M	AN
George, A. Hawley	Po box 5H Kivalina AK 99750	907645-7410	M	An
Seymour Tuzroyluke III	P.O Box 50065 Kivalina AK 99750		M	AN
Shernell Hoarley	P.O box 50056 Kivalina AK 99750		F	AN
Tony Oktollik	P.O Box 50014	891-1096	M	AN
Angeline Oktollik	P.O BOX 50014	891-1096	F	AN
Jerry Knapp	P.O Box 50078		M	AN

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**

Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Annette Koenig	POBox 50019 Kivalina, Ak 99750		F	AN
~~Mutton Koenig Jr~~				
Winona Hawley	PO Box 50075 Kivalina Ak 99750		F	
Dollie A. Hawley	Kivalina, Alaska		F	
Jayson Bert Knox				
Sam Hawley				
Sonya Burger	Kivalina, AK		F	
Christina Swan	Kivalina AK		F	AN
Brenda Hawley	KVL, AK 99750		F	AN

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ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

KIVALINA PUBLIC MEETING

SIGN IN SHEET

PROJECT NAME: Kivalina Evacuation and School Site Access Road Project No. 0002384/NFHWY00162 **DATE:** November 15, 2016

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (see below)
Emma Booth	P.O. Box 72 Kivalina, AK 99750	645-2163		
Margaret Baldwin				
Frank Worly	Box 50037	6455008		
Leonard Kaca	Box 50013	645 3336	M	AN
Felicia Thomas	Box 50066		F	AN
STANLEY HAWLEY	P.O. Box 50024 quun435r@gmail.com	645-5499	M	AN

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effective: December 2004

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
JAWOOR SWAN	P.O Box 65		F	AN
Colleen Swan	POB 50025 Colleenekc@aol.com	645-2123	F	AN
Doreen Baldwin	P.O. BOX 50043 KVL, AK 99750	645-5696	F	AN
Richard Sage	PO Box 50077 KVL, AK 99750	645-5005	M	AN
Dolly H. Swan	P.O. Box 50023 Kivalina, AK 99750	645-5116	F	AN
[illegible] Ross Stalker	Box 71		M	Eskimo
John Hawley	Box 65	645-5061	M	Inupiaq
[illegible]	Box 65		F	Eskimo
Robert Hawley	Box 14		M	Eskimo

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PROJECT NAME: Kivalina Evacuation and School Site Access Road
Project No. 0002384/NFHWY00162

DATE: November 15, 2016
LOCATION: Kivalina

NAME (PLEASE PRINT)	**MAILING ADDRESS and *EMAIL**	**PHONE**	***GENDER (M/F)**	***RACE (W, AN, N, B, H, A, P, O)**
Dolly E. Foster	P.O. box 50074 KVL AK 99750 dollyfoster@hotmail.com	645-5131	F	Inupiaq
Rita Ramoth	PO Box 50017 KVL AK 99750 rrramoth@~~yahoo.com~~ alaska.edu	645 5300	F	Inupiaq
[illegible]	Box 50001 KVL AK 99750	645 5028	M	Inupiaq
[illegible]	PO Box 50073 Kivalina AK 99750	645 2143	F	"
Maria Kameroff	P.O. Box 50005 Kivalina AK 99750	645 5588	F	Inupiaq
Alexis Hawley	PO Box 54 Kivalina AK 99750	538 4079	F	Inupiaq
Corey GN Stern	PO Box 50066 Kivalina, AK 99750	645 5066	M	Yupik
Ester Norton	PO Box 50001 Kivalina AK 99750	645-5020	F	AN
[illegible]	P.O. Box 50022 Kivalina AK 99750	645 5743	M	Inupiaq

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effective: December 2004

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
JACK KOENIG	P.O. Box 50005		M	AN
Joseph Swan	P.O Box 50042			
11 11	11 1 1 11	645-5406	M	AN
Winona Carter	PO Box 50033 KVL AK	6455095	F	AN
Mona Stalker	50073	645-5272	F	AN
Eunice Adams	50074	645-5381	F	AN
Angel Koenig	50080		F	AN
Austin Swan Jr	55	645 5398	M	AN
Jasmin Adams	PO Box 55	645 5398	F	AN

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
~~Amos Carter~~				
Amos Carter	PO Box 33 Kivalina, AK 99750		M	AN
Ashlee Hawley	P.O. Box 50065 Kvl, AK 99750		F	AN
Brian Barger	PO BOX 50020 KVLAK 99750	645-5150	M	AN
Shirley Adams	POBOX 58 KVLAK 99750	645 5859	F	AN
Lawrence Adams	General delivery	645 5859	M	AN
Tia Adams		645 5096	F	AN
Lena Cleveland	PO Box 50061		F	AN
Elizabeth Diamant	PO BOX 150774 HOMER 99603	545 7222	F	W

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**

Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Stephen M Koenig	PO Box 50063	907 645 5497	M	AN

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ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

KIVALINA PUBLIC MEETING

SIGN IN SHEET

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (see below)
Jolene Wesley	P.O. Box 48	645-5114	F	Eskimo
Loretta Hawley	PO Box 43	645-5420	F	AN
Quun Hawley	P.O box 50026	645-5055	M	Native
Kevin Hawley	P.O. Box 50056	645-5152	M	Native
JD Sage	PO Box 50006	645 2340	M	AN
Virgil J. Adams	P.O Box 50074	6455384	M	A N

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Louisa Hawley	P.O Box 50020	645-2342	F	AN
Regina Turner	McQueen School	645-2125	F	W
Linda Roberts	McQueen School			
Tasha Knox	P.O Box 50007		f	An
~~Ray~~				
Kathy Christy	5172 E. 98th Anchorage	907-223-2999		
Amy Hensley	P.O Box 50034 Kvl AK	6455207	F	AN
Nellie Adams	P.O Box 50063	645-5497	F	AN
Shield Stalker	P.O. Box 50071		M	AN

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 15, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kivalina**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Reppi Swan	P.O. Box 23 KVL AK 99750	645-5155		
Gloria Adams	PO Box 50073 Kivaline AK 99750	645-5043		

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ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

NOATAK PUBLIC MEETING

SIGN IN SHEET

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (see below)
Sara Lindberg	Anchorage	(907)3288622	F	W
Millie Hawley	P.O. Box 50051 Kivalina 99750	907 645-2153	F	I Alaska Native
JOHN BAICER	Box 312 Kotzebue	442-0910	M	IN
Andrew Niemiec	Anchorage	343-5263	M	W
Vernon Cole	NOATAK		M	E
Gretchen Booth	Noatak, AK	485-3391	F	E

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Noatak**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Robert Booth	rbooth545@gmail.com		m	
Stanley Hawley	qunu43sr@gmail.com	485-5499	M	AN
Alice A Adams Ahlook Alice A Adams Ahlook	Housing #1 Bering St Box 53 KVL 99750	645-5393	F	Esk..
Janet Mitchell	PO Box 76 ICR	6455419	F	Ak Inupiaq
Dolly Sage	P.O. Box 56	485-5175	F	AN.
Robert Sage Sr	P.O. Box 56	485-5175	M	AN.
Janet N Mills	Box 58 Noatak	485-5210	F	AN
Benjamin P. Arnold	Box 38 Noatak	4852123	F	Inupiaq
Victor Onalik Sr	Box 63	485-2325	M	Inupiaq

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Noatak**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Joey Walton	PO Box 180	907 485-5382	M	AN
Vincent Onalik Sr	Box 141	4852940	M	AN
Chuck Booger Sr	Box 12	4852059	M	AN
Melford Booth	Box 66	4852117	M	AN
Joseph Luther	Box 53	485-2520	M	A.N
Edith J. Onalik	Box 63	485-2321	F	AN.
Stella Shy	educationcoordinator@noatagg.org Box 95, Noatak 99761	485-2244	F	AN
Whittier Burns	Box 57 Noatak	485-2457	M	AN
Frank Onalik Sr.	Box 5 Noatak AK	485-2455	M	Inupiaq

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Noatak**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Debra Onalik	PO Box 5	485 2455	F	AK Native
Eva Onalik	Box 98 Noatak	485-5444	F	AK Native
Herbert Onalik Jr	Box 23		M	AK NATIVE

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ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

KOTZEBUE PUBLIC MEETING

SIGN IN SHEET

PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (see below)
Sara Lindberg	Anchorage	907-328-9622		
John Chase	jchase@nwabor.org	442.8212	M	human
STANLEY HAWLEY	PO BOX 50026 KIVALINA AK. 99750 quinn435r@gmail.com	645-5499	M	ISLANDER
Millie Hawley	PO Box 50051 Kivalina Ak 99750	645-2153	M	Inupiaq
Alice A Adams	Box 53 Kivalina, Alaska	645-2883	F	Inupiaq
Janet Mitchell	PO Box 50079 Kivalina Ak 99750	645-5419	F	Ak Native

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kotzebue**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
GENE ARMSTRONG	PO BOX 71 BUCKLAND, AK 99727	~~404-5382~~	M	AN
Justice Hildreth	po Box 967 Kotzebue Ak 99752	412-203	M	An
JOHN WADE	PO Box 361 99752 Kotzebue AK	412-354	M	AN
MAE MENDENHALL	P.O. Box 377 KOTZEBUE ALASKA 99752	434 1995	F	AN
Jennifer Tabl	909 W 9th Ave Ste 200 Anchorage, AK 99501	265-3798	F	AN
Andrew Niemiec	Anchorage	343-5263	M	W
Susan Georgette	PO Box 270 USFWS Kotzebue susan_georgette@fws.gov	442.3799	F	W
Bill Carter	POBox 270 USFWS Kotzebue bill_carter@FWS.gov	442-3799	M	W
Jim Dan	Box 574 Kotz 99752	442-3953	M	C

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PROJECT NAME: Kivalina Evacuation and School Site Access Road **DATE: November 16, 2016**
Project No. 0002384/NFHWY00162 **LOCATION: Kotzebue**

NAME (PLEASE PRINT)	MAILING ADDRESS and *EMAIL	PHONE	*GENDER (M/F)	*RACE (W, AN, N, B, H, A, P, O)
Elizabeth Cravalho	PO Box 49 Kotz AK 99752	(907) 2234409	F	AN
Angeline Sturm	PO Box 575 Kotzebue AK 99752	907-227-0037	F	AN
John Lincoln	PO Box 456 Kotz, AK 99752	907-444-1655	M	AN

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Kivalina Evacuation and School Site Access Road

Project No. 0002384/NFHWY00162

Comments Are Welcome!
Kivalina, Alaska
November 15, 2016

Please take a moment to fill out this comment sheet so that we can respond to your comments. If you do not finish the comment sheet today, please mail to Sarah E. Schacher, P.E., DOT&PF, 2301 Peger Road Fairbanks, AK 99709; or e-mail to sarah.schacher@alaska.gov. Thank You!

Name: Alice A Adams Telephone: 645-2033

Address: Box 53, Kivalina Alaska

Please add comments you think may be helpful during the design development process. Are there specific elements of the project that you wish to address?

We Need To hurry. Get this Road going; People That don't attend

all mtg Tend To Not Know.
Get people trained = Lobby =
Get more People = work with engineering
and environmental = Work with Dot
Work Together
Thank you So much for your
Information and your work

*We respectfully request comments by **December 12, 2016** so we may have time to consider and respond to concerns*

Kivalina Evacuation and School Site Access Road

Project No. 0002384/NFHWY00162

Comments Are Welcome!
Kivalina, Alaska
November 15, 2016

Please take a moment to fill out this comment sheet so that we can respond to your comments. If you do not finish the comment sheet today, please mail to Sarah E. Schacher, P.E., DOT&PF, 2301 Peger Road Fairbanks, AK 99709; or e-mail to sarah.schacher@alaska.gov. Thank You!

Name: Dolly E. Foster Telephone: 907-645-5131 C.

Address: P.O. Box 50074 Kivalina, Alaska 99750-0074

Please add comments you think may be helpful during the design development process. Are there specific elements of the project that you wish to address?

I envision a (2) lane road, for the use for a busing system to and from the schools

*We respectfully request comments by **December 12, 2016** so we may have time to consider and respond to concerns*

Kivalina Evacuation and School Site Access Road

Project No. 0002384/NFHWY00162

Comments Are Welcome!
Noatak, Alaska
November 16, 2016

Please take a moment to fill out this comment sheet so that we can respond to your comments. If you do not finish the comment sheet today, please mail to Sarah E. Schacher, P.E., DOT&PF, 2301 Peger Road Fairbanks, AK 99709; or e-mail to sarah.schacher@alaska.gov. Thank You!

Name: Benjamin P. Arnold Telephone: 9074855090

Address: POBOX 28 Noatak, AK 99761

Please add comments you think may be helpful during the design development process. Are there specific elements of the project that you wish to address?

Feasability is always an issue with any type of projects and help saving funding/monies is to strategizes to the most effective way for the evacuations and school relocation road. Is it possible to ask (RIDA) Alaska Industrial Development Association with cost effectiveness about possibilities to use the REDDOG ROAD since it already exists. Proximity to K-HILL and new school location from the Village and existing port road near these locations should be considered to saving funding/monies.

*We respectfully request comments by **December 12, 2016** so we may have time to consider and respond to concerns*

NANA

January 12, 2017

Sarah Schacher, P.E.
Preconstruction Engineer
2301 Peger Road
Fairbanks, AK 99709

Regarding: Kivalina Evacuation road and School Site

Dear Ms. Schacher:

NANA recognizes the urgent need of the community of Kivalina to build both an evacuation road and the school site to ensure residents have a means to leave the community in the event of an emergency and retreat to higher ground. NANA supports the advancement of this project and its completion as soon as possible so that the life, health, and safety of Kivalina residents are protected.

NANA Regional Corporation is one of thirteen Alaska Native Corporations established pursuant to the Alaska Native Claims Settlement Act (ANCSA) of 1971. NANA is a for-profit corporation with a social responsibility to our over 14,000 shareholders who are the descendants of the Iñupiaq people of Northwest Alaska. NANA manages approximately 2.2 million acres of lands on behalf of our shareholders. These lands fall within the borders of the Northwest Arctic Borough and include the community of Kivalina as well as the new school site and evacuation road the community is pursuing.

As part of our commitment to this project, NANA is working with City of Kivalina, the Native Village of Kivalina, the Northwest Arctic Borough, the Northwest Arctic Borough School District, the Alaska Department of Transportation and Public Facilities, and the Federal Highway Administration to make NANA lands that are needed available. The Article VIII Kivalina and Noatak Committee of the NANA Board have the authority to issue right of ways on NANA land near Kivalina. The Committee recently adopted a resolution authorizing and directing management to provide interim right of ways for work to continue in parallel to the completing the ANCSA 14(c)3 process to convey lands to the City of Kivalina.

We urge the State of Alaska continue to advance this project for the community of Kivalina.

Sincerely,

Wayne Westlake

Wayne Westlake
President/CEO

CC: Mayor Austin Swan, City of Kivalina
Millie Hawley, Kivalina IRA Council President
Mayor Clement Richards, Northwest Arctic Borough
Dr. Annmarie O'Brien, Superintendent of Schools, Northwest Arctic Borough School District

NANA Regional Corporation, Inc. • P.O. Box 49, Kotzebue, Alaska, 99752 • T: (907) 442-3301, (800) 478-3301 • F:(907) 442-4161 • nana.com/regional

APPENDIX B: Agency Coordination Records

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

NORTHERN REGION
Design and Engineering Services

2301 Peger Road
Fairbanks, Alaska 99709-5316
Main: 907-451-2273
TDD: 907-451-2363
Fax: 907-451-5126

November 10, 2016

Dear Agency Contact:

Re: Kivalina Evacuation and School Site Access Road
0002384/NFHWY00162
Request for Scoping Comments

The Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA) in partnership with the Northwest Arctic Borough (NAB), Native Village of Kivalina, and the City of Kivalina, are proposing to improve community safety in Kivalina, Alaska by providing an evacuation road between Kivalina Island and a school to be constructed by the NAB that would also serve as a safe emergency evacuee assembly site on Kisimigiuqtuq Hill (K-Hill). Kivalina is located on the southeast tip of a 5.5-mile long barrier island, located between the Chukchi Sea (Arctic Ocean) and Kivalina Lagoon approximately 80 miles northwest of Kotzebue.

DOT&PF is conducting formal scoping to support preparation of an environmental document for the proposed road project in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended. Please identify any environmental, cultural, historic, or subsistence resources you believe may potentially be impacted by the proposed project, and provide any other information you deem valuable to the environmental documentation process. Your responses will help provide us with the necessary inputs to develop and design a proposed final project that avoids and minimizes as many potential adverse environmental and human impacts as possible.

Background

The community of Kivalina has been working for decades with a variety of local, state, and federal agencies to address threats of coastal erosion and flooding. Numerous study, concept, and planning documents exist on potential solutions, which range from: erosion protection around the city; to relocation of the entire community; to a new mainland site. Options involving community relocation have been problematic, as they are neither culturally preferable nor fiscally practical in the foreseeable future. Accordingly, Kivalina has turned to a locally approved approach of facilitating a safe, reliable, and direct means of community evacuation to an acceptable mainland location on K-Hill.

Project Location

The proposed road project origin would be at the City of Kivalina, which lies within the Kotzebue Recording District and is located in Section 21, Township 27 N, Range 26 W, of the Kateel River Meridian. The desired project terminus at K-Hill is located in Section 19, Township 28N, Range 25W, of the Kateel River Meridian. The feasibility of several potential route alignments is currently being evaluated within a project study area encompassing Kivalina Island, the southern portion of Kivalina Lagoon, and the lower Wulik and Kivalina River drainages in Townships 27N and 28N, Ranges 25W, 26W and 27W of the Kateel River Meridian (Figure 1).

Purpose and Need

The Kivalina Evacuation and School Site Access Road project would provide Kivalina residents a safe and reliable evacuation route in the event of a catastrophic storm or ocean surge, allowing evacuees to mobilize to safe refuge at a site on K-Hill also dedicated by the NAB as the preferred new location for the community school. Upon its anticipated construction, the school will augment the undeveloped evacuation site by serving as a full-service community emergency shelter with all-season, longer-term support capabilities.

Recent climate data has indicated that arctic sea ice is forming later in the season, increasing fall and winter storm duration and intensity along the Northwest Arctic coast. Consequently, residents of Kivalina face significant and increasing risks to safety, life and property by storm systems predicted to further intensify over time. The need for a concerted effort to mitigate these risks became more evident during an evacuation event in October 2007 when debris-laden storm waves overtopped the barrier island.

To facilitate community safety in the face of this increased threat, Kivalina needs a safe, stable, and reliable evacuation infrastructure (routing, transportation, shelter) in the event of impending catastrophe. To provide the routing component of this infrastructure will require construction of a road facility over a safe route that allows emergency response vehicles to access a secure location capable of supporting evacuees in times of need.

Proposed Action

Within the project study area, DOT&PF and FHWA are currently reviewing the feasibility of three existing, preliminary route options independently proposed by Kivalina and the NAB (Figure 2). While these routes may provide a useful basis for alternative development during NEPA documentation, additional draft alternatives are anticipated to be identified and considered as a consequence of agency and public scoping. Common to all anticipated alternatives will be the requirement to support the following actions:

- **Establishment of a safe, reliable, all-season Kivalina Lagoon crossing during evacuation mobilization.**
    - Concepts previously studied for their feasibility include construction of an earthen causeway across the lagoon that variously incorporates hydraulic and boat passage options including bridge(s), culvert(s), or both.

- **Construction of an all-season gravel access road between Kivalina Island and the desired K-Hill evacuation site**.

    - The road would be designed to accommodate both general purpose and emergency evacuation vehicles over a two-way road with shoulders, multiple turnouts, and safe side slopes that include guard rails or other safety features as required.

    - Over the last decade, Kivalina and the NAB have evaluated the feasibility of numerous local road routings that could potentially provide for evacuation, school access, or material site development. Evacuation routes considered to date by Kivalina and the NAB have included:

        - An alignment referred to as a *Northern Route* approximately 9.1 miles in length that would originate at the south end of the Kivalina Airport runway, parallel the runway on its east side northward for approximately 1.5 miles, cross the lagoon eastward via a causeway and/or bridge, and follow high ground between the Wulik and Kivalina Rivers to its terminus at K-Hill.

        - An alignment considered a *Southern Route* approximately 6.9 miles in length that would begin at the south end of the Kivalina Airport runway, immediately cross the lagoon eastward via a causeway and/or bridge, and follow lowlands and relic channels of the Wulik River to K-Hill.

        - A *Combined Route* approximately 8.6 miles in length that would follow the Northern route before merging with the Southern route via a one-mile long connecting segment.

- **Identification of Material Sources:** Although project materials would be specified as contractor furnished and development of material sources would not be included in the Proposed Action, analyses of material locations proximate to potential routes would be conducted to determine their feasibility and evaluate environmental impacts of their development. Four locations in the project study area known to contain potentially viable project materials, and currently being evaluated by Kivalina and the NAB, include:

    - *K-Hill*: K- Hill geology is characterized by exposed limestone and rock rubble at the ground surface. It is anticipated that below the surface, larger frost-fractured rocks and boulders may also exist.

    - *Wulik River Deposition Zone*: The Wulik River Deposition Zone is characterized by visible gravel bars and beaches along the river banks that would contain suitable materials to construct the proposed project.

    - *Wulik River Relic Channel*: The Wulik River Relict Channel is characterized by visible gravel and sand at the ground surface. The fluvial material in these areas was likely deposited when the Wulik River was located north of its present location.

- *Kivalina River Deposition Zone:* The Kivalina River is also being evaluated for potential material sources due to the areas visible on gravel bars and beaches that appear to contain suitable material.

Independent preliminary research and review on project study area resources was conducted by Kivalina and the NAB and is summarized in Appendix A. Additionally, a substantial document cache of previous studies and assessments on the project area, potential development projects at Kivalina, and various natural resources are available on the DOT&PF project website at: http://dot.alaska.gov/nreg/KivalinaEvacRd.

Based on additional agency and public input, engineering and environmental analyses and evaluations, and the application of regional Traditional Knowledge, DOT&PF intends to identify issues of environmental, technical and cultural concern, refine the project scope as necessary, and through evaluation of qualified potential routes develop a preferred project alternative that minimizes human and environmental impacts while meeting project purpose and need.

We respectfully request your written comments no later than December 12, 2016. Please mail them to: DOT&PF Attn: Sarah E. Schacher, P.E., 2301 Peger Road Fairbanks, AK, 99709; or you may e-mail comments to me at sarah.schacher@alaska.gov.

Thank you for your attention to this request. If you have any questions regarding the proposed project, please contact me at (907) 451-5361.

Sincerely,

Sarah E. Schacher, P.E.
Preconstruction Engineer

Enclosures: Figure 1 – Location & Vicinity Map
Figure 2 – Study Area and Potential Routes
Appendix A

pk/lmc

Distribution by email:
Alan Bittner, Anchorage Field Manager, U.S. Bureau of Land Management
Judy Bittner, State Historic Preservation Officer, Alaska Dept. of Natural Resources
Audra Brase, Regional Supervisor, Alaska Dept. of Fish & Game
Alan Cavallo, Public Assistance Branch Chief, Alaska Dept. of Military & Veteran Affairs
Sally Cox, Alaska Dept. of Commerce, Community & Economic Development
Jennifer Curtis, Environmental Protection Specialist, U.S. Environmental Protection Agency
Lesley DeWilde, Real Estate Services Chief, Bureau of Indian Affairs
Matthew Eagleton, Regional EFH Coordinator, NOAA-NMFS
Sandra Garcia-Aline, Division Administrator, Federal Highway Administration

Susan Georgette, Refuge Manager, U.S. Fish & Wildlife Service
Jeanne Hanson, Asst. Regional Administrator, NOAA-NMFS
James Helfinstine, Commander, U.S. Coast Guard, JBER
Bob Henszey, Fish & Wildlife Biologist, U.S. Fish & Wildlife Service
Rhea Hood, Archaeologist, U.S. National Park Service
Pete Probasco, Assistant Regional Director, U.S. Fish & Wildlife Service
Jeanne Proulx, Natural Resource Manager, Alaska Dept. of Natural Resources
Mary Romero, Project Manager, U.S. Army Corps of Engineers
James Rypkema, Environmental Program Manager, Alaska Dept. of Environmental Conservation
Glen Stout, Wildlife Biologist, Alaska Dept. of Fish & Game
Ronald Wall, Captain, Alaska State Troopers 'D' Detachment
Kristi Warden, Deputy Division Manager, Federal Aviation Administration
Ryan Winn, Field Office Project Manager, U.S. Army Corps of Engineers

State Parks, Refuges, and Critical Habitat Areas

A review of the Alaska Department of Fish & Game (ADF&G) Conservation Areas website (http://www.adfg.alaska.gov/index.cfm?adfg=protectedareas.locator) on September 26, 2016 revealed no state refuges, sanctuaries, critical habitat areas, or wildlife ranges within the study area.

National Parks, Preserves, Monuments, and Wild and Scenic Rivers, and Private Properties

A review of the National Park Service's website (https://www.nps.gov/hfc/carto/PDF/WEARmap1.pdf) was conducted on September 26, 2016 to determine if any National Parks, Preserves, Monuments, or Wild and Scenic Rivers exist in the study area. Cape Krusenstern National Monument is located approximately 8.5 miles to the south but does extend into the project study area. Noatak National Preserve is located approximately 45 miles to the east. None of these designated sites are within the study area. Kivalina Lagoon includes a small portion of the Alaska Maritime National Wildlife Refuge (Chukchi-Sea Unit); two islands, totaling 75 acres are owned by the Kivalina Sinuakmeut Corporation located directly east of Kivalina at the mouth of the Wulik River http://fws.maps.arcgis.com/apps/webappviewer/index.html?id=3eed8d6b30ea443dafe4380d70d0fa5el). Another 116 acres of the Refuge, owned by the same Corporation, is located 4 miles south and effectively constitutes the land spit separating the Imikruk Lagoon from the Chukchi Sea.

Navigable Waters

All tidal and marine waters are considered navigable, which in this case would include Kivalina Lagoon. Building a causeway over the lagoon would require a U.S. Army Corps of Engineers (USACE) Section 10 permit, and potentially a U.S. Coast Guard (USCG) Bridge permit if applicable. Neither the Kivalina nor the Wulik River are listed as navigable waters (http://www.poa.usace.army.mil/Portals/34/docs/regulatory/NavWat.pdf). DOT&PF and FHWA will coordinate with the USCG on permit requirements, if any.

Floodplain Management

Two rivers flow into Kivalina Lagoon: the Kivalina River at the northern end of the lagoon and the Wulik River at the southern end. The floodplains of both rivers are broad and braided. The Northwest Arctic Borough (NAB) implements flood prevention in code in order for communities, including the City of Kivalina, to participate in the National Flood Insurance Program (NFIP). Although Kivalina does not have a 100-year floodplain identified or mapped by the Federal Emergency Management Agency (FEMA), Flood Hazard Data from the USACE indicates that the limits of the 100-year floodplain is the 30-foot contour on the 1976 ADCRA Community Map. The proposed project area is at or below the 25-foot contour and therefore in the floodplain of the Kivalina and Wulik Rivers. Consideration of floodplain impacts will be included as part of the NAB permitting process for this project.

Water Resources and Water Quality

The Alaska Department of Environmental Conservation (ADEC) has delineated a drinking water protection area (http://www.arcgis.com/home/webmap/viewer.html?webmap=a1196dd615694cccb85fd9088212412e) for the Kivalina Water System which encompasses the Wulik River adjacent areas, including a portion the southern study area (PWSID: AK2340117). Water for the community of Kivalina is obtained from the Wulik River using a seasonal three-mile long surface transmission line (*Evacuation and School Access Road Route Reconnaissance Study, Native Village of Kivalina, 2014*). A search of ADEC data on September 26th, 2016 revealed no impaired waterbodies nor any water quality monitoring locations within the study area (http://www.arcgis.com/home/webmap/viewer.html?webmap=f7e8ca8c14fe4520b9e2e1498e3cdee3).

Wetlands and Vegetation

A search of the U.S. Fish and Wildlife (UFWS) National Wetlands Inventory (NWI) mapper (https://www.fws.gov/wetlands/Data/Mapper.html) identifies most the study area as mapped wetlands. In addition, a previous desktop wetland delineation and functional assessment completed for the NAB in 2015 identifies 95% of the study area as comprised of wetlands and Waters of the United States (*Wetland Delineation and Functions and Values Assessment Kivalina Evacuation Route Wetlands Mapping Study, NAB 2015*). Necessary permitting will be conducted in accordance with Section 404 and 10 of the Clean Water Act for unavoidable wetland impacts.

Fish and Fish Habitat

A diversity of marine and anadromous fish may be found in lagoon and/or rivers within the study area. Both the Kivalina and Wulik Rivers, as well as Kivalina Lagoon and a small connector stream, are identified in the ADF&G Alaska Waters Catalog (AWC) Fish Resource Monitor as anadromous waterbodies within the study area (http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.interactive). Species identified in these waterbodies are summarized in the table below:

Anadromous Stream Name	Anadromous Stream Number	Species Identified
Kivalina River	331-00-10044	Pink, chum, king, coho, sockeye, Dolly Varden (char)
Wulik River	331-00-10060	Pink, chum, king, coho, sockeye, Dolly Varden (char), whitefish
Kivalina Lagoon	331-00-10060-0010	Pink, chum, king, coho, sockeye, Dolly Varden (char), whitefish
Unnamed reach connecting Kivalina Lagoon and Kivalina River	331-00-10050	Pink, chum, coho, Dolly Varden (char)

Of the several species of anadromous whitefish found in the Wulik River and Kivalina Lagoon, sheefish (inconnu) are the largest. Arctic grayling are sometimes present in the Kivalina Lagoon. Rainbow smelt are indigenous to most all Chukchi Sea lagoons that are open to the sea. Several species of marine fish, some of which are relatively brackish-water tolerant, are found in Kivalina Lagoon and near-shore coastal waters. These include Bering flounder, yellowfin sole, starry flounder, saffron cod, Arctic cod, Pacific herring, sculpin, and capelin. Arctic cod and saffron are documented to appear in Kivalina Lagoon twice a year after freeze-up and in early July (*Subsistence Production in Kivalina, Alaska: A Twenty Year Perspective. Technical Report No. 128 prepared for the ADF&G Division of Subsistence. Juneau, Alaska. Burch, 1985*).

Kivalina residents rely heavily on fish as cultural and nutritional resources. In 2007, Kivalina harvested more than 54,000 fish. Of the estimated 79,000 edible pounds of fish and shellfish harvested, 86% were Dolly Varden. Safron cod, locally known as tomcod, comprised 2%, and salmon species made up 1% of the total. All other species fell below 1% (*Alaska Subsistence Salmon Fisheries 2007 Annual Report Technical Paper No. 346 prepared for the ADF&G Division of Subsistence. Anchorage, Alaska. Fall et al. 2009*). In the Kotzebue area, subsistence salmon fishing has few restrictions other than the general statewide provision. Standard conditions include prohibition of fishing within 300ft of a dam, fish ladder, weir, culvert or other artificial obstructions (Fall et al. 2009).

Essential Fish Habitat

The Arctic Fisheries Management Plan includes the study area in Essential Fish Habitat (EFH) designations for late juvenile and adult saffron and arctic cod, potentially for late juvenile and adult snow crab and arctic cod, and has determined that there is insufficient information for determine EFH for eggs, larvae and early juveniles of arctic cod and saffron cod and for larvae and early juveniles of snow crab. (http://www.npfmc.org/wp-content/PDFdocuments/fmp/Arctic/ArcticFMP.pdf#page=89. A Preliminary EFH Assessment has been completed by WHPacific in 2012. Any outstanding work will be completed and DOT&PF will consult with the National Marine Fisheries Service (NMFS) on effects to EFH and implementation of any proposed conservation measures.

Aquatic Wildlife

The study area is strongly influenced by seasonal ice cover. Ice directly affects the distribution and migration patterns of birds and marine mammals. Ice freezes to the bottom in the fall in shallow nearshore areas and many species of birds and marine mammals migrate south along the coast as sea ice advances. In spring, nutrients and sea ice algae trapped in the ice nourish primary production, resulting in a highly productive estuarine-like nearshore corridor which anadromous and marine fish, shorebirds, waterfowl, and some species of marine mammals take advantage off, including during their migration back north to feed and breed.

Marine Mammals:

Marine mammals are an essential part of the culture and food security in Kivalina year-round with different species occurring at different times of the year (IEA Chapter 4: Important Areas for marine mammals and coastal species). In the coastal area off Kivalina, marine mammal species include beluga whale (*sisuaq, Delphinapterus leucas*), gray whale (*aġviġluaq, Eschrichtius robustus*), bowhead whale (*aġvik, Balaena mysticetus*), bearded seal (*ugruk, Erignathus barbatus*), ringed seal (*natchiq, Phoca hispida*), spotted seal (*qasigiaq, Phoca largha*), and polar bear (*nanuq, Ursus maritimus*). In Kivalina Lagoon, marine mammals most frequently observed are bearded, spotted and ringed seals. Marine mammals that are consistently important for subsistence harvest are beluga, bearded seal and ringed seal (OCS EIS, 2007: http://www.boem.gov/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/2007-026-Vol%20I.pdf).

All marine mammals are protected under the Marine Mammal Protection Act, and, ringed seals and polar bear are also listed as Threatened under the Endangered Species Act (ESA).

Aquatic Birds:

The area around Kivalina is a staging area for migratory aquatic species in the spring and the fall and more than 100 species of birds, most of which are waterfowl and shorebirds have been identified in this region (*Red Dog Mine Extension Aqqaluk Project Final Supplemental EIS, 2009*), including Canada geese (*Branta canadensis*), greater white-fronted goose (*Anser albifrons*), tundra swan (*Cygnus columbianus*) and all four species of loon. Both Steller's Eider (*Polysticta stelleri*) and the Spectacled eider (*Somateria fischeri*) are also known to be in this area, both of which are listed as Threatened under ESA (*Environmental Assessment and Finding of No Significant Impact: Section 117 Expedited Erosion Control Project, Kivalina, USACE, Alaska District, 2007*). Specifically, the presence of open water and emergent vegetation in the sedge-grass marshes associated with ponds and the riparian low shrub areas along the Kivalina and Wulik river drainages provide suitable inland breeding and molting habitat for species such as the Canada goose. The near-shore areas and lagoon provide habitat for the yellow-billed loon (*Gavia adamsii*), which feeds on fish and invertebrates in the marine environment as well as in freshwater. Yellow-billed loons nest exclusively in coastal and inland low-lying tundra from 62° to 74° N latitude, in association with permanent, fish-bearing lakes. Waterfowl are important birds harvested for subsistence. Migratory aquatic birds are protected under Migratory Bird Treaty Act.

Terrestrial Wildlife

Terrestrial Birds:

More than 100 species of birds migrate from the lower 48 states and Central and South America, to nesting, breeding, and rearing grounds in the State of Alaska. Five species have been identified as species of concern for northern Alaska, including the gyrfalcon (*Falco rusticolus*), snowy owl (*Bubo scandiacus*), gray-cheeked thrush (*Catharus minimus*), Smith's longspur (*Calcarius pictus*), and hoary redpoll (*Acanthis hornemanni*) (BPIF 1999 cited in Red Dog Mine EA). Within the project area, riparian corridors of willow and alder shrubs likely contain the highest diversity of land birds. In addition to these long-distant migrants, the general area also has occurrences of raptors like golden eagles (*Aquila chrysaetos*), gyrfalcon and peregrine falcons (*Falco peregrinus*) (which are known to nest along in the rocky cliffs of the area close to Red Dog Mine (Red Dog Mine Supplemental EIS, 2009). In addition, willow (*Lagopus lagopus*) and rock ptarmigan (*Lagopus muta*) appear to occur in low shrub and tussock tundra in the region, and are considered the most important terrestrial birds for subsistence. Migratory birds are protected under the Migratory Bird Treaty Act. Golden eagles are further protected under the Bald and Golden Eagle Protection Act of 1940.

Terrestrial Mammals:

Five species of large terrestrial mammals are known to occur in the study area: caribou (*Rangifer tarandus*), moose (*Alces alces*), muskox (*Ovibos moschatus*), Dall sheep (*Ovis dalli*), and brown bear (*Ursus arctos*). Caribou, moose, and Dall sheep have historically been and continue to be important subsistence resources for Kivalina. Common furbearers in the project area include wolves (*Canis lupus*), wolverine (*Gulo gulo*), red fox (*Vulpes vulpes*), arctic fox (*Alopex lagopus*), lynx (*Felis lynx*), marten (*Martes americana*), and mink (*Mustela vison*). Many of these species are important to hunters and trappers in the region for their pelts, which are used to make traditional Alaska Native crafts and clothing (Red Dog Mine Supplemental EIS, 2009).

Caribou:

Caribou are the principal terrestrial subsistence animal in the region and are hunted in the tundra hills behind Kivalina. A 1992 ADF&G subsistence survey conducted in the community indicated a harvest of 351 caribou—18.2% of the total subsistence harvest (OCS EIS, 2007). Local caribou are part of the Western Arctic Herd the largest caribou herd in the State of Alaska and one of the largest in the world (Red Dog Mine Supplemental EIS) that migrates annually in large numbers through the region. Most caribou are harvested in the fall when the main migration reaches the Kivalina area, but they are also hunted throughout the winter, as available, and shot opportunistically year-round. Winter distributions, in both numbers and location, are highly variable and may be dependent on local weather conditions (*U.S. Environmental Protection Agency Draft Environmental Impact Statement Red Dog Mine Project Northwest Alaska, February 1984*). Most of the spring migration occurs well to the east of Kivalina (Red Dog Mine Supplemental EIS, 2009).

Other Species:

Moose: Moose in the Kivalina area are part of Game Management Unit 23. During winter, moose are found along the drainages of the Wulik and Kivalina rivers. Compared to other populations in Alaska, moose in this area are considered to be of low density (OCS EIS 2007, Red Dog Mine Supplemental EIS, 2009).

Muskoxen: Reintroduced in 1970, the Cape Thompson population, ranging from the Noatak River north to Cape Lisburne remains fairly small (around 300 animals), and is generally found within 15 miles of the coast (Red Dog Mine Supplemental EIS, 2009).

Dall Sheep: Dall sheep are prized for their meat, fat, sinew, skins, and horns and hunted in the upper Wulik and Kivalina River drainages (OCS EIS, 2007). Kivalina hunters reported taking about 25 Dall sheep in the 25 years prior to 1991.

Brown Bear: Brown bears occur in the area throughout the year, making use of a variety of habitats (Red Dog Mine Supplemental EIS, 2009). In spring, bears use alpine slopes, shifts to lowland or coastal areas during summer, and during fall in particular, can be found around salmon spawning streams.

Protected Species and Habitats

Threatened and endangered species are managed under the ESA, requiring federal agencies to ensure that all activities they "authorize, fund, or carry out" do not jeopardize the continued existence of any threatened or endangered species or designated critical habitat. Migratory birds are protected by the Migratory Bird Treaty Act of 1918. Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), issued in 2001, requires the evaluation of the effects of federal actions on migratory birds, with an emphasis on species of concern. Although eagles are not considered rare in this part of Alaska, another potential regulatory mechanism that applies to wildlife in the study area is the Bald and Golden Eagle Protection Act of 1940. Marine mammals are further protected by the Marine Mammal Protection Act of 1972. Fish and fish habitat have further protection if federally designated under EFH in the Magnuson-Stevens Fishery Conservation and Management Act.

On a State level, water bodies listed in the AWC are considered important to anadromous fish species and are afforded protection under Alaska Statute 16.05.871. For other wildlife, it should be noted that as of August 15, 2011, the Alaska Department of Fish and Game (ADF&G) no longer maintains a Species of Special Concern list. The list has not been reviewed and revised since 1998 and is no longer considered valid. Instead ADF&G currently uses the Alaska Wildlife Action Plan to assess the needs of species with conservation concerns, and to prioritize conservation actions and research.

Species that fall under these formal protections and may occur in the study area include all species of Pacific salmon, ringed, bearded and spotted seals, beluga whales, spectacled and Steller's eider, and all migratory birds (see specific sections above for details).

Historical, Architectural, Archeological, and Cultural Resources

Twenty-nine Alaska Heritage Resource Survey (AHRS) sites are currently located within or directly adjacent to the study area (see Table below). Twenty-four of these are archaeological resources and potential historic structures located within the community of Kivalina. Three sites, including the remains of a camp (NOA-301), meat caches and icehouses (NOA-298), and a reindeer corral and processing site (NOA-302), are located within the study area south of the mouth of the Wulik River. One site, the Ualliik Trail (NOA-304) is mapped outside of the study area but historically followed the east bank of the Wulik River into the study area. Additionally, the boundaries of the Cape Krusenstern National Historic Landmark (NHL), which extends more than 10 miles northwest of the Cape Krusenstern National Monument boundary, encompasses a portion of the south half of the study area.

An archaeological predictive model prepared for this project in January 2016 and results of a reconnaissance investigation completed in September 2016 suggest that locally proposed route corridors and material source areas encompass landforms with increased potential for containing archaeological resources. FHWA and DOT&PF will consult with the State Historic Preservation Officer (SHPO), Tribal entities, and the National Park Service in accordance with Section 106 of the National Historic Preservation Act (NHPA) and Section 4(f) of the DOT Act of 1966 to identify resources that may be adversely affected by the proposed undertaking.

Alaska Heritage Resource Survey (AHRS) sites

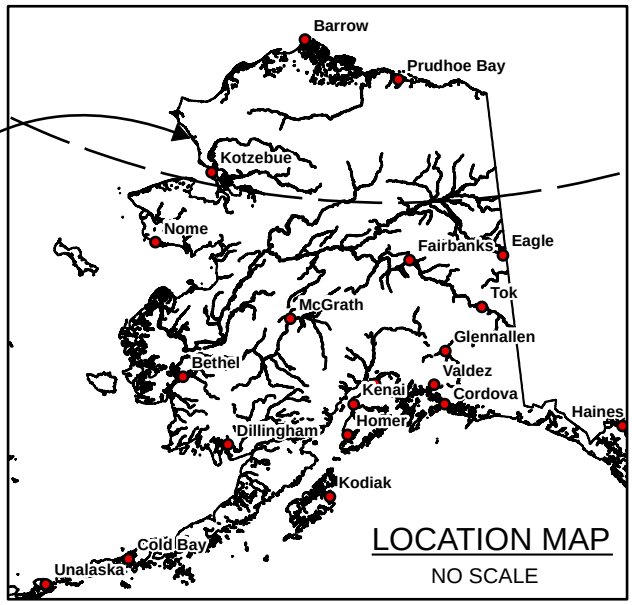
AHRS #	Approx. Location (relative to nearest Proposed Project Element)	Description	DOE Status
NOA-004	0.30 mile SE of Southern Route Causeway	Kivalina Village	Unevaluated
NOA-042	Encompasses southern portions of North/Combined and Southern Routes	Cape Krusenstern Archaeological District	National Historic Landmark
NOA-298	1.60 miles southeast of Southern Route	Meat Caches/Icehouses	NRHP Eligible
NOA-301	1.53 miles southeast of Southern Route	Camp	NRHP Eligible

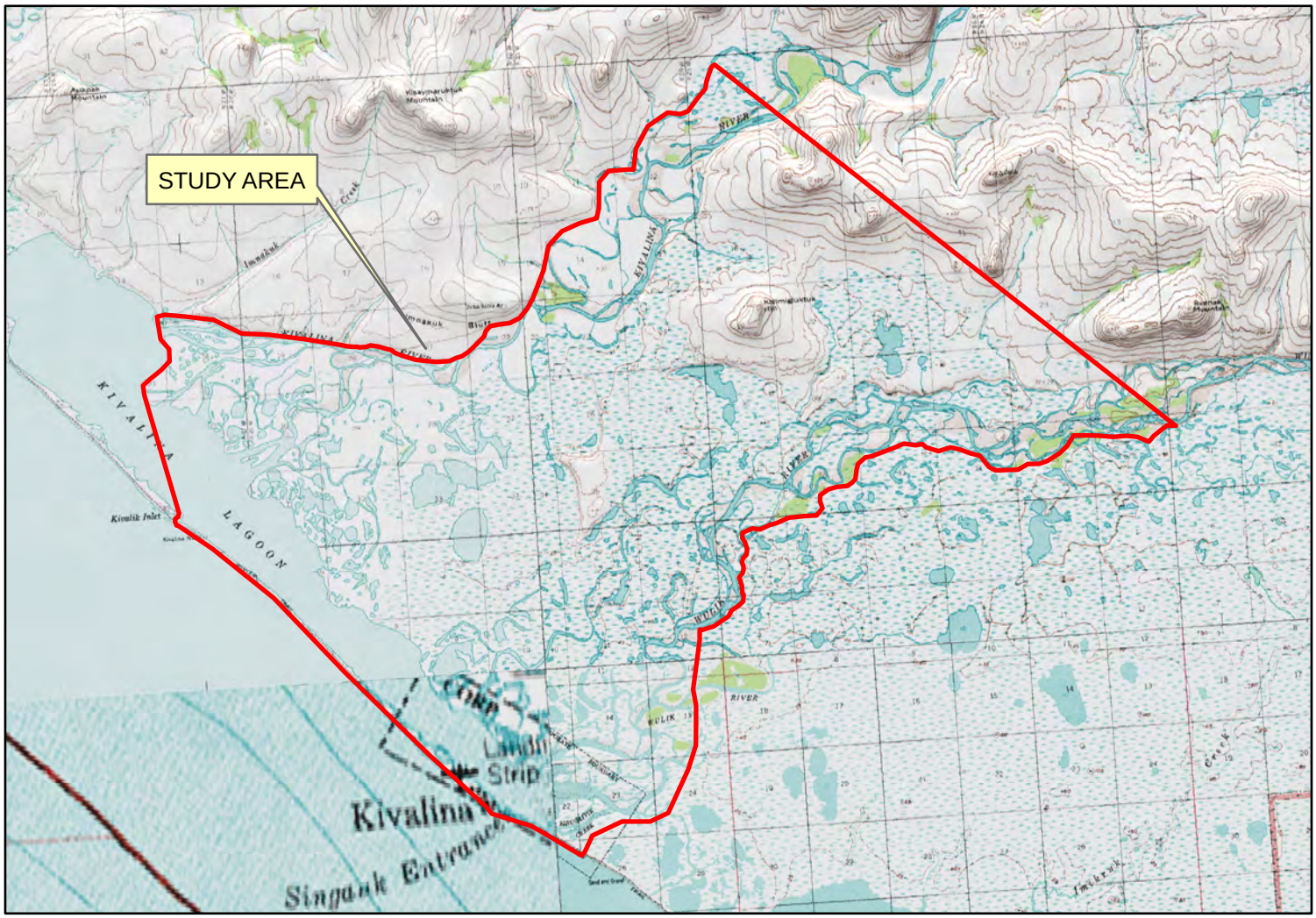
AHRS #	Approx. Location (relative to nearest Proposed Project Element)	Description	DOE Status
NOA-302	1.55 miles southeast of Southern Route	Reindeer Corral and Processing Site	NRHP Eligible
NOA-304	1.80 miles southeast of Southern Route	Ualliik Trail	Unevaluated
NOA-311	0.50 mile southeast of Southern Route Causeway	Single Story Wood Frame Structure	Unevaluated
NOA-312	0.50 mile southeast of Southern Route Causeway	Single Story Wood Frame Structure	Unevaluated
NOA-313	0.45 mile southeast of Southern Route Causeway	Single Story Wood Frame Structure	Unevaluated
NOA-314	0.20 mile southeast of Southern Route Causeway	Two Story Wood Frame Structure	Unevaluated
NOA-315	0.38 mile southeast of Southern Route Causeway	Kivalina Cemetery (used prior to the mid-1940s)	Unevaluated
NOA-316	0.38 mile southeast of Southern Route Causeway	Kivalina Cemetery #2	Unevaluated
NOA-317	0.40 mile southeast of Southern Route Causeway	Eroding Human Remains and Artifacts	Unevaluated
NOA-318	0.50 mile southeast of Southern Route Causeway	Eroding Human Remains and Artifacts	Unevaluated
NOA-319	0.55 mile southeast of Southern Route Causeway	Human Remains	Unevaluated
NOA-320	0.57 mile southeast of Southern Route Causeway	Eroding Human Remains	Unevaluated
NOA-321	0.50 mile southeast of Southern Route Causeway	Human Remains	Unevaluated
NOA-322	0.53 mile southeast of Southern Route Causeway	Possible House Pit Depressions	Unevaluated
NOA-323	0.42 mile southeast of Southern Route Causeway	Possible Gravesite and Historic Sod House	Unevaluated
NOA-324	0.41 mile southeast of Southern Route Causeway	Burial Structure	Unevaluated
NOA-325	0.15 mile southeast of Southern Route Causeway	Human Remains	Unevaluated
NOA-326	0.15 mile southeast of Southern Route Causeway	Human Remains and Burial Box	Unevaluated
NOA-327	0.15 mile southeast of Southern Route Causeway	Artifacts	Unevaluated
NOA-328	0.15 mile southeast of Southern Route Causeway	Historic Sod Houses	Unevaluated
NOA-339	0.48 mile southeast of Southern Route Causeway	Non-human Faunal Remains	Unevaluated
NOA-362	0.40 mile southeast of Southern Route Causeway	Buried Wood Structure; Human Remains	Unevaluated
NOA-587	0.35 mile southeast of Southern Route Causeway	Kivalina Federal Scout Readiness Center	Recommended Not Eligible
NOA-591	0.25 mile southeast of Southern Route Causeway	Artifact Scatter	Unevaluated
NOA-592	0.27 mile southeast of Southern Route Causeway	Possible Historic Sod House	Unevaluated

Hazardous Materials, Pollution Prevention, and Solid Waste

A search of the ADEC *Contaminated Sites Database* identified only one site in the study area. This site, ADEC# AKARNG Kivalina FSA, is recorded as having its cleanup complete. A 6.5- acre Class 3 unpermitted municipal landfill is located within the study area, approximately 0.3 miles north of the Kivalina Airport runway and surrounded by the Chukchi Sea to the west and the Kivalina Lagoon to the east. Possible contaminants at this site include construction and demolition waste, asbestos, and sewage. Honey bucket waste is comingled with solid waste at this site.

PROJECT LOCATION





0 1.25 2.5 5 Miles

Northwest Arctic Borough
Alaska Department of Transportation and Public Facilities - Northern Region

Location & Vicinity Map
Project Number: 0002384/NFHWY00162

DATE: November 2016 | FIGURE 1

N
W E
S

Kivalina River

Kivalina River Depositional Zone

Kisimigiuqtuq Hill

School Site

Simiq Hill

Wulik River Relic Channel

Wulik River Depositional Zone

Wulik River

Kivalina

NOTES:

*Access routes shown are from "Evacuation and School Access Road Project, Kivalina, Alaska, Route reconnaissance Study; submitted to Native Village of Kivalina, submitted by WHPacific (revised June 2014).

The imagery background is WV-2 satelltie imagery from July 2016.

Legend

- North Access Route*
- Combined Access Route*
- South Access Route*
- Native Allotments
- Potential Material Sources
- Project Study Area

0 0.5 1 2 Miles

DATE: November 2016

FIGURE 2

STUDY AREA AND POTENTIAL SITES
PROJECT NUMBER: 0002384/NFHWY00162

Alaska Department of Transportation & Public Facilities

Kivalina Evacuation & School Site Access Road

Fall, 2016

Summary of AGENCY Scoping Comments

AGENCY	AGENCY COMMENT SUMMARY	RESPONSE/ NEXT STEPS
National Park Service (NPS) Primary Point of contact: Rhea Hood Rhea_hood@nps.gov 907-644-3460	**Section 106/4F:** The project study area lies within the boundary of the Cape Krusenstern Archeological District National Historic Landmark. The NPS is interested in identification and evaluation of cultural resources in the study area, proposed ground disturbing activities, and mitigation actions.	
USFWS Primary Point of contact: Robert J. Henszey Branch Chief Planning & Coordination Kaithryn Ott 907-456-0277 Kaithryn_ott@fws.gov	**ESA:** The project is within the range of three species listed as threatened under the ESA of 1973: Spectacled Eiders & Alaska-breeding Steller's eiders – low numbers may migrate through the area, but they are not known to nest in the area. Polar bears – the project area is within Unit 3, barrier island habitat designated as critical polar bear habitat. Polar bears may occasionally pass through the area in low densities, but denning is rare and encounters are expected to be infrequent. USWFS recommends a Polar Bear Interaction Plan be developed (or provided by them) for personnel to follow in the event of an encounter. **Migratory Birds:**	

	USFWS recommends no land disturbing activities between May 20 to July 20 to minimize disturbance to nesting birds in accordance with the Migratory Bird Treaty Act (MBTA). **Material Sources:** USFWS recommends development of K-Hill as a material source, citing it as the least impactful material source to wetlands and fish habitat. The Wulik and Kivalina river material sources should be avoided due to potential impacts to EFH for Salmon and Dolly Varden. Depleted material pits may develop into deepwater traps that are disruptive to important fish habitat. **Causeway:** USFWS recommends maintaining existing physical and ecological processes within Kivalina Lagoon; including: 1. Connectivity for wildlife passage and fish spawning in the lagoon. 2. Accommodating tidal shifts 3. Promoting natural sediment transport **Miscellaneous:** If power is to be run to the evacuation site on K-Hill, USWFS recommends a buried line to avoid impacts to migratory birds. Alternatively (not preferred), overhead power lines can be used in conjunction with installation of fixed-tag bird flight diverters. If any portions of the road are to be lighted, USFWS recommends shielding the lights to reduce outward-radiating light. BMP's to mitigate propagation of invasive weeds is recommended. USFWS prefers the northern route because they perceive it to be the least impactful to higher value wetlands and riverine habitat. They also anticipate lower maintenance costs to maintain the northern route, citing potential changes in the Wulik river meander path potentially becoming an erosion control challenge for the southern route.	

Department of Natural Resources (DNR) Primary point of contact: Dianna Leinberger Natural Resource Manager Division of Mining, Land & Water 907-451-2728 dianna.leinberger@alaska.gov AJ Wait Natural Resource Manager 907-451-2777 Aj.wait@alaska.gov Julie Smith Natural Resource Manager 907-451-3010 Julie.smith@alaska.gov	**DNR Land:** An Easement from DNR will be required for the Lagoon Crossing. Public notice and appeal period will apply, and easement applications should be submitted a year in advance. AJ Wait is the contact for easements. **Material Sources:** The Kivalina and Wulik Rivers are considered navigable rivers by the State of Alaska. A material sales agreement and full disposal of interest decision with DNR will be required in order to mine from designated material sites/sources within tidelands, shorelands/submerged lands, or islands determined to have emerged from the bed of the navigable rivers which passed to the state. A mining and reclamation plan needs to be submitted for DNR review for any material sources (private or state interest) within the State of Alaska. Julie Smith is the contact for material sources. Material source applications should be submitted a year in advance.	
Alaska State Historic Preservation Office (AK SHPO) Primary point of contact: Mark W. Rollins Archaeologist II 907-269-8722 Mark.rollins@alaska.gov	**Section 106:** There are several cultural resources within the study area and potential for archaeological sites along the proposed corridor. SHPO will seek further identification efforts once the APE is developed. The APE should be broad enough to encompass areas within which an undertaking may directly or indirectly affect historic properties.	

AK SHPO, Scoping Response:

From: Rollins, Mark W (DNR)
Sent: Friday, November 25, 2016 3:10 PM
To: Schacher, Sarah E (DOT)
Cc: Gamza, Thomas A (DOT)
Subject: Kivalina Evacuation and School Site Access Road, Request for Scoping Comments

Hi Sarah,

The Alaska State Historic Preservation Office (AK SHPO) has no additional information regarding identified cultural resources (historic, prehistoric, and archaeological sites, locations, remains, or objects) at this time for the subject project. We look forward to future consultation on additional draft alternatives anticipated to be identified during the NEPA process and recommend DOT&PF include all potential material sources and route alternatives in the area of potential effects (APE). If you have any questions about developing the APE, once alternatives are identified, we are happy to assist you. As you noted in Appendix A of your letter, there are several cultural resources within the study area and potential for archaeological sites along the proposed route corridors, as such we look forward to reviewing the archaeological predictive model and report from the fieldwork completed in September, 2016. Please note that if additional alternatives are located outside of the fieldwork conducted in September, 2016 that additional archaeological investigations may be appropriate. Before further identification is considered, we recommend DOT&PF establish an APE.

As a reminder, The APE should encompass the geographic area within which an undertaking may directly or indirectly affect historic properties. Following the establishment of the APE, any potential historic properties within the APE must be evaluated for eligibility for inclusion to the National Register of Historic Places *(36 CFR § 800.4).* The nature of project effects on any historic properties, including those listed in or eligible for inclusion in the National Register of Historic Places, will need to be assessed *(36 CFR § 800.5).* Adverse effects to eligible historic properties will need to be resolved through mitigation measures developed in consultation with our office *(36 CFR § 800.6).*

As more information becomes available, we will work with DOT&PF and consulting parties to avoid, minimize, and/or mitigate effects to historic properties. We look forward to further consultation with DOT&PF for this project in accordance with the 2014 *Programmatic Agreement… for the Federal-Aid Highway Program in Alaska* and Section 106 of the National Historic Preservation Act.

Thank you for submitting the scoping materials for the subject project for our review and comment. If you have any questions about cultural resources please contact me or Northern region's Professionally Qualified Individual (PQI) Tom Gamza.

Mark W. Rollins

Archaeologist II

Alaska State Historic Preservation Office/ Office of History and Archaeology

550 West 7th Avenue, Suite 1310

Anchorage, AK 99501

(907) 269-8722

National Park Service, Scoping Comments:

From: Hood, Rhea [mailto:rhea_hood@nps.gov]
Sent: Tuesday, November 29, 2016 12:22 PM
To: Schacher, Sarah E (DOT)
Subject: Kivalina Evacuation and School Site Access Road 0002384/NFHWY000162

VIA ELECTRONIC MAIL: NO HARD COPY TO FOLLOW
IN REPLY REFER TO:
8.A.4 (AKRO-RCR)

National Park Service
240 W. 5th Ave.
Anchorage, AK 99501

Sarah E. Schacher, P.E.
2301 Peger Road
Fairbanks, AK 99709

Dear Ms. Schacher,

Thank you for your letter of November 11, 2016, requesting National Park Service preliminary review and comment of the proposed Kivalina Evacuation and School Site Access Road Project.

The NPS administers the National Historic Landmark program for the Secretary of the Interior. The NPS serves as an interested party throughout the Section 106 process to help ensure the integrity of the NHL, which includes consultation prior to an agency making a determination of effect.

Based on the project description you provided, the entire project study area is within the boundary of the Cape Krusenstern Archeological District National Historic Landmark (attachment). Kivalina is part of the NHL because of its evidence of precontact occupation, and because of the understanding that currently submerged lands and wetlands were dry during the Pleistocene and have potential for research on the history of that period. We are interested in the process of identification and evaluation of cultural resources in the study area, activities or construction that will involve ground disturbance in the study area, and mitigation actions during and after construction of the access road.

Please direct questions and correspondence to me at (907) 644-3460 or rhea_hood@nps.gov. We look forward to working with you to minimize harm to this important property.

Sincerely,

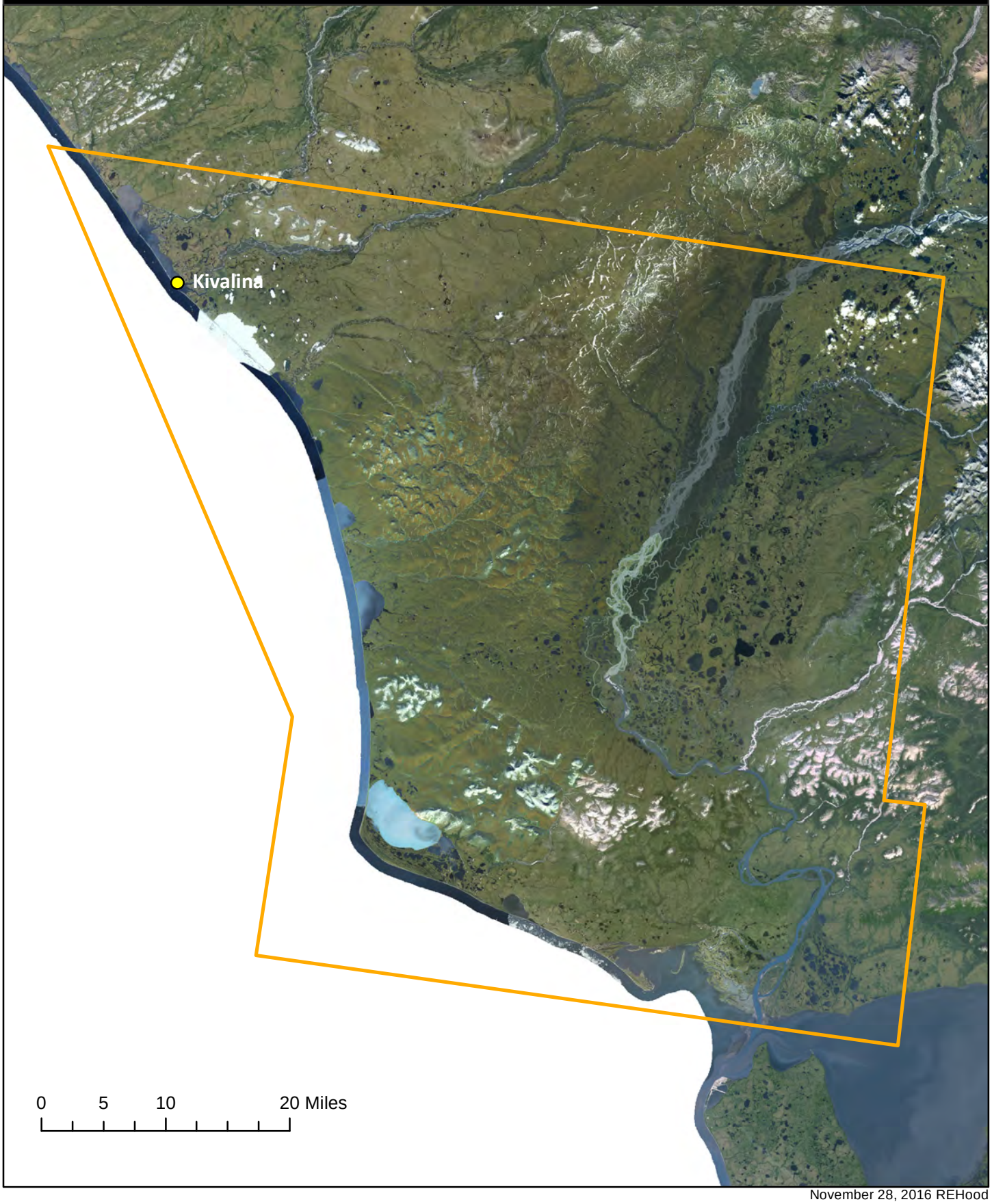
/s/ Rhea Hood

Rhea Hood

Archeologist, National Register of Historic Places Program

Cape Krusenstern Archeological District
National Historic Landmark Boundary
NOA-00042

National Park Service
Alaska Regional Office
Cultural Resources



November 28, 2016 REHood

Alaska Department of Natural Resources, Scoping Comments:

From: "Leinberger, Dianna L (DNR)" <dianna.leinberger@alaska.gov>
To: "Schacher, Sarah E (DOT)" <sarah.schacher@alaska.gov>
Cc: "Wait, Alexander J (DNR)" <aj.wait@alaska.gov>, "Smith, Julie A (DNR)" <julie.smith@alaska.gov>
Subject: FW: Kivalina Evacuation and School Site Access Road 0002384/NFHWY000162: Request for Agency Scoping Comments by 12/12/2016

Hello,

Thank you for the opportunity to provide comment during scoping notice for the Kivalina Evacuation and School Site Access Road. The Department of Natural Resources (DNR), Division of Mining, Land and Water (DMLW), Northern Region Lands Office has reviewed the material and has the following comments.

1. The State received title to the affected lands beneath navigable waters under the Alaska Statehood Act (P. L. 85-508) and the Submerged Land Act of 1953 (P.L. 31, 83rd Congress, First Session; 67 Stat. 29) as well as the Equal Footing Doctrine, which declares that all new states enter the Union on an equal footing with the original states with respect to sovereign rights and powers to include ownership of the beds of navigable waters. The proposed alternatives all cross the Kivalina Lagoon and therefore will require an easement from DNR, DMLW. Easements are a type of disposal of interest and therefore require a public process that involves public notice and an appeal period; therefore project planners should consider this when developing timelines for permitting. Submitting an easement application a year in advance would be best. For any easement related questions, please contact AJ Wait, Natural Resource Manager, at aj.wait@alaska.gov or at 451-2777.

2. While USACE does not list the Kivalina or the Wulik Rivers as navigable, they are considered navigable by the State of Alaska. Any material mined from tidelands, shorelands or submerged lands, or from islands determined to have emerged from the bed of the navigable rivers which passed to the State are state land/resources and a material sale will be required. In order to issue material sale contracts, DMLW will need to designate the sites as material sites/sources which will require a full disposal of interest decision to determine if the action is in the best interests of the State; therefore project planners should consider this when developing timelines for permitting. Submitting applications a year in advance would be best. For any material site/sale questions, please contact Julie Smith, Natural Resource Manager, at julie.smith@alaska.gov or at 451-3010.

3. DNR, DMLW reviews all mining and reclamation plans for all material site mining within the State regardless of land ownership, so a mining and reclamation plan should be submitted for DNR, DMLW review/approval (AS 27.19). Any non-state land mining and reclamation plans may be submitted to Julie Smith.

DNR, DMLW understands this is an important project for the people of Kivalina and we look forward to working with the community, the Northwest Arctic Borough, and state and federal agencies on this

project. Thank you again for the opportunity to comment. If you have any questions or we can provide additional information, please let us know.

Sincerely,

Dianna

Dianna Leinberger
Natural Resource Manager
Northern Region Office
Division of Mining, Land & Water
Department of Natural Resources
(907) 451-2728

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
Planning and Consultation Branch
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
December 12, 2016

Sarah E. Schacher
Preconstruction Engineer
Department of Transportation and Public Facilities
Northern Region
2301 Peger Road
Fairbanks, Alaska, 99709-5316

Re: Kivalina Evacuation and School Site Access Road
0002384/NFHWY00162
Request for Scoping Comments

Dear Ms. Schacher:

The U.S. Fish and Wildlife Service (Service) has reviewed the Request for Scoping Comments by The Alaska Department of Transportation and Public Facilities (ADOT&PF) to construct an all-season evacuation road between Kivalina Island and Kisimigiuqtuq Hill (K-hill; Figure 1). We understand ADOT&PF and FHWA are reviewing three preliminary route options (Figure 2):

- A northern route of approximately 9.1 mi (14.6 km), originating at the south end of the Kivalina Airport runway. This route would run north on the east side of the barrier island for approximately 1.5 mi (2.4 km), cross the lagoon eastward via a causeway or bridge, and then proceed along higher (drier) ground between the Wulik and Kivalina rivers to the terminus at K-Hill;
- A southern route of approximately 6.9 mi (11.1 km), originating at the south end of the Kivalina Airport runway. This route would immediately cross the lagoon eastward via a causeway or bridge, and proceed through low-lying wetlands along relic channels of the Wulik River to K-Hill; and
- A combined route of approximately 8.6 mi (13.8) would follow the northern route before merging with the southern route via a 1-mi (1.6 km) connecting segment.

In addition, four potential material source locations have been identified in the project area. These include: K-Hill, the Wulik River deposition zone, Wulik River relic channels, and the Kivalina River deposition zone (Figure 2).

Recommendations: The Service recognizes the purpose and need for the proposed project and appreciates the opportunity to comment on these preliminary options. We offer the following recommendations to help reduce adverse impacts from the proposed project to fish, wildlife, and habitat.

Threatened and Endangered Species: The proposed project is within the range of three species listed as threatened under the Endangered Species Act of 1973 (ESA), as amended: spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*). Additionally, the project area occurs within Unit 3, barrier island habitat, of designated polar bear critical habitat (75 FR 76085).

Although low numbers of spectacled and Steller's eiders may migrate through the project area, neither species is currently known to nest in the region. Polar bears may occasionally pass through, or rarely den, in the area, although their density is very low and encounters are expected to be infrequent. The Service recommends the applicant develop a Polar Bear Interaction Plan for personnel to follow in the unlikely event that a polar bear enters the project area. Alternatively, if desired by the applicant, the Service can provide standard *Polar Bear Interaction Guidelines*.

When the project description is finalized and the permitting process begins, the Service will conduct section 7 consultation under the ESA for the proposed project. The lead Federal action agency (i.e., the federal funding or permitting agency) will be responsible for initiating section 7 consultation.

Migratory Birds: Migratory bird nests, eggs, or nestlings could be destroyed if work is conducted in nesting habitat during the spring and summer breeding season, which is generally May 20 through July 20 in the proposed project area. The Migratory Bird Treaty Act (MBTA) prohibits the willful killing or harassment of migratory birds. To minimize disturbance to nesting birds and help comply with the MBTA, we recommend land disturbing activities (e.g., clearing, excavation, fill, brush hogging, etc.) not occur from May 20 to July 20. For more information on timing guidelines for land disturbance activities, please refer to the following link: http://www.fws.gov/alaska/fisheries/fieldoffice/anchorage/pdf/vegetation_clearing.pdf (please also note these guidelines are currently under revision).

In addition, the scoping letter does not identify a source of electrical power for the evacuation site on K-Hill. The Service recommends avoidance of overhead powerlines by burying power cables in the roadbed, or by providing on-site power generation. If overhead powerlines would be proposed to connect the evacuation site on K-Hill to the existing power supply in Kivalina, migratory birds (including listed eiders) would be at risk of collision with the overhead lines. Birds in flight suffer considerable mortality from collisions with man-made objects (Manville 2004). Birds involved in collisions with man-made objects may also experience sever injuries including concussions, internal hemorrhaging, and broken bones. Birds in flight are particularly at risk of collision when visibility is impaired by darkness or inclement weather (Weir 1976); conditions which are common in northwest Alaska. Overhead power lines would also constitute a long-term, if not permanent, collision risk to all migratory birds.

Therefore, if overhead powerlines cannot be avoided, the Service recommends installation of fixed-tag bird flight diverters similar to the FireFly™ (Figure 3) to increase visibility of any overhead lines and reduce collision risk for migratory birds. Recent analysis suggest line marking devices placed at adequate spacing are likely to reduce collision rate by 50-80% (APLIC 2012).

Finally, if lighting would be proposed for the road corridor or evacuation site at K-Hill, the Service would recommend incorporation of design features (e.g., shielding to reduce outward-radiating light) to minimize the potential for attracting and disorienting migratory birds.

Evacuation Road Route: The Service considers wetlands, ponds, sloughs, watercourses, and riparian areas to be higher-value habitat types where impacts should be avoided or minimized. Although the Northern route is longer, 9.1 m (14.6 km), it avoids riverine and wetland habitats within the floodplain of the Wulik River (Figure 2). While the Southern and Combined routes take a more direct path, and may initially be more economical to develop, due to the dynamic nature of the Wulik River meander plain, both the Southern route and eastern portion of the Combined route would likely be more costly to maintain in the long-term. Additionally, the Northern route would largely avoid traversing important riverine and wetland habitats in the project area, and would therefore be the least impactful alternative. Therefore, because the Northern route would be the least impactful to wetland habitat, and represents the lowest-maintenance, long-term alternative, the Service recommends selection of the Northern route for the proposed Kivalina Evaction Road.

Material Sources: The Service recommends avoiding development of the three potential material sources within the Wulik and Kivalina rivers (e.g., the Wulik River deposition zone, Wulik River relic channels, and the Kivalina River deposition zone). The Kivalina and Wulik rivers are important spawning, rearing, and migratory habitat for King (*Oncorhynchus tshawytscha*), Sockeye (*Onchorhynchus nerka*), Pink (*Onchorhynchus gorbuscha*), Coho (*Onchorhynchus kisutch*), and Chum salmon (*Onchorhynchus keta*), as well as Dolly varden (*Salvelinus malma*) (WHPacific 2012). Gravel mining within the Kivalina or Wulik river channels could be problematic because once material sources are depleted, they would likely fill with water and potentially become anoxic deepwater traps for overwintering fish. Due to the potential for disrupting important fish habitat from in-channel material extraction, and the importance of the local fisheries to subsistence, we recommend against development of any material source within the Kivalina or Wulik river channels.

Instead, the Service advocates for development of the K-Hill material source. Because the K-Hill source is located 1) in drier habitat outside the Wulik and Kivalina river channels, and 2) proximal to the evacuation road terminus at K-Hill, the Service believes development of this material source would be least impactful to important local fisheries and wetland habitat.

Kivalina Lagoon Causeway/Bridge: To avoid and minimize impacts to marine mammals and anadromous fish species, the Service recommends any crossing of Kivalina Lagoon should maintain normal physical and ecological processes within the lagoon by promoting natural sediment transport patterns, accommodating tidal shifts, and maintaining functional connectivity for wildlife passage and fish spawning.

Invasive Weeds: River corridors provide an easy pathway for spreading invasive species and the Service recommends implementing Best Management Practices (BMPs) for minimizing the introduction and proliferation of invasive species. BMPs can include establishing an equipment cleaning practice, invasive species education for staff and contractors, scheduling work at times when plants do not have viable seeds, using certified weed-free gravel and erosion control products, controlling invasive species at material sites, disposing of spoil and vegetation contaminated with invasive species appropriately, revegetating with local native plant species,

and developing a monitoring and treatment plan. For more assistance with managing for invasive species in the project area, please contact our office.

Mitigation: Service policy regarding impacts to fish and wildlife habitat includes first avoiding, then minimizing, and finally compensating for any remaining unavoidable impacts. These impacts include direct, indirect, and temporal impacts. If there are unavoidable project impacts, then the Service recommends compensatory mitigation for the unavoidable impacts by restoring or permanently protecting equal or higher-value wetlands as described in the 2008 Final Compensatory Mitigation Rule (33 CFR 325 and 332).

We appreciate this opportunity for early comment. If you need further assistance, please contact Kaithryn Ott at 907-456-0277 or *kaithryn_ott@fws.gov*.

Sincerely,

Robert J. Henszey
Branch Chief
Planning and Consultation

ecc: Susan Georgette, Refuge Manager, U.S. Fish and Wildlife Service
Mary Romero, U.S. Army Corps of Engineers

Literature Cited

Avian Power Line Interaction Committee (APLIC). 2012. *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*. Edison Electric Institute and APLIC. Washington, D.C.

Manville, A.M., II. 2004. Bird strikes and electrocutions at power lines, communication towers, and wind turbines; State of the art and state of the science – next steps towards mitigation. Proceedings 3rd International Partners in Flight Conference, March 20-24, 2002, Asilomar Conference Grounds, CA. USDA Forest Service General Technical Report PSW-GTR-191. 25 pp.

Weir, R. 1976. Annotated bibliography of bird kills at man-made obstacles: a review of the state of the art and solutions. Unpublished report prepared for Department of Fisheries & Environment, Canadian Wildlife Service-Ontario Region.

WHPacific. 2012. Native Village of Kivalina Evacution route significant biological resources baseline report and preliminary essential fish habitat analysis. Prepared for Maniilaq Association on behalf of: Native Village of Kivalina. 41 pp.

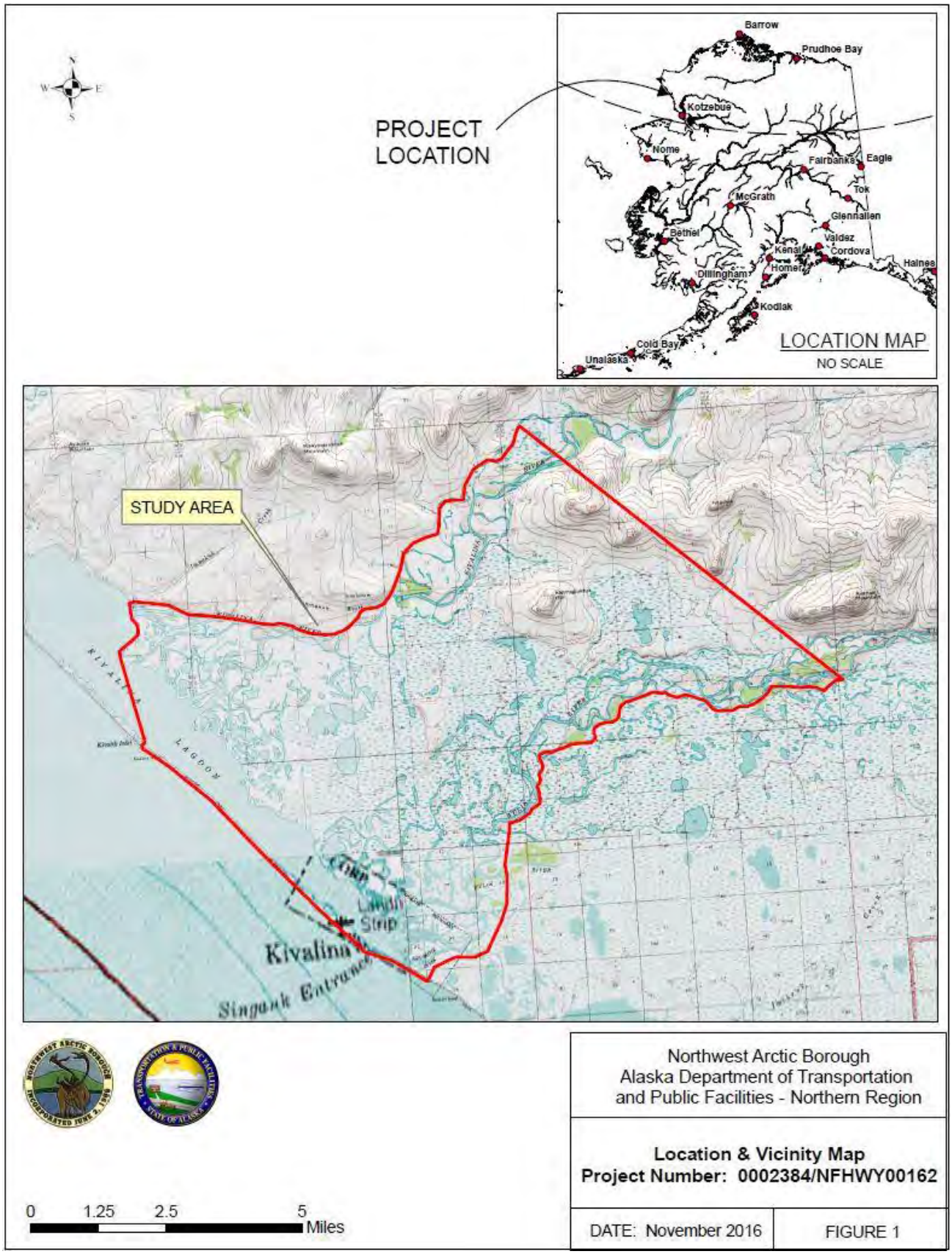


Figure 1. Location of the proposed evacuation road project east of the community of Kivalina, Alaska.

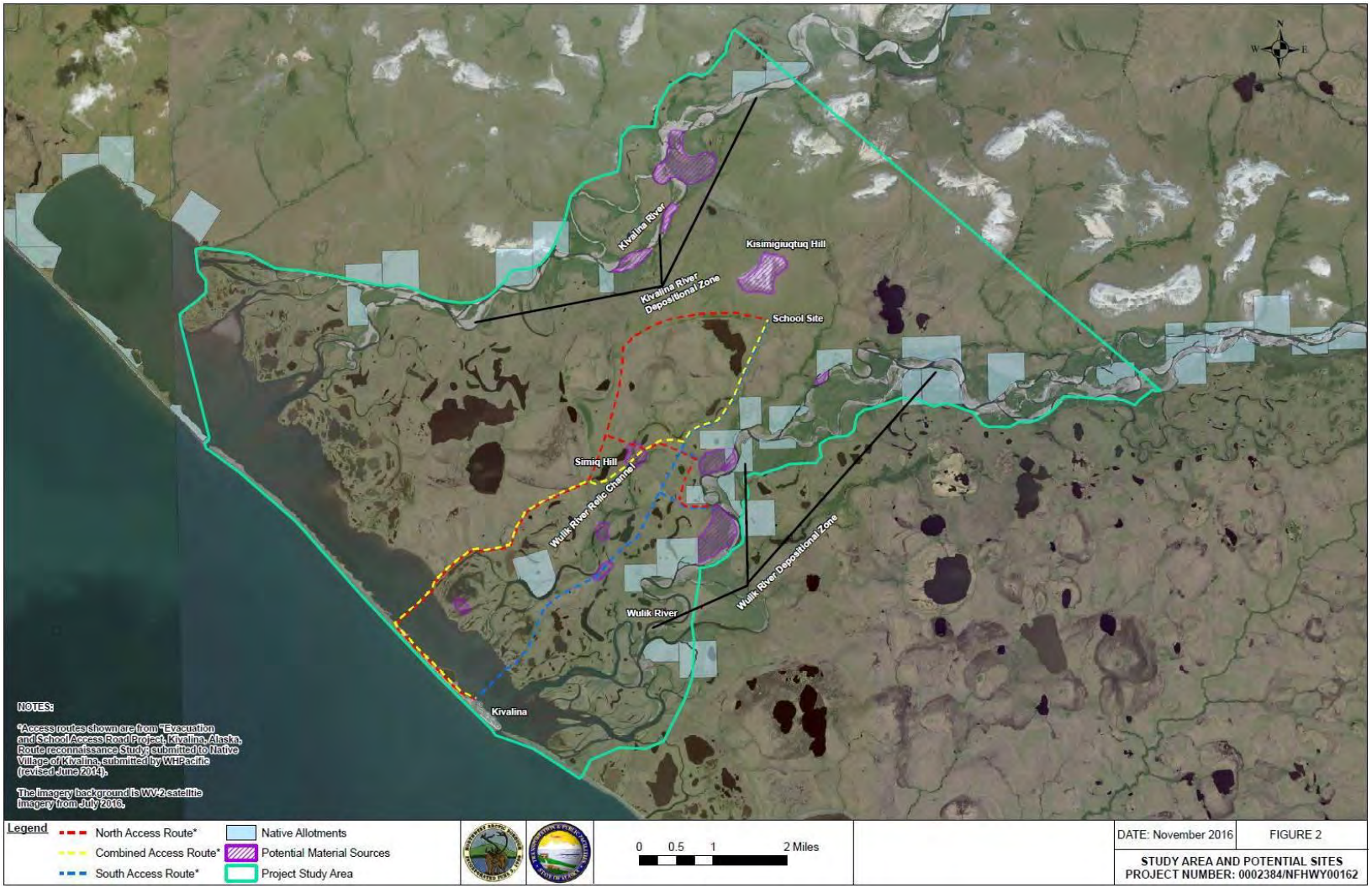


Figure 2. Detail of the proposed Kivalina Evacuation Road route alternatives and potential material sources within the Kivalina and Wulik rivers.

Figure 3. The Service recommends fixed-tag FireFly™ diverters (or similar) be installed at appropriate intervals on and overhead powerlines associated with the proposed Kivalina Evacuation Road Project.

From:	Schacher, Sarah E (DOT)
To:	Hutchinson, Jonathan J (DOT); Karczmarczyk, Paul F (DOT); Katherine Keith (katherine@akremotesolutions.com); Anderson, Ryan (DOT)
Subject:	FW: POA-2012-124, Kivalina Evacuation Route Scoping Response Letter
Date:	Wednesday, December 28, 2016 11:51:24 AM
Attachments:	POA-2012-124_Scoping Response Letter.pdf

FYI.

-----Original Message-----
From: Grauf, Jeremy J CIV USARMY CEPOA (US) [mailto:Jeremy.Grauf@usace.army.mil]
Sent: Wednesday, December 28, 2016 11:01 AM
To: Schacher, Sarah E (DOT)
Subject: POA-2012-124, Kivalina Evacuation Route Scoping Response Letter

Hi Ms. Schacher,

It was a pleasure to meet with you last week, and I hope you are having a wonderful holiday season.

Please see the attached scoping response letter. I don't know who will be working on this project, but in the mean time you can send any questions and/or correspondence me.

Please contact me via email at Jeremy.Grauf@usace.army.mil, by mail at the address above, by phone at (907) 753-2798, or toll free from within Alaska at (800) 478-2712, if you have questions. For more information about the Regulatory Program, please visit our website at http://www.poa.usace.army.mil/Missions/Regulatory.aspx.

Thanks,

Jeremy Grauf
Regulatory Specialist/GIS Specialist
US Army Corp of Engineers, Alaska District Regulatory Division CEPOA-RD-NN, North Section PO Box 6898 JBER, Alaska 99506
Office: 907-753-2798

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
P.O. BOX 6898
JBER, AK 99506-0898

DECEMBER 28, 2016

Regulatory Division
POA-2012-124

Ms. Sarah Schacher
Department of Transportation and Public Facilities
2301 Peger Road
Fairbanks, Alaska 99709-5316

Dear Ms. Sarah Schacher:

The United States (U.S.) Army Corps of Engineers, Alaska District (Corps) is providing this letter as a written comment to the November 10, 2016, Kivalina Evacuation and School Site Access Road Scoping Letter. Your project has been assigned number POA-2012-124, Chukchi Sea, which should be referred to in all correspondence with us.

The Corps' regulatory authorities are based on two laws: Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403), which prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from the Corps; and Section 404 of the Clean Water Act (CWA), which prohibits the discharge of dredged or fill material into waters of the U.S. without a Corps permit. Based on information provided, and available to our office, portions of the proposed work may occur in waters of the U.S. and would, therefore, be within the Corps' jurisdiction.

Waters of the U.S. include, but are not limited to, tidal waters, rivers both perennial and intermittent streams and wetlands. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include "muskegs", swamps, marshes, bogs, and similar areas.

The Corps' evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses, including (1) evaluating the proposal's impacts in accordance with the National Environmental Policy Act (NEPA) (33 CFR part 325), (2) determining whether the proposal is contrary to the public interest (33 CFR § 320.4),

and (3) in the case of a Section 404 permit, determining whether the proposal complies with the Section 404(b)(1) Guidelines (Guidelines) (40 CFR part 230).

If the proposal requires a Section 404 permit application, the Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)). Time and money spent on the proposal prior to applying for a Section 404 permit cannot be factored into the Corps' decision whether there is a less damaging practicable alternative to the proposal.

If an application for a Corps permit has not yet been submitted, the project proposer may request a pre-application consultation meeting with the Corps to obtain information regarding the data, studies or other information that will be necessary for the permit evaluation process. A pre-application consultation meeting is strongly recommended if the proposal has substantial impacts to waters of the United States, or if it is a large or controversial project.

Nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations.

Please contact me via email at Jeremy.Grauf@usace.army.mil, by mail at the address above, by phone at (907) 753-2798, or toll free from within Alaska at (800) 478-2712, if you have questions. For more information about the Regulatory Program, please visit our website at http://www.poa.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

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Jeremy Grauf
Regulatory Specialist

Kivalina Evacuation and School Site Access Road
Project Number: 0002384/NFHWY00162
USFWS Agency Scoping Meeting
Federal Building, Fairbanks, AK
12/19/16

Attendees:

USFWS:
Kaithryn Ott, USFWS Endangered Species Wildlife Biologist; Section 7 Consultation
Louise Smith, USFWS Wildlife Biologist
Robert Henszey, Fairbanks Branch Chief

DOT&PF:
Paul Karczmarczyk, AK DOT&PF
Sarah Schacher, AK DOT&PF
Jonathan Hutchinson, AK DOT&PF

OTHERS:
Katherine Keith, Remote Solutions
John Baker, Remote Solutions
Sara Lindberg, Stantec

DOT&PF provided a brief project summary and opened the meeting up to discuss USFWS questions, comments, and concerns. The following summarizes the meeting discussion by topic.

Preferred Route

Question from Louise: Can you use the existing airport runway as part of an evacuation road? Why not?

> Paul: The FHWA regulations have specific embankment standards and this activity would not be allowed by FAA.
>
> Sarah S: The Purpose and Need for the project also dictate that having a direct route out of the community is critical to having a safe and reliable access route rather than running in parallel to the runway.

Question from Louise: How long before the community moves once the school moves?

> Sarah S: The FHWA won't get involved in a school relocation project so that isn't within the scope of this meeting. The federal action for this meeting relates solely to the evacuation road.
>
> Sara L: The community is not ready to determine where they are going to relocate.

Follow up from Louise: Regarding the Northern Route, building a road at the northern higher lands seem more ideal.

Sara L: The purpose and need of this project is to provide a safe and immediate evacuation route. Taking their elders north along the barrier island one mile may not be possible during a storm surge event and would not be safe. Furthermore, people in public meetings speak about staying up all night in fear during storms and would like the lagoon crossing to be as close to town as possible.

Material Sites

Louise: The Wulik is pristine and is a beautiful river known for Dolly Varden. My opinion, regarding gravel, is that you will constantly need to dewater, which could be problematic in the winter. The concern is the excavation may not recharge naturally, resulting in permanent alteration in that part of the river. In other areas, excavations too deep may become anoxic from sedimentation and we would generally like to see avoidance of the river channels.

Sarah S: We know that's something to consider; and there is an example regionally of a material site on the Noatak River that remains dry during winter excavation, and we anticipate this site would be the same. On that issue, DOT is currently working with UAF on a Sag river sedimentation study to see how fast its river bars replenish after excavation, although that is a very different system than what we are looking at with this project.

Jonathan: There was a pond that was trapping fish during flooding events on the Dalton Highway, and we developed criteria with DNR and ADF&G for excavation in that area to avoid fish entrapment. Instead of creating shallow pits during excavation, we used deep trench pits with perpendicular access to the channel to allow fish escapement. The trenches were sloped so they would continue to drain and avoid both entrapment and concerns about anoxic conditions. We could agree to similar stipulations for this project.

Louise: That sounds like a great solution and may be workable in this scenario. The Wulik appears to act like a delta. If you do mine deep, you will need to include an egress.

Causeway

The current crossing options for the lagoon will include some form of bridge and/or culverts with a causeway of gravel with or without rock. Considerations for these options are sediment transport, hydraulic processes, boat passage, marine mammals, ice impacts, and other issues. A similar design, as an example for reference, but on a larger scale is the Safety Sound bridge in Nome.

Question from Louise: What is water flow like in the lagoon?

John: There are two inlets into the lagoon from the sea.

Sarah S: Most of the hydrologic movement in the lagoon occurs during storm surge events, but otherwise there is minimal lagoon circulation.

John: Breakup is not at all a big event in the lagoon. There's so little movement of the water, that rather than flowing out through the inlets, the ice just melts in place.

Questions from Louise: Was there modeling from USACE on closing the causeway?

Sarah S: The biggest challenge to closing the lagoon completely would be the ability of the community to navigate in or out of the enclosed portion of the lagoon;…

Paul: …and also we anticipate both adult and juvenile fish, and marine mammal, passage will be concerns from NOAA/NMFS too, so at this point I'm not thinking full closure will be acceptable, but we'll know more when we talk with the EFH and marine mammal folks in Anchorage.

Katherine: The USACE Causeway and Bridge Design Report June 2016 study modeling has completed multiple circulation studies and flow modeling that is available as a reference.

Question from Louise: What are your money constraints and schedule?

Sarah S: Our goal is to get through scoping and get to a Class of Action decision early in February, with the conclusion of the environmental documentation occurring before end of 2017. Design itself will be rather straightforward.

Katherine: We will be applying again for a TIGER grant application on behalf of the community this April (2017). We submitted a grant application in 2016 and have also completed significant lobbying in DC to help make legislators and federal agencies aware of the project.

Comment from Robert: What is your current data on the wetlands?

Sara L: ASRC completed a desktop wetlands study in 2016. As you can imagine, the majority of the area is considered high value wetlands. We wanted to characterize those values on a finer scale, so we took the high value wetlands and further divided them into both High and High+ values based on a number of criteria. The permanently flooded, emergent wetlands are the highest functioning according to the study.

Follow up from Robert: Interestingly, it may turn out that instead of emergent wetlands, the less common shrubby habitat in that area is actually of higher value locally for wildlife habitat. In that regard, we might actually prefer you avoid areas with taller willows and brush, as these would be higher value nesting habitat for migratory birds than the low scrub and emergent habitats.

Section 7 Consultation

Kaithryn: There really isn't a Section 7 concern in this area for either of the eiders or other species, except that reinstatement of Section 7 polar bear critical habitat could create a delay if we hadn't prepared properly for it. It should not be an issue for this project, but a polar bear interaction plan will be required. Otherwise, this project should meet requirements for an Informal Section 7 consultation.

Summary of USFWS Comments/Concerns

- Avoid Fish trapping within material sites
- Defer to NOAA/NMFS re: causeway openings on EFH and marine mammal passage/concerns
- Shrubby wetlands may be of higher value and more important for bird nesting than emergent, flooded areas. Parse those areas out if possible during design and seek avoidance/minimization
- Informal Section 7 consultation will be sufficient

ACTION ITEMS

Katherine to Share: Links to USACE Bridge Design and Wetlands Study

Kivalina Evacuation and School Site Access Road
Project Number: 0002384/NFHWY00162
ADF&G Agency Scoping Meeting
DOT&PF Building, Fairbanks, AK
12/19/16

Attendees:

ADF&G:
Audra Brase, Region 3 Supervisor, ADF&G Habitat Division

DOT&PF:
Ryan Anderson, AK DOT&PF
Paul Karczmarczyk, AK DOT&PF
Sara Schacher, AK DOT&PF
Jonathan Hutchinson, AK DOT&PF

OTHERS:
Katherine Keith, Remote Solutions
John Baker, Remote Solutions
Sara Lindberg, Stantec

DOT&PF provided a brief project summary and opened the meeting up to discuss ADF&G questions, comments, and concerns. The following summarizes the meeting discussion by topic.

Fish Habitat

Audra: Ideally, it would be better to do more work in the Kivalina River drainage then in the Wulik River. However, the challenges with the Purpose and Need are understood. The Wulik is a much bigger system and more greater subsistence resource than the Kivalina, although on paper ADF&G does treat the two rivers the same. It appears the material sites you have selected in the Wulik River are below known spawning sites. For overwintering, the Dolly Varden go into the sound (lagoon) especially with the warming climate. When overwintering in the sound and the lower part of the Wulik, they don't just sit in a hole but they are a bit active and swim around. Knowing about the Dolly Varden and their overwintering activity in the lagoon would be helpful as we get closer to designing the lagoon crossing. ADF&G is trying to do a sonar count this spring in the Wulik River for the Red Dog Mine, and has data every year for three years. Sport fish division has done this. Juvenile fish outmigration happens in the spring, and spawning for Dolly Varden are farther up the river and takes place in the fall.

Lagoon Crossing

Paul: We would be interested in hearing about your concerns for the lagoon crossing and implications on both adult salmon and other fish passage, and also any potential effects on, for example, the lagoon's prey base or other resources used by juvenile fish during outmigration.

Audra: We wouldn't be at all comfortable with a solid causeway concept because of the impacts that would have on marine mammals, fish habitat, and overwintering Dolly Varden.

Material Sites

Sarah S: River material extraction is appealing because of the ability to have a winter haul, and using the K-hill site is more costly.

Jonathan: The summer and winter mining methods and hence costs will be very dependent on agency feedback and any specific measures implemented for mitigation.

Audra: Using the Wulik gravel is not off the table if appropriate reclamation is used and connectivity is maintained to avoid impacts to fish and habitat values.

John: What design elements can we incorporate now to make you more comfortable?

Ryan: For example, is it possible for us to look at the depths of the channels along the river, and then use that depth as a reference for the maximum extent of how deep you would be comfortable with us going when accessing gravel? The nearby ponds in the area could be used as reference when suggesting excavation depths.

Audra: Yes. You need to make sure any proposed gravel site next to the river is day-lighted to allow for channel connectivity, and you might also need to design what is left afterward to create appropriate fish habitat. As for extraction methods, ADF&G would rather see a shallow trench vs a deep hole. What constitutes "deep" will depend on the location.

John: Is there a way we can extract on the big gravel bar on the Wulik and make the habitat better?

Audra: You would not want a big pond, as that would divert flow and in effect "shallow up the river". Instead, you want to be sure any excavation is day-lighted, and make it narrow. You want to be sure you leave a slot to make sure the fish can get back out to the river. Also, you don't want to work near known spawning areas.

Ryan: We could include conceptual material site designs to show an acceptable typical version in the environmental document, but we'll need input from the agencies on criteria to consider and specifics we'll need to mandate in order to reach that acceptable design.

Mitigation

Paul: The best thing we can do is to incorporate both fish habitat and wetland impact mitigation into design as we go. We'd like to work up front with ADF&G and other agencies to come up with a mitigation proposal acceptable to the USACE and also serve to mitigate other resource impacts.

Audra: Reconnecting sloughs and oxbows may be valuable, as long as it is not impacting the local whitefish fishing areas. I would be interested in seeing which waterbodies flood and then determine logical locations to connect channels.

Audra: As for the lagoon and larger crossings, a bridge is always better than a culvert. Culverts have typically failed around the state. Once you nail down the route, we can work with you to see where bridges may be more appropriate.

Water Withdrawal

Ryan: What about water withdrawals? There will be water needs for this project to create ice roads, and also later on for dust control and compaction.

Audra: We would need to get a handle on whether there are fish in the various lakes along the routes.

Ryan: To simplify matters, could we just assume there are fish in all the lakes? That way, rather than going out and spending time and money sampling all the lakes, we could create parameters for the contractors based on that worst-case assumption, have them go get bathymetry of any lake they'd like to use for water withdrawal, and then put parameters on the depth of withdrawal based on a standard assumption of fish presence?

Audra: Yes, we can assume there are fish in all lakes, and then limit draw down of water accordingly, or limit draw down to just lakes where a certain depth could be maintained. This would avoid having to do a pre-survey.

Audra: Something else that may help is when you reclaim the material sites, you can make sure they are connected to the river and then you could still use them for maintenance water after construction. We do allow water withdrawals from fish bearing waters, but would need to implement fish screening requirements that would need to be followed.

Audra: As for permitting, we'd issue two different permits - one for construction and one for maintenance. Gravel pits could double as water storage for the winter haul road, and then also be used long-term for ongoing maintenance. You could also pump the water back into the river as long as the sedimentation wasn't a problem.

ACTION ITEMS

ADF&G to provide: The spawning and overwintering areas mapped, and the data collected can be provided to DOT&PF by Fred DeCicco.

Audra: I suggest you talk to Nikki Braem, ADF&G Subsistence, as she's got a lot of local use information.

The ADF&G point of contact for this project will be Parker Bradley.

Kivalina Evacuation and School Site Access Road
Project Number: 0002384/NFHWY00162
Combined NPS and ADNR/OHA-SHPO Agency Scoping Meeting
NPS Building, Anchorage, AK
12/20/16

Attendees:

NPS:
Rhea Hood, Archaeologist, NPS National Register of Historic Places Program
Andrew Tremayne, NPS Alaska Regional Office Archaeologist

SHPO:
Mark Rollins, OHA Archaeologist
Alan Depew, OHA Archaeologist

DOT&PF:
Paul Karczmarczyk, AK DOT&PF
Sara Schacher, AK DOT&PF

OTHERS:
Katherine Keith, Remote Solutions
John Baker, Remote Solutions
Sara Lindberg, Stantec
Ross Smith, Stantec

DOT&PF provided a brief project summary, review of work completed to date, and opened the meeting up to discuss NPS and SHPO questions, comments, and concerns. The following summarizes the meeting discussion by topic.

Section 106 Process and Impacts to Cultural Resources

Question from Rhea: What is the general approach to impacts to cultural resources? Has this been discussed with the community of Kivalina? What will you do if you find human remains? Has an inadvertent discovery plan been completed for Kivalina?

> Sarah S: Our Standard Contract Provisions will be included in the construction contract documents. That is, if anything in the field is discovered, work would stop, and the contractor would need to contact SHPO, and then proceed as determined. This will be discussed with community of Kivalina during the Section 106 consultation process, and we'd also develop an inadvertent discovery plan.

Mark: It will be important for DOT&PF to identify an appropriate Area of Potential Effect (APE) for consideration by SHPO. While the study area boundary you show is good, an APE could stay the same size or get smaller. SHPO will defer to Tom Gamza (DOT&PF Environmental Analyst/Professionally Qualified Archeologist) to determine if enough work has been done within the resulting APE.

Paul: And we also assume we'll need inadvertent discovery plans in place and require monitoring during any ground disturbance. There is a still a long way to go with the project before we get to that point, and there is still a lot of room for avoidance and minimization. And remember that no NEPA-qualified alternative has been proposed yet, so we have lots of flexibility with design…within engineering parameters of course.

Question from Andrew: What is your project timeline?

Sarah S: We need to start the 106 process with an initiation of consultation letter as soon as possible. We will approach FHWA next month for a Class of Action call, and expect to complete the environmental document next year.

Question from Andrew: Do you anticipate preparing a Memorandum of Agreement (MOA)?

Sarah S: If there is something to mitigate, then we would.

Sara L: As a review of what's been done so far, in January 2016 NLURA put together a probability map using landform analysis and the contour data available at that time, and that defined high, moderate, and low resource probability areas within the study area. Stantec archeologists looked at that mapping and planned a reconnaissance effort for September to identify areas of focus for future field investigations. That recon effort included collecting soil probe information and looking at depths to permafrost. Then later, in October, a field investigation was completed focusing on subsurface testing along the northern, southern, and combined routes, as well as the two causeway terminus points on the island. Testing was also done at potential material sites at the time. We conducted 75 shovel probes at 21 locations in 5 test units, and additional soil probes to document permafrost levels. During the October fieldwork, Remote Solutions met with SHPO and identified additional focus areas that were also covered. And even with that level of effort, no resources were found in either the September or the October investigations. The study report is in final draft and should be done in a few weeks.

Paul: Any mitigation measures, including an MOA, if needed, would be captured in the construction contract specifications. For example, as Sarah mentioned the inadvertent discovery plan developed during consultation would likely result in an MOA with the Native Village of Kivalina regarding a process to follow should human remains be discovered.

Mark: The DOT Statewide programmatic agreement for handing cultural resources could meet the requirements for this project. This agreement has appendices with templates that help in the development of construction monitoring and inadvertent discovery plans. If a determination of adverse effect was completed for this project it would trigger a need for an MOA. Another option is, if you can't do sufficient identification beforehand, you could do a Programmatic Agreement (PA) with protocols on how to proceed with construction and what would be done if something was encountered. Also, if SHPO was not able to make a finding of effect but wanted to keep the process moving, you could do a PA.

National Historic Landmark (NHL) Boundary/4(f) concerns

DOT&PF provided a brief overview of Section 4(f) and its elements for NPS staff, and conveyed concerns on anticipated actual and potentially perceived impacts to the NHL by NPS and the public.

Question from Sarah S: One of our questions is about the NHL boundary, where it is and how it will affect Section 106 consultation. The SHPO and NPS have two different boundary maps. The AHRS website shows the study area partially within the NHL, but the NPS map shows a different coverage.

Andrew: Based on our map, the whole study area is within the landmark boundary. We can provide SHPO with the latest GIS files for the correct boundary mapping. However, no matter where the boundary is, the NPS position on the project would not change. The Park Service offers technical assistance to SHPO and DOT&PF to ensure any cultural sites within the boundary do not get damaged. It sounds like DOT&PF is doing everything right in your approach. One thing we would like to see is a description of how you will deal with mitigating sites during construction if they are encountered.

Alan: It will depend on if they are contributing sites that are encountered. There might not be any contributing sites within the landmark boundary. Because the entire project is within the landmark boundary, there will not be a finding of no historic properties affected. Rather, we will be looking at either a finding of adverse effect, or no adverse effect. The question is whether there are resources within that boundary that are being affected.

Mark: The National Historic Landmark itself is considered an historic property, so you can never have a "no effect" determination, it is either a no adverse, or adverse effect.

Section 4f Consultation

Question from Paul: Given the extent of the NHL, there would be no practicable alternative to going through the landmark as it encompasses the entire study area, the community of Kivalina, and the evacuation road terminus. From your experience, does the presence of a road necessarily have an adverse effect on a landmark by its own right? For example, simply on some basis of it being a "given" there's an adverse altering to setting, viewshed, or historical context?

Mark: DOT&PF will need to do the analysis to determine that there is no alternative to going through the landmark to make sure you are minimizing going through it. There will be a public notice process and the Park Service has final jurisdiction on the Landmark. The NPS will receive consultations for a non-objection for both the 4(f) evaluation and the Section 106 process.

Question from Paul: Any ideas on mitigation? Something we can include during design?

Alan: Mitigation will be consulting party driven. The Park Service would also be involved in that process.

Andrew: We will bring in Janet Clemens in as a Section 106 reviewer for the Park Service.

Action Items:

- DOT&PF/Remote Solutions/Stantec complete the cultural resources survey report
- Depending on consultation &/or proposed routing differences, consider add'l 2017 field survey effort.

Kivalina Evacuation and School Site Access Road
Project Number: 0002384/NFHWY00162
NMFS Agency Scoping Meeting
NMFS Office, Anchorage, AK
12/21/16

Attendees:

NMFS:
Greg Balogh, Protected Resources, Deputy Director, Marine Mammals
Matt Eagleton, Regional Essential Fish Habitat (EFH) Coordinator, Habitat Conservation Division
Sam Simpson, EFH Coordinator, Habitat Conservation Division

DOT&PF:
Paul Karczmarczyk, AK DOT&PF
Sarah Schacher, AK DOT&PF

OTHERS:
Katherine Keith, Remote Solutions
John Baker, Remote Solutions
Sara Lindberg, Stantec

DOT&PF provided a brief project summary and opened the meeting up to discuss NMFS questions, comments, and concerns. The following summarizes the meeting discussion by topic.

Lagoon Crossing

Question from Greg Balogh: For the lagoon crossing, did the community indicate their preferred crossing method?

> Paul: The community has independently selected the southern route as their preferred road. But for the lagoon crossing concept, we haven't made any decisions on configuration and are looking to NMFS and other agencies for what will minimize impacts to marine mammals and fish. We want to engineer the crossing around those concerns, not design something without knowing about problems then have to go back and revise it.

Matt: A causeway could potentially bottleneck fish, so we will be looking for fish passage accommodation. Also, you'll need to protect points along the active floodplain for erosion.

John: The area is pretty stable. The currents are very low.

Question from Paul: Regarding juvenile fish in the lagoon and rearing habitat. Would a causeway pose issues with salinity and water chemistry due to reduced hydrological exchange or flow rates? Would you for instance be concerned about some incremental decrease in salinity affecting fish survival or habitat elements due to a causeway reducing unimpeded salt water exchange?

Matt: I don't see an issue as long as you maintain natural sediment transport. You also need to consider ice scour. Dolly Varden are a consideration but NMFS doesn't manage Dollies.

John: Ice scour should not be an issue. Ice doesn't move through the lagoon it just melts. The lagoon is mostly shallow throughout the entire middle of the lagoon. The far ends have depth.

Paul: And we've talked to ADF&G about Dolly Varden recently, both about adult spawning and juvenile rearing habitats, and they've given us a lot of good information to incorporate into preliminary design considerations.

Question from Paul: What about marine mammal passage in the lagoon? What criteria will you be looking for? Do you know of any information available on passage concepts or limitations of different types of culverts, box structures, bridges with or without piers, etc.?

Greg: I can't think of any instances where there have been culverts for seals. I will have to look into that to see if there is any evidence of seals swimming through culverts.

Matt: The Endicott Causeway has 3 bridges that were installed as mitigation. Seals will go through those; they are 100 feet long each. I don't think seals would go through a culvert. We have found fish won't go through any culvert longer than 300 feet, regardless of if there is light showing at the end of, or even within the culvert or not. There was actually a long culvert they installed artificial lighting in, and fish wouldn't go through it. You'll need to consider migrating crabs too. In Nome there's the Port Causeway breech, and that is 3-5 meters wide and is specifically designed for crab migration.

Matt: Our hydrologist Sean Eagan could help you locate the best place for the bridge within the lagoon.

MMPA, EFH, and Section 7 consultation process

Question from Sarah S: Do you have any construction concerns about timing or method and how that might impact marine mammals?

Greg: From the marine mammal point of view, aerial surveys completed in the spring would help to identify the various densities of seals depending on timing. We should also assume both the ringed and bearded seal will be T&E listed species before this project is constructed. If densities of seals are low enough based on spring surveys that you have the ability to suspend construction when a seal comes close, then Informal Consultation will be sufficient. For example you would set up a protocol where you would have observers watching for seals and would only need to pause things such as 120-160 decibel pile driving while they're present within a pre-determined distance of the specific project area. If seal densities are too great, or you are not able to pause construction, then Formal Consultation and the issuance of an Incidental Harassment Authorization (IHA) will be required.

Question from Sara L: Can we assume presence and estimate densities of seals in the lagoon to keep the process moving without a spring survey?

Greg: Yes, we can assume presence, and numbers for densities, if we want to keep moving without a survey. Everyone uses assumptions. If you want to keep consultation informal, then

you will not be allowed to have any take. Harassment of a seal from construction noise would be considered a take. Acoustic harassment is the big concern for this project. We would apply threshold distances to the activity area, usually of 2km, which is standard. Marine mammal observers would have to be present during construction to monitor for any seals within this distance. If they see a seal entering the 2km threshold, the contractor would be required to stop work until the seal moved out of the area. I doubt seals are in the lagoon in the winter because it's so shallow, so winter construction is probably preferred. The north end of the lagoon would be out of the action area if the southern lagoon crossing was selected.

Question from Sara L: If DOT&PF moves forward with a IHA, could we make assumptions on presence and numbers for this as well?

Greg: Yes, estimates and assumptions are fine. You are to use the best available data. If you go forward with an IHA, consultation will take a minimum of 5 months. The IHA application consists of 14 questions that you can answer with best available data. Estimates and assumptions are fine. The take we would be worried about for this project would be through noise harassment. The application process includes a 60-day public notice period. Once the permit is issued, NMFS will then need an additional 45 days after that to process the information and complete its biological opinion. Alternatively, the informal consultation process consists of a filling out a template requesting informal consultation. The informal consultation process will take 30 days.

Question from Sarah S: Given the shallow lagoon depth and, from what we've heard, that it freezes to the bottom in most places or at the worst there is little water beneath the ice, we would likely be able to schedule placement of causeway fill during the winter. We could access the area on the ice, break and excavate ice, and place fill during the time there are no seals at all in the area. Would that be the best option?

Greg: Absolutely, as that would not pose the threat of a take given that no seals would be anticipated to be in the area during that time of year. That would be a good example of a specified method that could fit with an information consultation.

Material Sites

Matt: Make sure that for the relic channel material sources, you don't inadvertently cause erosion issues where they may come close to the road.

Mitigation

Question from Paul: Do you have any suggestions on fish habitat mitigation for gravel sources?

Matt: I am just glad you are not proposing to take sand from the beach. The publication *Impacts to Essential Fish Habitat From Non-Fishing Activities in Alaska, 2016* is a document located on our website that has a list of conservation recommendations. It also lists EFH issues by activity. Use that when completing your EFH Assessment.

Question from Paul: Do you have ideas for EFH mitigation projects that might also help satisfy USACE mitigation requirements? Something we could incorporate into design that would serve to mitigate impacts to several resources…wetlands and fish habitat…simultaneously? Or absent that something specific to EFH or marine mammals? For instance, were we to put in a causeway that had a bridge opening or two where passive sonar counters could be installed for marine mammal counts or to collect passage timing or other data, that would be easy to incorporate as we'd essentially be constructing the fixed pass-by points that could serve as survey stations for long term data collection. We're open to any ideas.

Greg: There is no data on if ringed seals swim under structures but I am not sure how valuable that information would be for the future.

Matt: There is a lack of tide information in the north. Maybe an avenue for mitigation is to look at collecting local tide information? The closest tide station is at Red Dog, which is a very different setting than in the lagoon. Often we model things based on stations such as Red Dog and as far south as Nome and then extrapolate, but as you know that's always a guess, particularly given the differences in the types of shorelines. The Non-Fishing Activities document also has ideas about how to mitigate for climate change. You might also talk to the community about what they expect will occur as a result of climate change, and think about accommodating those concerns in your design.

Action Items:

DOT&PF:

- Contact Sean Eagan to discuss hydraulics and placement of the bridge structure in the lagoon.
- Review the referenced document for potential design applications
- Discuss climate change impacts w/ the community to seek design input
- Get a more detailed bathymetry on potential lagoon crossing location(s) to qualify construction methodology that would not pose take hazard on seals (i.e., winter construction feasibility).

Kivalina Evacuation and School Site Access Road
Project Number: 0002384/NFHWY00162
USACE Agency Scoping Meeting
Stantec Office, Anchorage, AK
12/21/16

Attendees:
USACE:
Jeremy Grauf, Regulatory Specialist
Janet Post, Regulatory Specialist

DOT&PF:
Paul Karczmarczyk, AK DOT&PF
Sara Schacher, AK DOT&PF

OTHERS:
Katherine Keith, Remote Solutions
John Baker, Remote Solutions
Sara Lindberg, Stantec

DOT&PF provided a brief project summary and opened the meeting up to discuss USACE questions, comments, and concerns. The following summarizes the meeting discussion by topic.

Potential Routes and Project Cost

Question from Janet: Why do you think the lagoon crossing will be less expensive than the USACE design?

> Sarah S: We are looking at the assumptions that went into the Corps study so we can consider other options, such as material costs, along with the lagoon crossing opening needs. We are still in the preliminary phases of work on that. The biggest driver of cost is going to be material sources. We are hopeful that we can get good material on site.

Question from Janet: Where will the material come from?

> Sarah S: We are looking at K-hill as a very logical site. The Wulik River also has great alluvial resources. Actual rock material might still need to be imported, but at least the other materials could be found locally.

Questions from Janet: Although there are three listed routes, is there one realistic route that would be most beneficial?

> Paul: It's worth making the distinction now that the routes on the study area map are not by any means our NEPA alternatives. They are just several routes the community of Kivalina has proposed based on their local and traditional knowledge coupled with all the previous studies that have been conducted by the Corps, the Borough, the City, and others. We're just now in the

process of scoping to begin developing a range of alternatives for NEPA, and while those proposed routes will be a huge help in developing them, they are just a part of the data we'll be using. We'll need to incorporate recent surveys by the Borough that Remote Solutions has done, along with fitting the purpose and need, including all the past studies, as well as the agency and public input we're getting during scoping and consultation. So with that, your input on wetlands and what comes from our discussions here with you and other agencies will play a big part in determining what that most beneficial route would be.

Sarah S: That said, so far the community's proposed southern route or something in that vicinity seems the most beneficial and feasible. For evacuation purposed, the community needs to have a lagoon crossing as close to town as possible for safety. Also, a route going north along the spit is definitely more complex of a design because of how far out in the lagoon you would need to fill in order to avoid the airport.

School Site

Question from Janet: What is the school site footprint?

Paul: We don't know. The school construction is a parallel project being conducted by the Northwest Arctic Borough, but a completely separate action and not part of this project.

Wetlands

Question from Jeremy: What information do you have on wetlands for the study area?

Sara L: Development of an evacuation road road has a long standing project concept investigated by a number of agencies and entities for decades. As a result there are reams of existing data that is being synthesized into our new environmental review document for this project. For example ASRC completed a desktop wetlands study in January of 2016 which lines up with the NWI mapping pretty well. The majority of the study area is wetlands, most of which are semi-permanently or permanently flooded and which were evaluated as high value as part of their study. Because there were so many high value wetlands across the entire study area and it didn't seem appropriate to lump them all as having one value measure, we further split them into high and high+ wetlands based on function. To augment the ASRC desktop information, this fall the NAB had Remote Solutions and Stantec do field work in multiple areas. We looked for connectivity between the numerous lake and sloughs, and looked for other data points to verify wetlands status. Also 2' resolution LiDAR was completed this fall which still needs to be evaluated.

Question from Sara L: The existing wetlands information we have is based on desktop studies, but after extensive field reconnaissance this fall, and with an extensive photo record throughout the study area coupled with soils data taken during archaeological survey work, we intend to strengthen the desktop mapping in hopes of being sufficient for permitting without additional field surveys. Do you think this will be sufficient?

Jeremy: It is difficult to say for sure without seeing the data. Most of the study area is clearly wetlands. Let's just see how far we can get utilizing the desktop supplemented approach.

Compensatory Mitigation

Question from Paul: For the Cape Blossom project near Kotzebue, we had a generally similar length project that calculated out to about 160 debits for 11 miles of road. Do you see something similar for this project or can you even predict that given the new compensatory mitigation calculation process?

> Janet: Don't assume that you would need any compensatory mitigation. It may be that you will not need any at all given the project location in Western Alaska.

Question from Paul: What information would you need to make that determination?

> Jeremy: We would need the acreage of the impacts and resource types in both Cowardin and HGM. Then we would compare that to the acreage of wetlands available within the watershed. A Hydrologic Unit Code (HUC) of 12 would be sufficient, unless the project spans two units, and then two HUC 10 units would be sufficient to determine watershed acreage.

Question from Paul: Because the majority of study area is wetlands, selecting a route that avoids wetlands is going to come down to qualitative avoidance. We can use LiDAR data to find the high spots, but it will likely still be mostly wetlands. How much detail do you need to see in our avoidance documentation?

> Jeremy: We would like to see you avoid the High+ value wetlands. Documenting that will go a long way.
>
> Paul: As a sidebar, when we were talking to the USFWS, they explained that in that region, they really valued the woody shrub habitat over the emergent marsh wetlands which the Corps has usually considered of higher value, so there is likely going to be some competing notions of "high value" between the two agencies. Do you see a way to address that difference?
>
> Janet: We are open to protecting habitat resources that may be important to other agencies like the USFWS. Also, avoidance of salmon streams, adhering to the bird timing window…these are great avoidance and minimization measures as well. Your application should note all those considerations so they can be incorporated into our review.

Question from Paul: When we sent out scoping letters, I'd anticipated that we'd receive a response from the Corps that basically acknowledged jurisdiction, and provided a reference POA# for future use in correspondence and such. We haven't gotten one yet, and are wondering why?

> Janet: This project would definitely need an individual permit, and we have a POA# already set up for this project that was used during the Corps study back a few years ago. We'll just use that same number as it covers the same project area, and we can send you confirmation of that.

Action Items:

Janet: The Corps will send a letter to DOT&PF with the POA# for the project.