MOVING NEWTOK

Newtok's current village site
on the Bering Sea coast is threatened
by flooding and erosion.
The community will be relocating
to the Mertarvik site on a high hill
farther from the water's edge. The
MERTARVIK COMMUNITY LAYOUT PLAN
will guide the new village site's development.

PHOTOS BY **LISA CHARLES** AND **HDR ALASKA, INC.**

Background & Project Purpose

Newtok is a Yup'ik Eskimo village and residents maintain a traditional subsistence lifestyle. Newtok shares a history with other Nelson Island communities. Their ancestors have lived on the Bering Sea coast for at least 2,000 years. Collectively, the people from the five Nelson Island villages are known as Qualuyaarmiut, or "dip net people."

The Village of Newtok is located on the north bank of the Ninglick River in the Yukon-Kuskokwim Delta Region. Newtok is approximately 94 miles northwest of Bethel. The current village location was first settled in 1949. At that time, the community moved from Old Kealavik to escape flooding and because there was no suitable site for a school. The current village site was located at the farthest point up river that the barge carrying the school building materials could reach.

Now, Newtok is again threatened by flooding and continuing land erosion from the Ninglick River. Projections indicate that buildings within the village will begin to erode into the river within the next five years.

After considering several options, the community has decided to relocate to a new site approximately 9 miles away on Nelson Island. The new site is farther from the water's edge and located on a high hill. The new site is called Mertarvik which means "getting water from the spring" in Yup'ik. Once Mertarvik is occupied, it will be known as Newtok. For more information on how Mertarvik was selected, please see the *Newtok Background for Relocation Report* (ASCG 2004).

To make the move, Newtok residents began looking at alternatives and planning. This community layout plan (CLP) for the Mertarvik site is the next important step. This CLP gives details on what the new village will be like, and will guide the new village's efficient and orderly development.

Project History

Erosion on the Ninglick River has occurred for more than 50 years and has had a negative impact on the community. The river has eroded over 3,300 linear feet since 1954 (ASCG 2004). This has resulted in a loss of the landfill and barge landing, reduced river access, increased workload to reach the temporary landfill, reluctance of agencies to invest in the community's infrastructure, and a general uncertainty among residents about what is going to happen in the future.

In response to the erosion threat, the village decided to relocate. In the early 1990s, the Newtok Traditional Council (NTC) analyzed six potential village relocation sites. The community selected a site on the north side of Nelson Island. This site was part of the Yukon Delta National Wildlife Refuge. In 1996, the Newtok Native Corporation began working with the U.S. Fish and Wildlife Service (USFWS) to exchange land within the Yukon Delta National Wildlife Refuge. In November 2003, the 108th Congress passed S. 924, the legislation that authorizes the exchange of lands between the USFWS and the Newtok Native Corporation.

In the spring of 2006, a group of representatives from State and Federal agencies as well as other interested parties formed the Newtok Planning Group (NPG). The purpose of the group is to identify agency resources and to establish a strategy for assisting Newtok in its relocation efforts.

As part of the NPG work, Village Safe Water (VSW) developed a preliminary layout based on a piped water and sewer system at the new site (sometime referred to as the boomerang layout) with minimal operating costs.

The NTC hired HDR Alaska to further develop the VSW layout. The planning process began with agency interviews to identify their requirements. This was followed by a community meeting to identify the community's goals and objectives. Based on this input, a draft CLP with three alternatives was developed and presented to the community. During a community meeting, a vote was held indicating that Alternative 1 was the preferred layout. This alternative was modifed based on the community's comments to become the final CLP (see reverse).

Simultaneously with this CLP effort, the U.S. Army Corps of Engineers (COE) is working with the NTC to recommend construction of an evacuation center on Mertarvik to address the emergency needs of the existing community.

Planning Requirements

The CLP has to be designed to meet the needs of Newtok residents. In addition to being functional for their daily activities, the layout also needs to consider the topography of the selected site as well as the operation and maintenance costs. The main planning requirements are summarized below:

- Centrally locate community facilities
- Accommodate alternative energy sources
- Locate washeteria/water treatment plant near the power plant to use waste heat
- Accommodate 63 single family housing units with room for expansion
- Provide access to barge landing, airport, gravel source, and fish camp

Population & Demographics

Knowing the population and demographics of Newtok is important because they have a direct effect on many aspects of village life including housing, transportation, infrastructure, and community facilities.

Population in 2006	323
Estimated population in 2020	640
Average household size	5.1
Occupied housing units	63

Source: ASCG 2004

Constraints

Sloping terrain. The new village site is located on a north-facing slope. The slope influenced the location of roads in an attempt to keep road grades to 8% or less. This grade is desirable because it:

- makes travel up and down the hill easier,
- has fewer maintenance needs,
- has fewer drainage issues.

Housing. The US Department of Housing and Urban Development (HUD) has certain criteria that need to be met before they will fund a housing project. HUD requires that projects:

- have an acceptable separation from above ground tanks,
- not be located in the runway protection zone (RPZ) of an airport,
- have a noise level of 65 dbl or less,
- have no contamination from toxic chemicals.

Airport. A runway requires a long, flat stretch of land. Area terrain limited airport alternatives. In addition, the sewage lagoon and landfill must be a minimum of 5,000 feet away from the airport. All setback requirements and height restrictions must also be met.

Infrastructure. The new site must be able to support a gravity fed water and sewer system. Maintenance costs should be minimized to reduce the financial obligations of the community. The sewage lagoon and landfill should be separate to prevent cross-contamination.

Water. A wellhead protection zone extends 200 feet around the well to protect it from uphill contaminants.

Goals & Objectives

A community meeting was held on December 10, 2006, to identify the community's goals for the Mertarvik Community Layout Plan. The community's wishes are summarized below:

Goal 1: Provide access to the natural environment

Create connections to the setting and preserve access to subsistence resources, including fishing, hunting and berry picking areas.

Objectives:

- Provide connections to subsistence resources such as fish camp and berry patches
- Consider wind and sun orientation in layout design

Goal 2: Preserve traditional way of life

Maintain Newtok's traditional way of life including Eskimo dancing and learning from the elders.

Objectives:

- Develop community spaces where people can interact and learn from each other
- Provide housing that is suitable for large families

Goal 3: Use reliable, affordable and sustainable infrastructure

Improve the quality of life of Newtok residents by providing basic infrastructure that can be maintained by the community.

Objectives:

- Develop a piped water and sewer system with affordable user fees
- Minimize maintenance requirements
- Consider alternative energy

Planning Level Phasing Strategy

Construction needs to be planned carefully so that it happens in a logical and efficient manner. This section of the community layout plan describes a strategy for phasing construction.

1. The first phase would be the construction of a barge landing site that will allow materials to be delivered to the site so construction can begin.
2. The next phase would be to develop the evacuation site being planned by the COE. This site would include an evacuation center and the supporting infrastructure such as a temporary generator, sewage lagoon, water treatment plant, and a road from the barge landing ramp. A road to a gravel source may be required.
3. The third stage would be to develop a construction camp including a building to house construction workers as well as material storage space.
4. Shortly after completing the construction camp, the airport would be developed to support construction activities. Construction of the airport would require a road to the airport and a road to a gravel source (if not already developed).
5. After the airport is complete, the next priority would be to construct housing. Roads would be built to access the housing areas. At the same time, the water system, sewer system, sewage lagoon, landfill, etc. should also be built so they are available when people start moving into the new village; however, phasing of infrastructure construction may change depending on the systems selected. After the new housing is built, housing from the existing village would be relocated.
6. The last phase would be the construction of the remaining community buildings and facilities. Until these facilities are built, the multi-use building would be used.

Planning Level Cost Estimate*

Facility	*Estimated Cost*
Well	$0.1M
Water Treatment Plant/ Water Storage Tank	$4.7M - $6.3M
Water Pipes	$4.5M - $5.5M
Sewage Lagoon	$4.5M - $6M
Sewer Pipes	$4.2M - $5.4M
Landfill	$0.12 M
School	New $22.9/ Move $5M
Airport	$20.5
Barge Landing Facility	$1M
Power Plant	$2M
Tank Farm	$2M - $3M
Roads/Trails (excluding Barge Landing road)	$14.2M - $16.3

*This is a partial list of costs associated with the new village site. More information is needed to develop an estimate for the other costs including relocation/construction of community facilities and housing. Agency coordination during project development is strongly recommended to identify cost-sharing opportunities.

Recommendations

The following studies are recommended to provide a solid basis for planning and design:

Building Survey

A comprehensive building survey of the existing village is needed to identify buildings that can be moved to the new site. The survey would include identifying repairs each building needs prior to it being moved.
Once the community has a firm number of how many buildings could be moved, they could work on acquiring funding for moving and replacing buildings. Residents could also start making needed improvements to existing buildings so they are ready to be moved when the time comes.

Housing Plan

After the building survey is complete, Newtok would know how many housing units can be relocated and how many new structures will be required. Newtok should work with HUD to identify potential funding sources.
In addition, the existing housing may not be the most appropriate housing for the new location and Newtok's traditional way of life. Newtok should work with HUD and research groups such as University of Alaska Building Technology Department to determine what type of housing should be built at the new site. Issues that should be explored include methods of making housing more energy efficient and reducing maintenance.

Alternative Energy Study

Newtok residents expressed a desire to reduce their dependency on diesel fuel and felt wind energy would be a suitable alternative. Given the cost and environmental consequences of relying on diesel fuel, identifying ways to reduce energy consumption and increased use of alternative energy sources is important. Newtok should work with the Alaska Energy Authority (AEA) to determine if wind energy is a viable alternative energy source for the Mertarvik Site.

Electricity Study

An electricity study that determines future energy use should be conducted to allow the power plant to be sized appropriately and determine how much energy could be provided by alterative sources.

Evacuation Center Betterments

The COE is allowed to include betterments as part of the evacuation center. Betterment means providing something in excess of what would actually be required by the project. The COE would be unable to fund the betterments, but including betterments in the evacuation center might be more cost-efficient in the long-run. For example, the evacuation center needs a temporary generator that would no longer be required once the village's power plant is built. Rather than purchasing and shipping a temporary generator for the evacuation center and a permanent one for the power plant, only the permanent generator would be obtained. Initially, it would be used for the evacuation center and then moved to the power plant. Because only one generator would be purchased and shipped, the cost for the overall relocation process would be less.

Water and Sewer Study

A study is needed to determine the type of water and sewer system (pipe versus closed haul or some combination) that will be included in the new village. Village residents would like a piped water and sewer system; however, residents need to make an informed choice. They need a study that shows the potential water and sewer systems as well as the cost for each type of system. This study will allow the villagers to select a system that balances all their needs and does not become a financial burden.

Identify Road Surface and Trail Designs

The CLP identifies the location of the village roads and trails but it does not recommend a surface material. Community residents are interested in a boardwalk system, gravel roads, and a geo-textile surface. Each road surface has different capital and operating costs. The community needs more information about the cost and maintenance requirements for these surfaces in order to make an informed decision about the road surface in the new village.

Post Office Design

The post office provides a vital link to the rest of the world and is likely to be one of the first community buildings built at the new site. The USPS has requirements and guidelines for a post office. Newtok should work with USPS so the new post office can be properly sited.

JUNE 2008

PREPARED FOR
NEWTOK
TRADITIONAL COUNCIL

BY HDR ALASKA, INC.

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THANK YOU TO THE FOLLOWING PEOPLE AND ORGANIZATIONS

Newtok Traditional Council

President, Moses Carl
Vice President, Joseph Patrick
Secretary, George Tom
Treasurer, Mary George
Member, Joseph John Sr.
Member, Joseph Inakak
Member, Charlie Tommy

Newtok Planning Group

DCCED, VSW, DOT&PF, COE, Denali Commission, RurAL CAP, USDA, HUD, DHS&EM, FAA, AVCP, CVRF, EPA, DEED, DNR, EDA, Newtok Traditional Council, Newtok Relocation Fund, Newtok Native Corporation

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Reference

Newtok Background for Relocation Report. ASCG. 2004.

MERTARVIK
COMMUNITY LAYOUT PLAN

Baird Inlet

To Nightmute

To Tununak & Tooksok Bay

Fish Camps/Neqsurviit

Berry Patches/ Naunriavitt

Fisheries Support Center/Neqsurviit Wiitaurvitt

Barge Landing/Paacat

Well/Elakaq

Recreation Area/ Ellami Aquivik

Wind Farm/ Wincaucat

Sewage Lagoon/Ciiqicivik

5,000 ft Airport Setback

To Cakcaoq

To Landfill/Lagvigkaq (approximately 0.8 miles)

Gravel Source

0 250 500 Feet

Legend

- Community Area
- Elder Housing
- Future Housing
- Housing
- School Property
- Community Garden
- Recycling Center
- Church/Agayuvik
- School/Elitnaurvik
- Post Office/Kalikivik
- Public Safety/Itercivik
- Tribal Hall/Caalivik
- Sewage Lagoon/Ciiqicivik
- Washeteria/ Water Treatment Plant/Ervigivik
- Clinic/Yuungcarivik
- Power Plant/Tank Farm/ Qeriurarvik/Kaassarvik
- Community Gym/Teen Center/Aquivik/ Ayagyuat Aquiviat
- Store/Kipusvik
- Teacher Housing/ Elitnaurstet Enait
- Multi-Use Building/Aqivik
- Incinerator/Elegcivik
- Library/Kalikivik
- Road/Trail
- Barge Landing/ Paacat Uciiruiit
- Recreation Area/ Ellami Aquivik
- Water Source/Elakaq
- Berry Patches/ Naunriaviit
- Fisheries Support Center/ Neqsurviit Wiitaurvitt
- Wellhead Protection Zone
- Wind Farm/Wincaucat
- Fish Camps/Neqsurviit
- Water Lines
- Sewer Lines
- Airport/Misvik

Produced by HDR Alaska on Behalf of the Newtok Traditional Council June 2008

Road Layout & Travel Considerations

- ATVs and snowmachines are the primary mode of transportation
- Roads should allow 2 vehicles to pass
- Keep roads under an 8% grade
- 40 foot road right-of-way with 14 foot roadway (approx. 10.15 miles of road)
- 20 foot trail right-of-way (approx.1.75 miles of trail)
- Provide links to fish camp, berry patches, barge landing ramp, and airport

Housing

- Minimum of 63 housing units required
- Expandable to 144 units
- Mostly 3- and 4-bedroom single family houses
- Elder housing near village center
- Some privacy from adjacent housing

Infrastructure (Water, Sewer, Electricity, Landfill, Etc.)

Infrastructure refers to the structures and systems that provide the foundation for development including utilities and transportation routes. Planning objectives for each infrastructure type are summarized below.

Water

- Strong preference for piped system over haul system
- Minimize operation and maintenance costs/ user fees

Sewer

- Strong preference for gravity fed piped system
- No lift stations/force mains
- Minimize operation and maintenance costs/ user fees
- Locate sewage lagoon a minimum of 5,000 feet away from the airport
- Minimize visibility of sewage lagoon

Electricity

- Generate power locally through the Ungusraq Power Company
- Reduce usage of diesel generators
- Incorporate alternative energy sources
- Locate power plant away from residential areas
- Provide enough capacity to meet village needs including washeteria and airport lighting

Fuel Tank Farm

- Store fuel for entire village
- Locate near barge landing ramp

Landfill

- Minimum of 5,000 feet away from the airport
- Easily accessible on a daily basis
- Not readily visible
- Some separation from the sewage lagoon to prevent cross-contamination

Recycling Center

- Include an incinerator
- Include a re-use area

Cemetery

- To be identified after the community has a better opportunity to visualize the area

Community Facilities

Community facilities are used by and benefit the entire village. Newtok residents expressed a strong desire to have all community facilities centrally located. Planning objectives for each community facility are summarized below.

Washeteria

- House laundry and bathing facilities
- Locate with or near the water treatment plant

School

- Relocate and reuse existing school building from current site
- Make new school site between 15 and 20 acres
- Separate from residential areas
- Locate teacher housing on the school site

Clinic

- Relocate and reuse existing clinic building from current site
- Located for easy access to airport for medevac purposes

Church

- Make larger than existing church

Tribal Hall

- House administrative programs
- Provide a gathering place

Post Office

- Will remain a contract post office (not operated by the United States Postal Service)
- Make three or four times larger than existing post office

Store

- Will be similar in size to existing store
- Be centrally located

Public Safety Building

- Provide office space for a Village Public Safety Officer (VPSO)
- Include a holding cell
- Include a court room for tribal court

Multi-Use Building

- Re-use the evacuation center and convert to a multi-use building
- Provide meeting space for community activities
- Potentially house a daycare center

Fisheries Support Center

- Locate near barge landing site
- Include an area for boat and net repair, office space, bunk space, and storage areas.

Outdoor Recreation Area

- Provide outdoor swimming and ice skating area
- Locate away from residential areas

Community Gym/Teen Center

- Indoor recreation space
- Basketball court
- Arts & craft area

Airport

- Accommodate a 4,000-ft runway
- A cross-wind runway would be desirable
- Include runway lighting
- Desire for terminal building