

Newtok

Transportation Plan

Submitted to:

Newtok Traditional Council

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and the

Bureau of Indian Affairs

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INCORPORATED

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Newtok

BIA Transportation Plan

Executive Summary

The Village of Newtok is experiencing severe erosion along the banks of the Ninglick River, at an average annual erosion rate of 85 feet per year. Based on past erosion rates, it is estimated that erosion will physically impact residences and infrastructure in eight years (2008).

The Newtok Traditional Council has initiated a village relocation planning process in order to prepare for the imminent encroachment of river bank erosion on its residences and facilities. The Council hired ASCG Incorporated (ASCG) to develop a Land Use and Transportation Plan for their proposed village relocation site using funding from the Bureau of Indian Affairs Indian Reservation Roads program.

This plan provides an update of existing community characteristics, summarizes the erosion problem and past mitigation efforts, presents a preliminary site plan map for the proposed relocation site, and identifies and describes road needs and priorities. The plan will provide a foundation for future community development studies as knowledge of conditions and opportunities at the relocation site increases.

To prepare the transportation plan, ASCG collected and assembled data from federal, state, regional, and local sources. ASCG worked closely with Council staff and members in developing the plan and associated mapping. The site plan and road priorities were approved at a public meeting held in Newtok on February 27, 2001.

There are approximately 6.71 miles of proposed roads to be constructed at the new village site. These road projects are shown below and on the Proposed Relocation Site Plan map (Figure 1) located in Appendix A.

Priority #1 – Construct Barge Landing Road and Airport Road

- **Barge Landing Road** is 0.23-mile road that will provide access to the barge landing, barge unloading and storage area, marine fuel header, and fuel tanks.
- **Airport Road** is a 0.68-mile road that will provide access to the airport.

Priority #2 – Construct Main Street, Qugaglig Road, and Piunritarqaq Road

- **Main Street** is a 3.63-mile road and is the main thoroughfare of the village. The road provides access to the sauna, teacher's housing, school, washeteria, church and many residences located inside the village, while providing access to all facilities located outside the village as well.
- **Qugaglig Road** is a 0.88-mile, main village road running parallel to Main Street. The road provides access to all residences and facilities on the Baird Inlet side of the

town. It accesses the power plant, two stores, multipurpose building, health clinic, post office, numerous residences, and the shoreline.

- **Piunritarkaq Road** is a 0.20-mile spur road that links the two main thoroughfares of the village and provides access to the shoreline.

Priority #3 – Construct Mikcyaq Road, Qassaiuli Road, Qeatuak Road, Arnapagaq Road, Nuyaralek Road

- **Mikcyaq Road** is a 0.25-mile road that links the two village thoroughfares and provides access to the school, multipurpose building, residences, and shoreline.
- **Qassaiuli Road** is a 0.29-mile road that links the two village thoroughfares and provides access to the health clinic, washeteria, residences, and shoreline.
- **Qeatuak Road** is a 0.26-mile road that links the two village thoroughfares and provides access to the church, store, residences, and shoreline.
- **Arnapagaq Road** is a 0.29-mile road that links the two village thoroughfares and provides access to residences and the shoreline.

List of Abbreviations

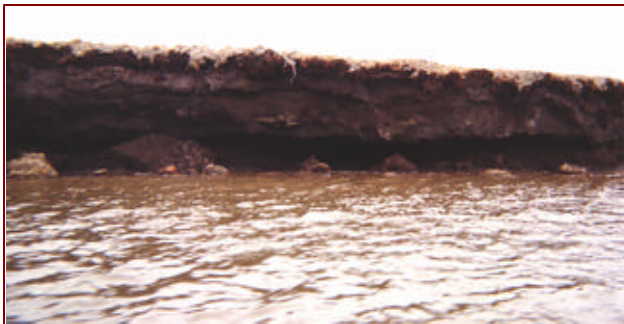
ADOT&PF	Alaska Department of Transportation and Public Facilities
ANCSA	Alaska Native Claims Settlement Act
ASCG	Arctic Slope Consulting Group Incorporated
ATV	All Terrain Vehicle
BIA	Bureau of Indian Affairs
DCED	Department of Community and Economic Development
EMS	Emergency Medical Services
HUD	Department of Housing and Urban Development
IHS	Indian Health Service
IRR	Indian Reservation Roads Program (BIA)
JATP	Juneau Area Transportation Plan
LKSD	Lower Kuskokwim School District
NTC	Newtok Traditional Council
SHPO	State Historic Preservation Office
STIP	Statewide Transportation Improvement Program
TEA-21	Transportation Equity Act for the Twenty-first Century
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VPSO	Village Public Safety Officer
VSW	Village Safe Water
YKHC	Yukon-Kuskokwim Health Corporation

Introduction

The Newtok Traditional Council has initiated a village relocation planning process in order to prepare for the imminent encroachment of riverbank erosion on its residences and facilities. The construction of new community roads at the proposed village relocation site is the top priority of Newtok residents and of this plan. The road system will provide a foundation for developing a viable community at the new site on the north end of Nelson Island, safe from the threat of erosion. The site is located approximately nine miles away from Newtok in the Yukon Delta National Wildlife Refuge and is part of a proposed land swap currently under negotiation between the U.S Fish and Wildlife Service and the Newtok Village Corporation.

The current site of Newtok is experiencing severe erosion along the bank of the Ninglick River. The erosion rate has been documented by the Newtok Traditional Council, the U.S Army Corps of Engineers, and Woodward-Clyde Consultants in 1983. Aerial photos from 1983 and 1996 clearly show the erosion of the river bank at the south end of Newtok. See Figure 3. Approximately 1,300 feet (1/4 mile) of land in front of the village was lost to erosion, equaling an annual average loss of 100 feet per year. From 1996 to September 2001, another 400 feet of land has been lost. Lines on Map Figure 2 indicate erosion levels from 1954 to 2001. A total of 4,000 feet of land was lost during this period (an annual average loss of 85 feet).

Erosion accelerates rapidly during south and southeasterly winds. Because the erosion rate has remained consistent, the Corps of Engineers estimates that erosion will physically impact residences and infrastructure in eight to nine years (2008-2009).



Erosion undercuts Ninglick River bank in front of Newtok.

The Newtok Traditional Council staff has carefully monitored the river's encroachment to the village by having markers placed along the banks of the river. In a two-month period between July and September of 2001, they documented a loss of 21 feet of land to the river. There is now approximately 800 feet between the eroding riverbank and the nearest house at the south end of the village.

The previous village dumpsite and a portion of the boardwalk leading to it, located on the south end of the village, washed into the Ninglick River in 1996 due to erosion. A temporary dumpsite was then established on the other side of the Newtok River, which is located adjacent to the village. This has created problems because trash gets dropped off and piles up on the riverbank because transport across the river is only possible at high tide.

The Newtok River is becoming progressively shallower due to the encroaching Ninglick River. This has stopped the flow of the Newtok River, creating a build up of silt. This has made it difficult for barge and boat access to and from the village boat landing.

The encroaching Ninglick River has also affected the local water source (a small lake), causing it to become saline. The village's transport container storage area at the south end of the village has containers currently hanging over the edge of the eroding Ninglick River bank.

This current and expected future loss of and damage to facilities and the subsequent effect on services, has caused agencies to hold off expending capital funds at the present site. Airport improvements and a solid waste master plan have been deferred. The Yukon-Kuskokwim Health Corporation has deferred the construction of a new health clinic. The existing health clinic is overcrowded.



Container storage endangered by Ninglick River erosion.

This encroachment on the village has caused much anxiety and concern among village residents. It is very difficult for residents to comprehend that their homes and way of life are being threatened. The idea of relocating to a new site close by is favored by most residents; even the people most resistant to the idea admit that it's inevitable.

People have lived within the Newtok area for hundreds of years. As erosion became a cause for concern, residents took a proactive approach to this serious threat to their homes and village. In 1987 the village tried to stop the erosion with an experimental sandbag seawall. Unfortunately, the project neither stopped nor slowed the erosion.

The Newtok Traditional Council has now initiated a village relocation planning process. Alternative relocation sites have been considered, with the most favored site located on the north end of Nelson Island. The Council hired ASCG Incorporated to develop a Land Use and Transportation Plan for their proposed relocation site. The purpose of the plan is threefold:

- To develop a land use plan map with village specifications for the proposed relocation site.
- To develop a transportation plan with prioritized roads, justifications, and estimated cost.



Bluffs along the north end of Nelson Island

- To provide a foundation for future community development studies as knowledge of conditions and opportunities at the relocation site increases.

The Bureau of Indian Affairs (BIA) has also provided special funding for this project through a unique appropriation to their Indian Reservation Roads (IRR) program as part of the federal highway legislation, Transportation Equity Act-21 (TEA-21). The BIA Assistant Secretary, Indian Affairs in consultation with tribal leaders of the TEA-21 Negotiated Rulemaking committee, outlined the procedure for expending these special funds (3/7/00, Federal Register, Volume 65, #45).

The overall study area for this transportation plan includes the existing village site of Newtok and the proposed village relocation site on the north end of Nelson Island in the Yukon Delta National Wildlife Refuge (designated as FWS West and FWS Middle), located approximately 60 degrees, 46 minutes North and 164 degrees 18 minutes West (Sec. 24, T8N, R85W, Seward Meridian). See Figure 2 for reference. Newtok is considered part of the BIA designated Bethel Agency located within the Juneau Area.

To prepare the transportation plan, ASCG collected data from federal, state, regional and local sources. ASCG worked closely with council members and staff in developing the plan.

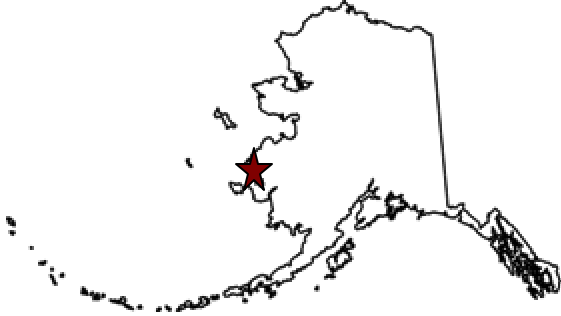
This plan will be referenced in a soil feasibility study of the site, scheduled for late winter or late summer 2002. The soil study is being funded by the Bureau of Indian Affairs with matching dollars from the U.S Army Corps of Engineers. This project will be administered by the U.S. Army Corps of Engineers.

This plan is organized into four sections:

- 1.0 General Description
- 2.0 Regulation and Master Planning of Transportation Improvements
- 3.0 Existing Transportation System
- 4.0 Road Facility Needs

1.0 GENERAL DESCRIPTION

1.1 Location



Newtok is coastal community situated on the west bank of the Newtok River, just north of the Ninglick River and Nelson Island. The village is 94 miles northwest of Bethel, in the Yukon-Kuskokwim Delta Region. The north, east, and south boundaries of the community are contiguous with the Yukon Delta National Wildlife Refuge. The geographical coordinates for the community are approximately 60 degrees, 56 minutes North and 164 degrees 38 minutes West (Sec. 24, T010N, R087W, Seward Meridian). The area encompasses 7.3 square miles of land and 1 square mile of water. Due to severe beach erosion, the village wants to relocate homes and facilities to a new site approximately nine miles away.

1.2 Background

Culture and History

Newtok is a traditional Yupik Eskimo village, with an active subsistence lifestyle. The people of Newtok share a strong cultural heritage with other Nelson Island communities; their ancestors have lived on the Bering Sea coast for at least 2,000 years. The people from the five villages in the area are known as Qaluyaarmiut, or “dip net people.” Relative isolation from outside influences has enabled the area to retain its traditions and customs; more so than other parts of Alaska. The area had only brief and intermittent contacts with Russians and Americans until the 1920’s.

Around 1949 the village was relocated from Old Kealavik ten miles away, to its present location along the Newtok River to escape flooding and to build a school. Into the 1960’s the residents of Newtok continued a migratory pattern of summering in fish camps on Nelson Island. After fishing season, Newtok’s men would often travel to Bristol Bay to work in the canneries. Thus Newtok remained simply a winter residence for its people. By the 1970’s, however, the snowmachine and modern housing projects had replaced the dog team and sod houses in Newtok, and its residents began to assimilate elements of American culture.

Government

Newtok was incorporated as a second class city within an unorganized borough in 1976. In 1997, the city government was dissolved. The BIA-recognized Newtok Traditional Council conducts local government affairs. The Newtok Native Corporation also serves the village. Contact information follows.

Newtok Traditional Council, P.O. Box 5545, Newtok, Alaska 99559
Moses Carl, President. Phone: 907-237-2314, Fax: 907-237-2428

Newtok Native Corporation, General Delivery, Newtok, Alaska 99559
Larry Charles, CEO. Phone: 907-237-2413

Population

The 2000 U.S. Census recorded a population of 321. Alaska Natives represented 96.9% of the population. The majority of the population is Yupik Eskimo. There were 63 households with an average household size of 5.1.

According to the Alaska State Department of Community and Economic Development (DCED), the population increased from 114 in 1970 to 321 in 2000. A population projection was performed at ASCG using this increase in growth between these years (1970 to 2000). The resulting average annual growth rate for this period was 3.51%. If this rate of increase continues, Newtok can expect a population of 640 by 2020.

Economy

The school, clinic, Traditional Council, Native Corporation, and commercial fishing provide most employment. Subsistence activities and trapping supplement income. Twenty-two residents hold commercial fishing permits.

According to the 1990 census, the median household income was \$14,844, with 50.2% of residents living below the poverty line. There were 42 people employed with 14 people looking for work, or 25.9% unemployed. This unemployment rate, when combined with adult workers not in the labor force, equals a total unemployment rate of 94.1%.

Environmental Considerations

It is important to consider the environmental impacts when developing any transportation system. The following information is intended to assist in the analysis of infrastructure development projects at the proposed relocation site.

Flood and Wetland Information



Proposed Newtok relocation site.

The proposed relocation site at the north end of Nelson Island is situated on five to thirty-foot bluffs, with intermittent gravel beaches, gradually sloping upwards to a summit of several hundred feet. Historically, there is no known flooding. Wetland impact would be minimal.

Wildlife. Fish and wildlife are abundant around the Newtok area. The area is a prime habitat of

mink, land otter, and beaver. There are occasional brown bear, moose, and

caribou. Salmon found in local waters include Coho, Pink, Chum, Sockeye and Chinook. In addition, area waters host black fish, needle fish, white fish, smelt, pike, lush fish, and seal. Birds include swans, cranes, swallows, sandpipers, raven, crow, seagulls, and a variety of geese. There is concern by the U.S. Fish and Wildlife Service that the proposed village site may be too close to the brandt geese breeding grounds located on an island approximately two miles northwest of the site in Baird Inlet.

Vegetation.

There is an array of tundra vegetation common to the region which provides the ground cover of the site, starting from the flat area along the river bank and gradually sloping upward to the summit, several hundred feet above. A detailed study of vegetation will be performed as a part of future site studies.



Thick tundra covers Nelson Island.

Historic Preservation. The State Historic Preservation Office (SHPO) has a record of a historic site near a potential water source (river) on the north end of Nelson Island. Coordination with the SHPO will be necessary during project development.

Wild and Scenic River Status. There are no designated Wild and Scenic Rivers near the proposed project area according to the Alaska Department of Natural Resources and the Bureau of Land Management.

Coastal Zone Management. Newtok is included in the Ceñaliulriit Coastal Resource Service Area. A coastal management plan for this service area was developed in September 1999.

Wilderness. The proposed relocation site for Newtok is located on the north end of Nelson Island, in the Yukon Delta National Wildlife Refuge. The site is currently being negotiated for in a land swap with the U.S. Fish and Wildlife Service.

1.3 Infrastructure

The Proposed Relocation Site Plan (Figure 1), located on the following page and in a larger format in Appendix A, is based on a 1996 infrared image and shows the proposed land use development. Detail about the community's current infrastructure are provided below.

Figure 1: Land Use Map

Housing

At the time of the 2000 U.S. Census, there were 67 housing units; 4 of these were vacant. Forty-one homes (65%) were owner-occupied with a 1990 median value of \$23,000. Twenty-two homes (35%) were renter-occupied with a 1990 median rent of \$99 per month.

Although the BIA and HUD have constructed 19 homes in Newtok, many of Newtok's 67 houses are Native homes of older construction. The village plans to move as many structures as possible to the planned village relocation site.

Public Facilities and Services

There are nine commercial and public buildings in the community. These include three stores (one corporation store, one private store, and one video store), a health clinic, a new elementary and high school completed in summer 2001, one church, the Traditional Council office, and Ungusraq Power Company providing electricity, and the old school building.

Health Clinic

The Newtok Health Clinic provides local health care. The Yukon-Kuskokwim Health Corporation (YKHC) operates the clinic, which is overcrowded. However, the YKHC has deferred the construction of a new and bigger health clinic due the threat of erosion to the village. A feasibility study for a flush/haul sanitation system for the health clinic was recently completed.

School

A new modular school was completed in 2001. The school serves approximately 100 students, and is staffed by six certified teachers. The school has its own sewage lagoon.

Electricity

Electricity is provided by the Ungusraq Power Company. Fuel oil is barged to Newtok during the summer months and stored at fuel tank farms. The Newtok Native Corporation has a fuel capacity of 94,000 gallons, and the Lower Kuskokwim School District (LKSD) has a fuel capacity of 121,255 gallons. Tom's Store has a fuel capacity of 24,000 gallons for heating fuel and gasoline.

Water

Drinking water is pumped from a nearby lake into a water treatment plant and transferred to the village water tank. However, village residents complain the water has become saline due to the encroaching Ninglick River contaminating the water supply. Residents supplement their water supply by collecting rainwater in the summer and by melting ice in the winter.

Washeteria

The washers and dryers at the washeteria were closed down in 2000 because of obsolete power lines to the washeteria. The village power generators are also too small to

accommodate all village electrical needs; washeteria power was cut off as a result. All washing and drying of clothes are now done by hand at home using hauled water and clotheslines.

Wastewater

Wastewater from Newtok's homes are collected in honeybuckets and dumped along the Newtok River bank. There is no plumbing.

Landfill

The previous village landfill, located on the south end of the village, washed into the Ninglick River in 1996 because of erosion. A temporary dumpsite was then established on the other side of the Newtok River adjacent to the village. This has created problems because trash gets dropped off and piles up on the riverbank while waiting for transport across the river. Transport across the river is only possible at high tide.

Airport

A State-owned 2,180-foot gravel airstrip provides air access year-round; major improvements have been delayed due to the threat of erosion to the village. A seaplane base is also available, but not widely used.

1.4 Soils and Topography

Existing Site

Newtok is a coastal community situated on the west bank of the Newtok River, a slow-moving river draining the flat Yukon-Kuskokwim delta. Approximately 800 feet to the south is the encroaching Ninglick River, eroding towards the village at an average rate of 90 feet per year. The surrounding land is flat, low-lying, marshy tundra dotted with thousands of thaw-lakes and sloughs. Vegetation in this low area is primarily the mosses, lichens, hair grass, sedges, and berries typical of tundra.

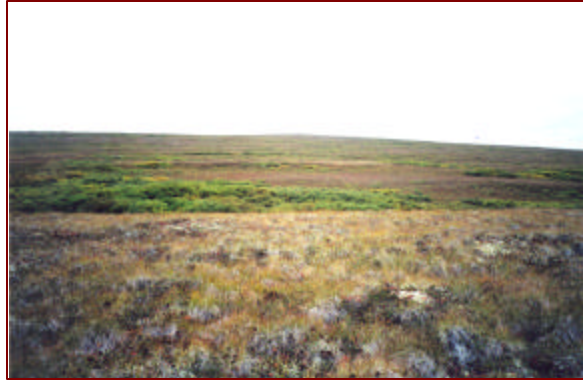
The bedrock in the area is comprised of non-marine sandstone and siltstone overlaid by volcanic flows and capped with a deep, wind-deposited silt. A typical soil profile has a deep frozen silt layered with peat at the surface. Permafrost continuously underlies a two-foot active layer (sometimes thicker when a greater layer of peat is present).

The shallow active layer combines with the continuous presence of permafrost and nearly flat surface slopes to yield extremely poor drainage conditions around Newtok. The permafrost is ice rich and, in thaw periods, the active layer is almost completely saturated and has virtually no bearing capacity.

Flooding and erosion raise additional concerns for Newtok. The shoreline is highly vulnerable to flooding, especially during spring ice jams in the river or in severe westerly windstorms on the Bering Sea. Thermal degradation of the riverbanks is causing shoreline sloughing. To this date, the landfill has been overrun by riverbank erosion; the transport container storage area is currently being overrun. The U.S. Army Corps of Engineers estimates that residences and other village facilities will be seriously threatened by erosion in eight years (2008).

Proposed New Site

Nelson Island was formed from volcanic lava flows. The proposed village relocation site at the north end of the island is an area of rugged, treeless tundra with gradual slopes that reach a summit of several hundred feet. Mosses, lichens, hairgrass, sedges, and berries are present. There are a couple of streams, some small and intermittent areas of marshy tundra, and no lakes. The bluffs along the Baird Inlet range between five and 30 feet high, and are separated in areas by intermittent gravel beaches. The U.S. Army Corps of Engineers plans a detailed soil feasibility study of the site for February or March of 2002.



Rocky bluffs appear to protect Nelson Island from erosion at proposed village relocation site.

1.5 Climate

Newtok is located within an area classified as the Transitional Climatic Zone of Alaska. This zone is typified by more pronounced temperature variations throughout the day and year, and less cloudiness. There is lower precipitation and humidity than is found in a Maritime climate. Average precipitation is 17 inches, with annual snowfall of 22 inches. Summer temperatures range from 42 to 59 degrees; winter temperatures range from two to 19 degrees.

2.0 REGULATION AND MASTER PLANNING OF TRANSPORTATION IMPROVEMENTS

2.1 Regulation of Transportation Improvements

Because Newtok is neither contained within an organized State borough not incorporated as a municipal government, public road improvements are subject only to State and Federal regulations and approval of the Traditional Council.

2.2 Comprehensive Planning

To date the Newtok Traditional Council has not developed a comprehensive plan. However, the village's number one priority is to move the village away from the current erosion hazard. A site has been chosen approximately nine miles away from the existing village site. The new site is in the Yukon Delta National Wildlife Refuge, under the jurisdiction of the U.S. Fish and Wildlife Service. The village has initiated a relocation planning process with the development of this plan.

Newtok is within the study area of the Alaska Department of Transportation and Public Facilities' (ADOT&PF) Yukon-Kuskokwim Area Transportation Plan that was produced in draft form in April 2001. The plan reviews the regional transportation system with the goal of identifying opportunities to improve safety, enhance quality of life, and support economic development. The document identified four main transportation improvements that are regional priorities: 1) improvements to airports, 2) winter trails, 3) mineral resource access roads in the upper Kuskokwim, and 4) barge landings and moorings. As of the time of this report, the Yukon-Kuskokwim Area Transportation Plan was still pending finalization.

The community has identified the following projects as being funded. The projects are listed by the name of the project, the fiscal year in which the project is expected to begin, and the agency involved.

TABLE 1: CURRENT AND PLANNED DEVELOPMENT

PROJECTS	SCHEDULE	FUNDING
Airport Master Plan for New Site	2004	DOT&PF
Sanitation Master Plan for New Site	2003-2004	VSW

Other planned but currently unfunded infrastructure projects include the Newtok Village Relocation Plan that will outline the development of village housing and infrastructure for the new site.

3.0 EXISTING TRANSPORTATION SYSTEM

Newtok is accessible by air and water; there are no roads connecting the community with any other in the area. A State-owned 2,180-foot gravel airstrip provides air access year-round. Major improvements have been deferred because of the erosion threat. A seaplane base is also available, but not widely used. Boats, skiffs, and ATVs are used in the summer, and snow machines are used in the winter for local transportation and subsistence activities. Barges deliver cargo twice per month during the summer; however it is becoming more difficult as the Newtok River entrance to the village boat landing becomes shallower.

3.1 Community Roadway System

Existing Village Site

Newtok has approximately 1½ miles of boardwalks within the community. There are no gravel roads. An 800-foot boardwalk connects the airport with the system of boardwalks in the village. Surface transportation is restricted to the boardwalk areas except during the winter when the surrounding areas become accessible to snow machines.



Boardwalks comprise Newtok's current transportation system.

Proposed Village Relocation Site

The new site has approximately 6.71 miles of proposed gravel road. These roads are shown on the Proposed Relocation Site Plan (page 4) as well as in Appendix A.

The BIA's Indian Reservation Roads (IRR) program maintains a partial inventory of Indian reservation roads. The BIA accepts changes to the inventory by completed "5704 forms." The form includes detailed information about road use, structure, condition, cost for improvement and ownership. Roads in the BIA IRR inventory generate additional funds for construction of roads in Alaska. Appendix B includes completed BIA 5704 forms for the Priority #1 road project at the Newtok proposed relocation site.

3.1.1 Right-of-Way and Roadway Ownership

Existing Village Site

Despite its lack of road development, Newtok has five segments of dedicated right-of-way, including a 110-foot-wide tract containing the boardwalk to the airport. Other corridors, all of which are 40 feet wide, include undeveloped access for a housing area near the school site (in the southeast corner of town), and for a subdivision near the armory at the north edge of town.

Very little subdivision of the Village Corporation property has occurred and consequently, Newtok's boardwalks are nearly wholly contained on private (Village Corporation) property and are probably owned by the Newtok Corporation. The Newtok Native Corporation has an ANCSA 12(a) entitlement to 92,160 acres but has not acted related to 14(c)(3) status.

Proposed Village Relocation Site

No right-of-way nor subdivision has been established yet, as the land is still part of the Yukon Delta Wildlife National Refuge. Negotiations are currently underway between the U.S. Fish and Wildlife Service and the Newtok Native Corporation.

3.1.2 Geometric Elements

Existing Village Site

There are no gravel roads in the village. Boardwalks provide the means of foot and ATV transportation. The boardwalk connecting the airport to the village is eight feet wide, and in good condition. All other village boardwalk widths vary between four and eight feet and these boardwalks are in poor condition. The boardwalks were built of wood, with most construction reportedly occurring in 1976 and 1981. The system is approaching the end of its useful service life.

Proposed Village Relocation Site

With the planned move of the village, an entire new road system will need to be constructed.

3.2 Existing Structural Characteristics

3.2.1 Surfacing and Subbase Material

Existing Village Site

Because of extremely poor drainage conditions in Newtok's existing village site, all transportation corridors in the village are wooden boardwalks.

3.2.2 Drainage

There are extremely poor drainage conditions in the existing village area.

3.2.3 Bridges

There are no known bridges in Newtok.

3.3 User Characteristics

3.3.1 Community Vehicle Inventory

Residents own many ATVs, boats, and snow machines. There are no trucks or cars in the village.

3.3.2 Trip Generators

The main activity centers in Newtok are the new school, stores, community center, health clinic, boat landing areas, and the airfield. Most of the buildings in the community lie within a 3,000-foot by 800-foot area. The airfield is one-quarter mile from the village center.

All travel in the village is accommodated by the boardwalk system. Most people walk. Four wheelers are also used on the boardwalks year around. Snow machines are used in the winter on many snow trails.

3.4 Maintenance

The Newtok Traditional Council is responsible for maintaining village boardwalks. However, Council staff reports that they have very little funding for maintenance. The ADOT&PF maintains the airport boardwalk.

3.5 Construction Material Source

Below are two material source studies performed by ADOT&PF in 1977 and by Woodward and Clyde in 1984.

ADOT&PF Material Source Study

The best prospects for construction material local to Newtok are on Nelson Island, across Baird Inlet. A reconnaissance effort by the ADOT&PF in 1977 found two potential material sites.

Site #1 is located along an unnamed stream on the north shore of Nelson Island, just southwest of the confluence of the Ninglick River and Baird Inlet, in Section 5, Township

8 North, Range 86 West, Seward Meridian. Although the material is suitable for construction, it is believed to have limited quantities. Moreover, mining of the source may affect a known salmon spawning area, thus complicating the necessary permitting requirements. Additionally, poor access conditions limit excavation to winter-only operations, which are reportedly difficult because of shallow ice conditions.

Site #2 is located along the north shore of Nelson Island, and is a three-mile length of beach beginning approximately four miles east of Site #1. Approximately 4,000 cubic yards of material was estimated as available from the site, although it is not known if any material has been excavated for recent projects in Newtok. The material was not judged to be particularly good for construction purposes, although it appears to be an economical choice for projects in the region. Access is a problem and very dependent upon the thickness of the river ice during the winter months.

Woodward and Clyde Material Source Study

This focus of this study was investigating rip rap sources on the north end of Nelson Island for the purpose of fortifying the banks of the Ninglick River at the existing site of Newtok, where erosion is occurring. See Figure 2 for the location of the sites.

Site #1 involved about a 1½-mile overland haul to the Ninglick River and an eight-mile downstream run to Newtok. Although bedrock at this site is poorly exposed, topographic benches suggest the presence of resistant basalt flow layers. Rock quality varied from basalt blocks over 1 cubic yard in size with high strength, moderate density and only slight weathering, to low strength, highly weathered, vesicular basalt.

Site #2 is located on the south shore of the Ninglick River, with apparently favorable beach access. Basalt flows are intermittently exposed along the shore for about 0.5 mile. The westernmost exposure (A) appeared to have the best rock. Rock quality in these exposures is highly variable. The upper 10 feet of these strata are composed of soil and highly weathered, very vesicular, low-density basalt that could be broken to sand by finger pressure. The rock generally became significantly more competent with depth. Height of the exposure was limited to 15 feet. Talus beneath the outcrop is generally less than 1 cubic foot in size; however, blocks with moderate strength to 1 cubic yard in size were observed.

4.0 ROADWAY FACILITY NEEDS

The Newtok Traditional Council and residents have identified the need to build a new village at the proposed relocation site on the north end of Nelson Island. The priority roads identified below will form the foundation for the proposed village grid system. The road layout will accommodate several neighborhoods in compact rows, with an estimated 80 residences constructed 75 to 100 feet apart. The school should be 150 feet from the nearest residences. The post office, church, clinic, and washeteria should all be centrally located inside the residential area so that the elderly do not have to walk far. All other commercial structures should be located outside the residential area. See Figure 1.

4.1 Juneau Area Transportation Plan (JATP) Road Construction Projects

1990 and 1993 Projects

No 1990 or 1993 BIA Juneau Area Transportation Plan application was submitted for Newtok.

2001 projects

The following roads have been prioritized by the Village of Newtok in 2001 in order to accommodate the proposed village relocation site layout:

- Priority #1 Construct Barge Landing Road and Airport Road
- Priority #2 Construct Main Street, Qugaglig Road, and Piunritarka Road
- Priority #3 Construct Mikcyaq Road, Qassaiuli Road, Qeatuak Road, and Arnapagaq Road.

4.2 2001 Priority Project Descriptions

The list below provides details of road improvement projects identified and prioritized by the village council and staff for the proposed relocation site. The Transportation Priority Map illustrating the location and length of each of the proposed roadway projects follows the list and is also located in Appendix A in a larger format.

Priority #1 - Construct Barge Landing Road and Airport Road (0.91 miles)

- a) **Project Description: Phase 1 Road Construction** - Construct two roads, approximately 0.91 miles, starting from the proposed barge landing area at the shoreline of Baird Inlet. Barge Landing Road runs across flat tundra for 0.3 mile, before crossing the proposed Main Street, and connecting to Airport Road. The road then winds up a slope for approximately 0.6 mile to a flat area and the proposed airport site.
- b) **Project Justification:** To initiate construction of the new village, these two roads need to be built first, as they will facilitate the movement of construction material and workers to the new village relocation site.

- **Barge Landing Road** **Route 0010** **0.23 miles**
Barge Landing Road will provide access to the barge landing, barge unloading and storage area, marine fuel header, and fuel tanks.

- **Airport Road** **Route 0020** **0.68 miles**
Airport Road will provide village access to the airport.

c) **Estimated Cost:** \$2,034,000

d) **Construction Timeframe:** ADOT&PF has scheduled an Airport Master Plan for 2004, with a potential earlier date if the project is progressing. The road location will be detailed as part of that project.

e) **Funding source:** ADOT&PF/BIA

- **Arnapagaq Road Route 0090 0.29 mile**

Arnapagaq Road links the two village thoroughfares and provides access to residences and the shoreline.

- a) **Estimated Cost:** \$2,730,420
- b) **Construction Timeframe:** Estimate within eight years
- c) **Funding source:** ADOT&PF/BIA

Figure 2: Transportation Priority Map

**APPENDIX A. ENLARGED PROPOSED RELOCATION SITE PLAN
MAPS**

APPENDIX B. ROAD INVENTORY INFORMATION

- **Resolution for BIA 5704 Road Inventory Forms**
- **5704 Forms**

APPENDIX C. FUNDING SOURCE INFORMATION

The primary sources of funding for transportation projects in Alaska is the Bureau of Indian Affairs (BIA) roads program or the State of Alaska's Department of Transportation and Public Facilities (ADOT&PF). Both agencies generally receive applications and are highly competitive. Other funding sources that Newtok may want to consider for roadway design and construction; Capital Project matching Grants through the Alaska Department of Administration, Community Development Block Grant Program, Community Facilities Guaranteed Loans through USDA, Rural Development, the National Cooperative Bank, and the Denali Commission. More detailed information on roadway funding sources can be found in Appendix C.

APPENDIX D.BIBLIOGRAPHY

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