NUVISTA

YUKON-KUSKOKWIM DELTA

COMMUNITY SUSTAINABILITY MODEL

Lower Yukon – Emmonak, Alakanuk, & Nunam Iqua

May 2017

CCHRC

WHPacific

YUKON-KUSKOKWIM DELTA COMMUNITY SUSTAINABILITY MODEL

MAY 2017

Prepared for:
Nuvista Light and Electric Cooperative, Inc.
1205 E. International Airport Road, Suite 202
Anchorage, AK 99518
www.NuvistaCoop.org

Prepared by:
WHPacific, Inc.

Cold Climate Housing Research Center

This page left intentionally blank.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AEA	Alaska Energy Authority
AHFC	Alaska Housing Finance Corporation
ANTHC	Alaska Native Tribal Health Consortium
ARUC	Alaska Rural Utility Collaborative
ANA	Administration for Native Americans
ANILCA	Alaska National Interest Lands Conservation Act
ATV	All-Terrain Vehicle
AVCP	Association of Village Council Presidents, Inc.
AVCP-RHA	Association of Village Council Presidents – Regional Housing Authority
AVEC	Alaska Village Electric Cooperative
BIA	Bureau of Indian Affairs
CCHRC	Cold Climate Housing Research Center
CDQ	Community Development Quota (Program)
CVRF	Coastal Villages Regional Fund
DEC	Alaska Department of Environmental Conservation
DOE	U.S. Department of Energy
DOL	Alaska Department of Labor and Workforce Development
DOT&PF	Alaska Department of Transportation and Public Facilities
DNR	Alaska Department of Natural Resources
EDA	U.S. Economic Development Administration
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
GPS	Global Positioning System
HUD	U.S. Department of Housing and Urban Development
ICDBG	Indian Community Development Block Grant
LYSD	Lower Yukon School District
NAHASDA	Native American Housing and Self Determination Act
PCE	Power Cost Equalization
PLB	Personal Locator Beacon
RHA	Regional Housing Authority
TED	The Energy Detective
USDA	United States Department of Agriculture
YK	Yukon Kuskokwim
YKHC	Yukon Kuskokwim Health Corporation

ACKNOWLEDGMENTS

Nuvista Light & Electric Cooperative, Inc. would like to thank the following individuals and organizations for their input and guidance during development of this Yukon-Kuskokwim (YK) Delta Community Sustainability Model planning document.

YK Delta Community Sustainability Model Stakeholders

Alaska Energy Authority

- Jed Drolet, Energy Information Analyst
- Kris Noonan, Bulk Fuel Program

Alaska Housing Finance Corporation

- Scott Waterman, Weatherization

Alaska Native Tribal Health Consortium

- Gavin Dixon, Project Manager
- Eric Hanssen, Sr. Engineering Project Manager

Association of Village Council Presidents

- Brent Latham, Economic & Energy Director
- Clarence Daniel, Transportation Director
- Vivian Korthuis, Tribal Services Director

AVCP Regional Housing Authority

- Mark Charlie, President
- Hilda Stern

Business

- Lisa Wimmer, Wells Fargo

Calista Corporation

- Andrew Guy, CEO

Cold Climate Housing Authority

- Jack Hebert, President/CEO
- Nathan Wiltse, Policy Program Manager
- Vanessa Stevens, Research Scientist

Denali Commission

- Joel Neimeyer, Federal Co-Chair

Department of Environmental Conservation (SOA)

- Stephen Price, Rural Landfill Specialist

Fuel Providers

- Robert Herron, Jr., Delta Western
- Mark Smith, Vitus Energy, LLC
- Randy Breaux, Crowley Maritime

Institute of Social & Economics Research, UAA

- Ginny Fay, Asst. Professor of Economics

Nuvista

- Board of Directors
- Natalie Hanson, Executive Director

Utilities

- Meera Kohler, AVEC
- Anna Sattler, AVEC

Village Representatives: Alakanuk

- Edgar Andrews, City Council
- Eusebia Augline, City Council
- Bryan Fritze, Alakanuk Traditional Council
- Ignatius George, IGAP
- Allen Hanson, City Administrator
- Christopher James, Alakanuk Native Corporation
- Jaron Kameroff, Alakanuk Traditional Council
- Ray Oney, Alakanuk Traditional Council

Village Representatives: Emmonak

- Martha Kelly, Emmonak Tribal Council
- James Kameroff, Emmonak Corporation CEO/President
- Kandace Kameroff, Emmonak Corporation Board Secretary
- Martin Moore, City Manager
- Sharon Oktoyak, Tribal Administrator

Village Representatives: Nunam Iqua

- Carin Finch, City Advisor

WHPacific, Inc.

- Suzanne Taylor, Project Manager

Yukon Kuskokwim Health Corporation

- Deanna Latham, Capital Projects Director

Yuut Elitnaurviat

- Kurt Kuhne, Executive Director

Village Safe Water Program (State of Alaska)

- George Wilson, P.E.
- Susan Randlett, VSW Engineer

This page left intentionally blank.

EXECUTIVE SUMMARY

This page left intentionally blank.

EXECUTIVE SUMMARY

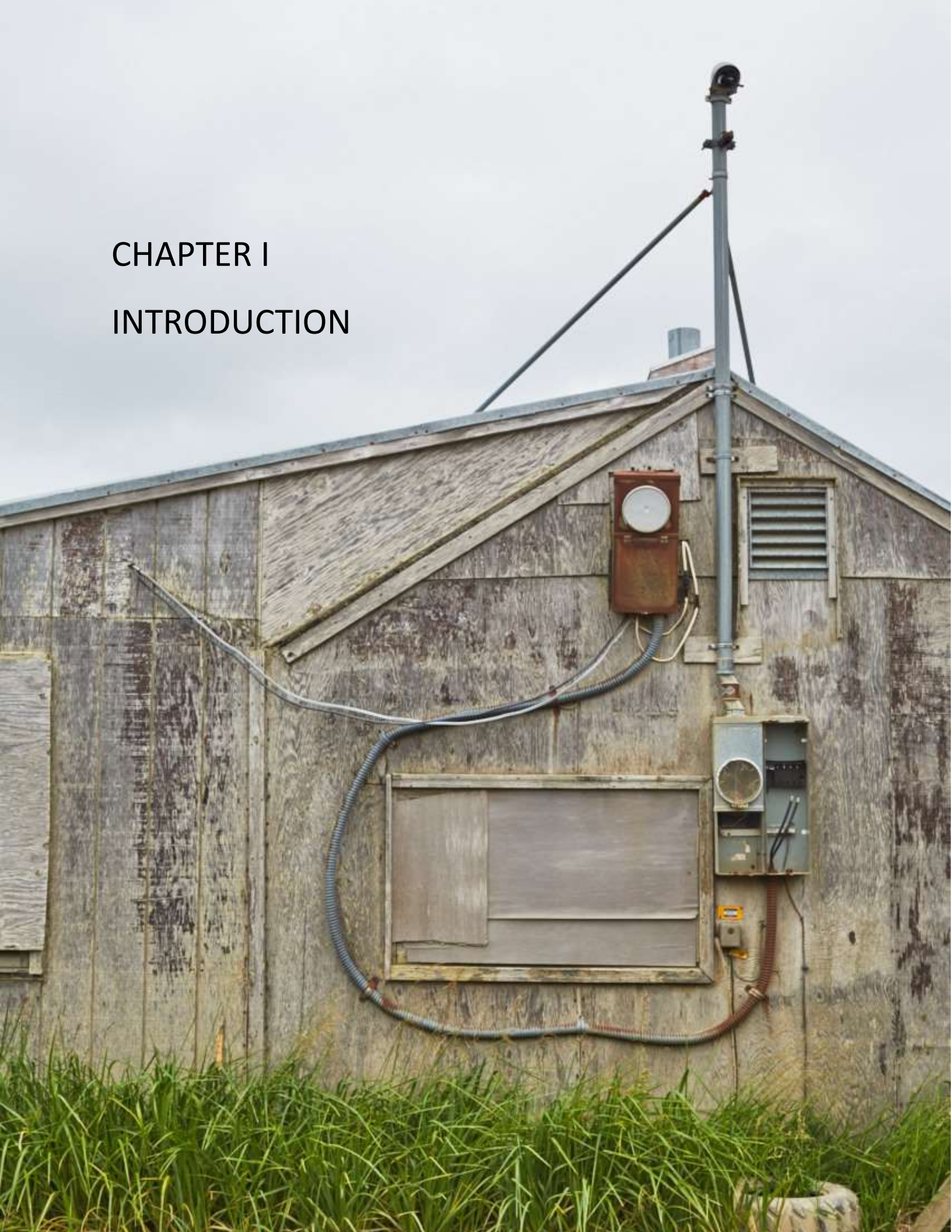
The intent of the Yukon Kuskokwim (YK) Delta Community Sustainability Model is to identify the potential for shared services or other strategies in the sub-regional cluster of villages that includes Alakanuk, Emmonak, and Nunam Iqua, to reduce operations and maintenance costs of these services, and in general, to reduce the cost of living in these communities. The goal was to recognize and analyze the current infrastructure in these sectors: Health, Transportation, Education, Sanitation (water, sewer, landfill), Housing, and Energy and Bulk Fuel and to analyze options for improvement.

The project team collected data from various local, regional, state and federal agencies. Profiles were created for each populated community to show the current status of each sector and their potential for shared service or other improvement strategies. As data gaps were identified, the outcome and methodology were modified as needed. For instance, the potential for some shared services could not be established where these services are not fully available within a community. Instead, the report also explores the potential options for improvement of services where basic service and infrastructure was not available.

Team members visited the communities and interviewed local leaders, regional organizations and state and federal agencies to compile additional data and listen to feedback on the potential options for shared services. This feedback is included with the advantages and disadvantages of each option. Finally, the team created an Implementation Chart and Funding Opportunity list to help with future efforts to reduce costs by implementing shared services.

Photo 1: Emmonak resident.

This page left intentionally blank.



CHAPTER I

INTRODUCTION

This page left intentionally blank.

INTRODUCTION

A grant received from the State of Alaska in 2012 enabled Nuvista Light and Electric Cooperative Inc. (Nuvista) to begin research and development of the Community Sustainability Model project for the Yukon-Kuskokwim (YK) Delta region.[1] The overall goal of the project was to identify partnerships between communities to potentially share services in the YK Delta and its sub-regions. Shared services for *Health, Transportation, Education, Sanitation (water, sewer, landfill), Housing, and Energy and Bulk Fuel* could potentially save money by creating a sole shared source for each sector. This report encompasses the communities of Alakanuk, Emmonak and Nunam Iqua, located near the mouth of the Yukon River.

In April 2016, a team of professionals from WHPacific, Inc. and the Cold Climate Housing Research Center (CCHRC) used data collected from the Quyumta project, completed in 2014, to begin developing the Community Sustainability Model. Quyumta means "together" in Yup'ik, the region's traditional language. The Yup'ik cultural values, traditions, behaviors and subsistence lifestyle led the team to take a holistic approach to this project, while respectfully considering indigenous wisdom and modern technology in shared services where logistically feasible. This report is the second phase of the project; the first phase examined the potential for shared services for the communities of Nelson Island.

Nuvista's Mission

To improve the energy economics in Rural Alaska by creating energy generation and transmission infrastructure to serve, connect and enable the region to attain affordable, long term energy sustainability and self-sufficiency.

1.1 METHODOLOGY

The planning and research team utilized the CCHRC Holistic Approach model piloted in Oscarville, outside of Bethel, as a vital resource in drafting the Community Sustainability Model. This guiding tool allowed the team to collect data from previous reports, state and federal agencies and local entities in a broad manner. The sectors include: Health, Transportation, Education, Sanitation (water, sewer, landfill), Housing, and Energy and Bulk Fuel.

This approach allowed the team to utilize an existing, strong network of contacts to streamline the data collection process, synthesizing data that has been previously collected and identifying data gaps. After identifying the data gaps, the team examined the potential for shared services in each sector as well as the need to improve services in place.

1.2 VISION

Nuvista's vision to seek solutions based on shared services recognizes the challenges faced by all YK Delta region communities, including Alakanuk, Emmonak and Nunam Iqua, when planning for a more sustainable, resilient future. To meet these challenges, the vision needs to see beyond the obstacles and allow for more effective collaboration and planning across all sectors: Health, Transportation, Education, Sanitation (water, sewer, landfill), Housing, and Energy and Bulk Fuel. This document is intended to serve as a guide for future project development within those shared service sectors and to inspire other communities within close proximity to do the same.

1.3 ORGANIZATION

This plan contains the following chapters:

- Introduction – an overview of the regional energy issues and challenges, the goals of the plan, methodology, and stakeholders involved.
- Regional Background – summarizes physical, demographic, and energy use characteristics of the region.

[1] Note: Nuvista is a 501(c)12 non-profit utility cooperative and is guided and governed by a seven-member Board of Directors made up of YK Delta business professionals and community leaders.

- Regional Analysis – a detailed look at the potential for shared services in the Lower Yukon Delta. Profiles listing each sector and its current services provide an overview of each community, with advantages and disadvantages of current and potential shared services.
- Implementation Plan – a summary of actions and strategy for potential shared services, or improved services in place.

Photo 2: Alakanuk School.

CHAPTER II

REGIONAL BACKGROUND

This page left intentionally blank.

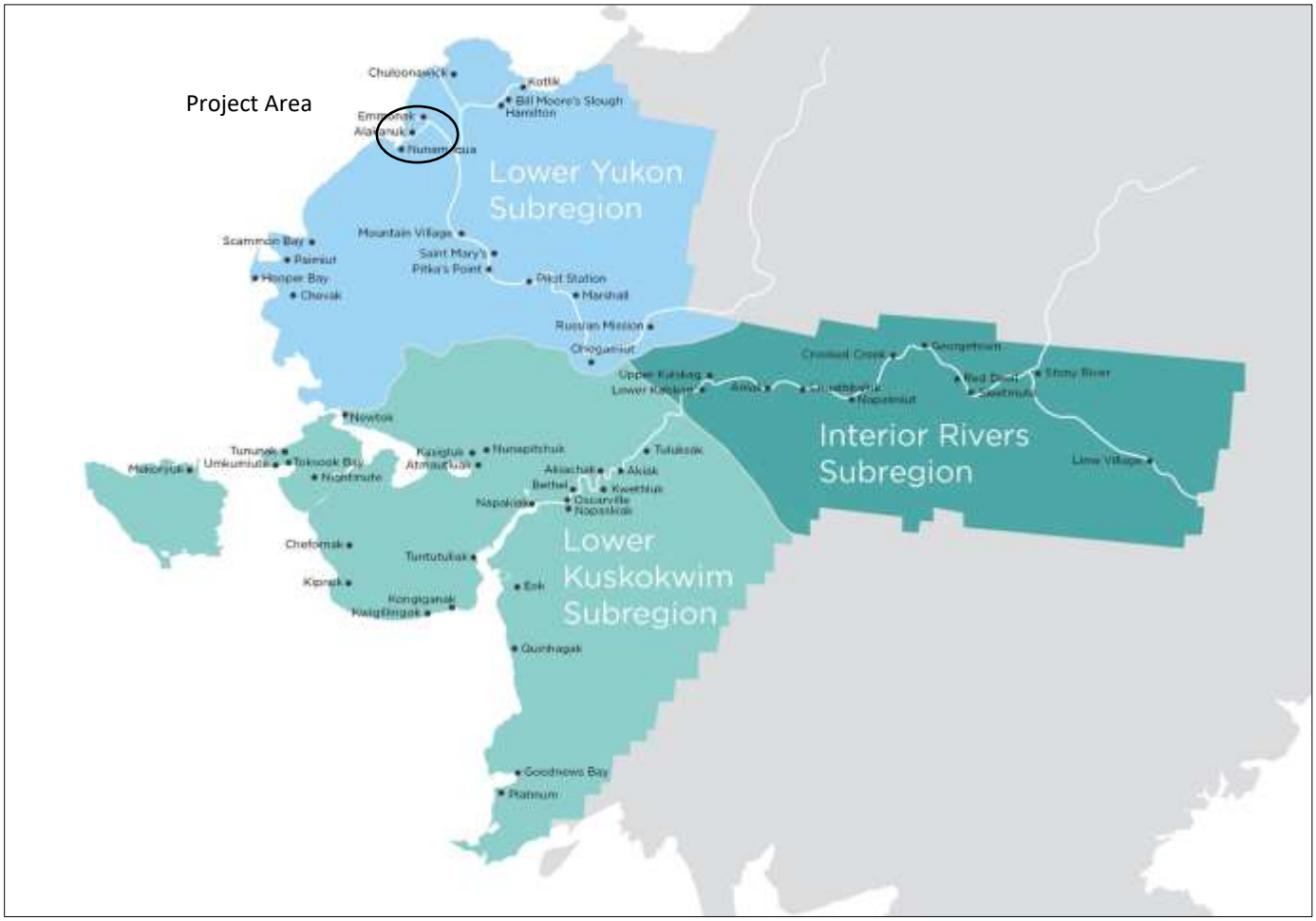
REGIONAL BACKGROUND

2.1 PHYSICAL CONDITIONS

LOCATION

Alakanuk, Emmonak and Nunam Iqua are located in southwestern Alaska` in the Yukon Kuskokwim (YK) Delta in the Lower Yukon sub-region. This is part of the Calista Regional Corporation land boundaries, as shown in Figure 1.

Figure 1: YK Delta regional map. Figure credit Nuvista Light and Electric Cooperative.



The Lower Yukon sub-region is located in the Kusilvak Census Area. Formerly known as the Wade Hampton Census Area, in July 2015, Governor Bill Walker renamed it for the region's highest mountain range, the Kusilvak Mountains. It encompasses 19,673 square miles. Besides Alakanuk, Emmonak and Nunam Iqua, the Kusilvak Census Area encompasses Chevak, Hooper Bay, Kotlik, Marshall, Mountain Village, Pilot Station, Pitka's Point, Russian Mission, Saint Mary's and Scammon Bay. According to the 2010 Census, approximately 95 percent of the population is Yup'ik (U.S. Census Bureau, 2010). Residents live a traditional subsistence lifestyle, utilizing fishing, hunting and gathering greens and berries for their diet.

In 1909, U.S. President Theodore Roosevelt set aside lands in southwestern Alaska for a wildlife refuge. More lands were added on December 2, 1980, when U.S. President Jimmy Carter signed the Alaska National Interest Lands Conservation Act (ANILCA) into law. This created the Yukon Delta National Wildlife Refuge of which these Lower Yukon communities are a part.

The Yukon Delta National Wildlife Refuge was established to conserve fish and wildlife populations and habitats in their natural diversity, to fulfill treaty obligations, to provide the opportunity for continued subsistence uses, and to ensure water quality and necessary water quantity (United States Fish & Wildlife Service, 2014).

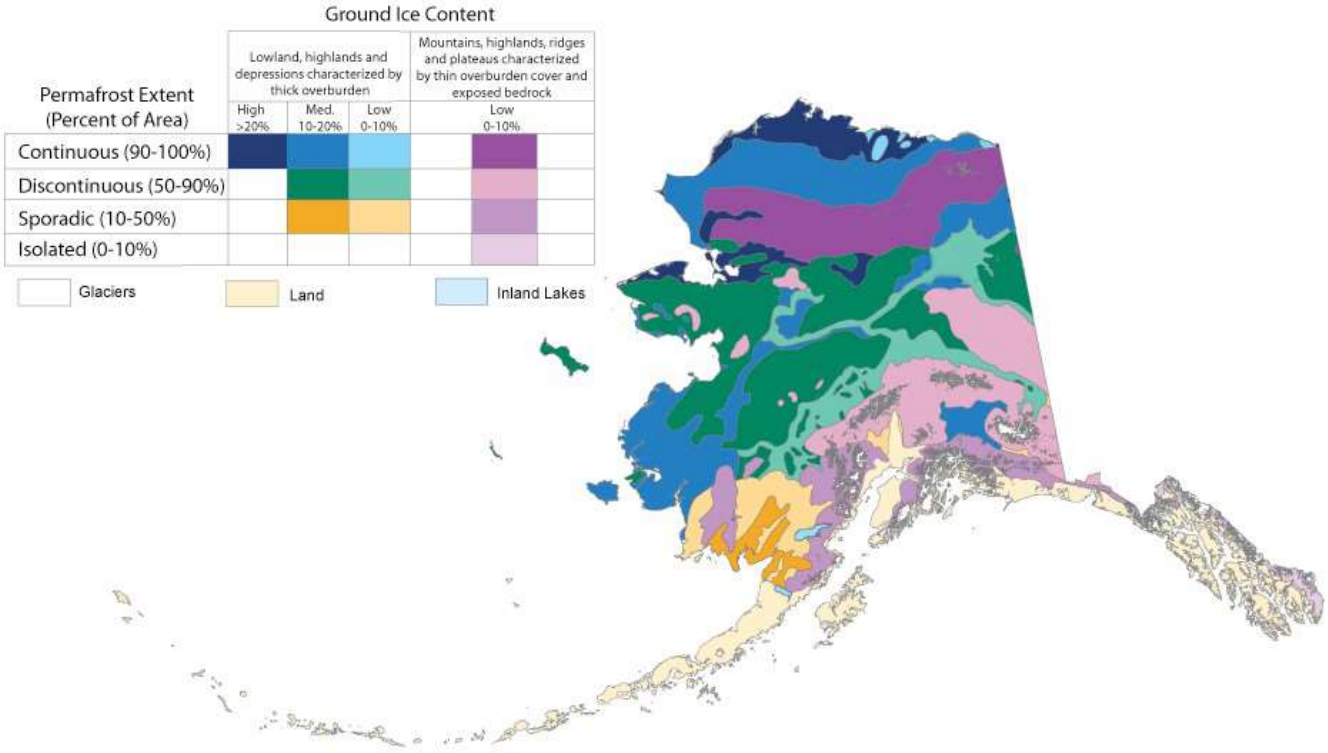
CLIMATE

The sub-regional climates in the YK Delta Region vary, with a maritime climate in the coastal communities in the Lower Kuskokwim and Lower Yukon sub-regions, a continental climate in the Interior Rivers sub-region and a transitional climate in communities that exhibit characteristics of both a maritime and continental climate. The maritime climate is typically wet and can include moisture year round with typical summer temperatures around 60^0 F and average winter temperatures ranging from 0° to 20° F. The continental climate is generally drier and colder in the winter and warmer in the summers than a maritime climate. Temperatures range from highs in the summer near 80° F and lows in the winter well below zero. Precipitation and snowfall in the Interior Rivers sub-region is generally light.

PERMAFROST

The unique geology of the YK Delta Region contains continuous and discontinuous permafrost. This permafrost consists of separate areas of ground that stays frozen year-round, and ground that melts in the summer for weeks or months (National Geographic Society, 2015). This creates a unique, sensitive situation where any disturbance to the ground could cause major changes in a short time, making it generally more difficult and expensive to build in this region. This, in turn, requires more funding for investment for infrastructure to be appropriately designed for this climate.

Figure 2: Map of permafrost in Alaska. Figure courtesy of (Abraham, 2011).



2.2 DEMOGRAPHICS

CURRENT POPULATION

The population of the study area is 1,755, as shown in Table 1. The median age in the three communities ranges from 20 to 28, which is younger than the Alaska state median age of 33.4 years old (American Community Survey, 2016).

Table 1: Population of Alakanuk, Emmonak, and Nunam Iqua (American Community Survey, 2016).

Community Name	Population 2014
Alakanuk	733
Emmonak	819
Nunam Iqua	203
Total	1,755

POPULATION TRENDS

Current population trends show very little out-migration of population in recent years. The population has risen in the last several years in all three study communities.

Table 2: The population is trending upward in Alakanuk (American Community Survey, 2016).

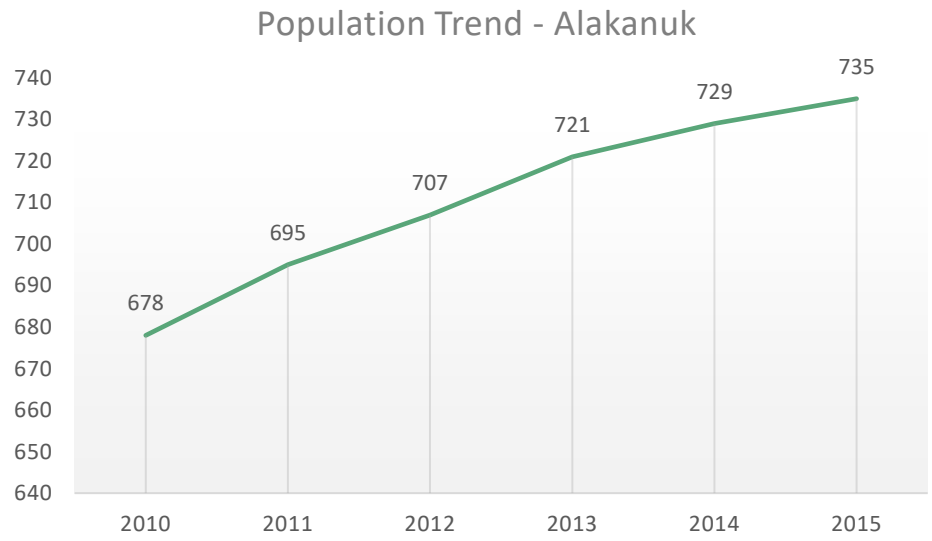


Table 3: The population is trending upward in Emmonak (American Community Survey, 2016).

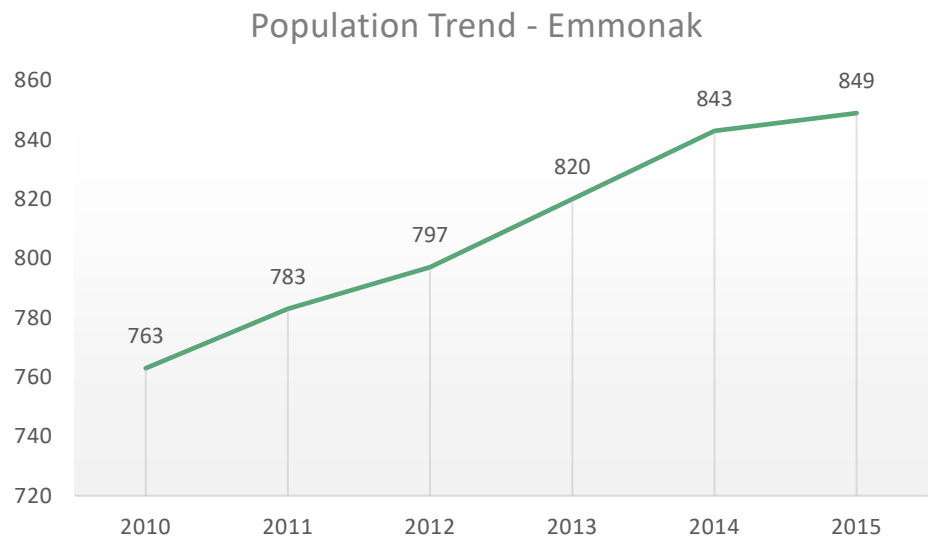
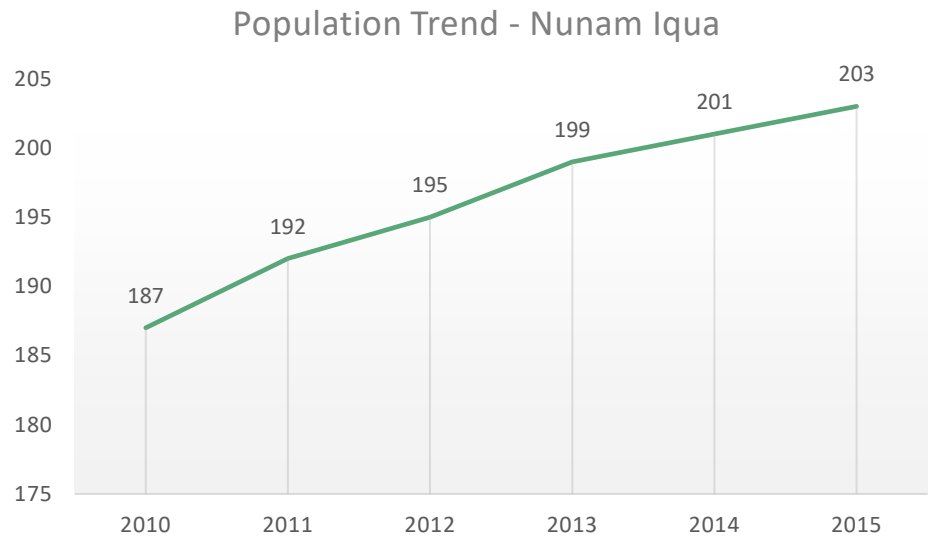


Table 4: The population is trending upward in Nunam Iqua (American Community Survey, 2016).



2.3 ECONOMY

The majority of the residents in the study area supplement their cash economy with subsistence activities which is defined by state and federal laws as the "customary and traditional uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts sharing and customary trade" (Alaska Department of Fish and Game, 2012). In Western Alaska as a whole, approximately 400 pounds of annual wild food is produced on average per person a year, compared with 17 pounds of wild food produced in the Anchorage area annually. Alaska Department of Fish and Game estimates that this food, if replaced with non-wild foods, would be valued at about $80,000,000 for Western Alaska (Alaska Department of Fish and Game, 2012). In the study area, all three communities rely on subsistence activities to supplement their household food, which means that a substantial part of the local economy does not rely on monetary transactions.

Subsistence activities take place over a vast area as a result of the large-scale migration patterns of some subsistence resources. Residents also use offshore areas for subsistence hunting and fishing of a wide variety of marine mammals, birds and fish. They use onshore areas for hunting and fishing and gathering of eggs and plants. Subsistence use changes from year-to-year and throughout time, depending on the availability of a specific species.

Photo 3: Lower YK Delta in winter 2017.

In some ways, subsistence foods represent income. When opportunities for employment tighten, residents can adjust to smaller incomes by increasing their use of subsistence foods. For many residents, rather than replacing subsistence, the cash economy enables individuals to participate in subsistence by providing money for snow machines, boats, outboard motors, and other subsistence supplies (such as bullets, fuel, etc.). The combination of subsistence and employment contributes to the overall village economy. Other economic drivers in the region include health care, commercial fishing, government, retail and commercial services.

All three communities in the study area participate in the Coastal Villages Region Fund (CVRF), one of the six Community Development Quota (CDQ) groups that participate in the Bering Sea fishing industry. CVRF receives royalty payments from catchers and processors. CVRF has also purchased ownership shares, thereby receiving royalties and part of the business profits, which they use to benefit residents in the region. The funds were used to develop Community Service Centers in many communities that provide a space for community members to repair and maintain snow machines, four-wheelers, sleds, trailers and other equipment critical to maintaining the subsistence economy.

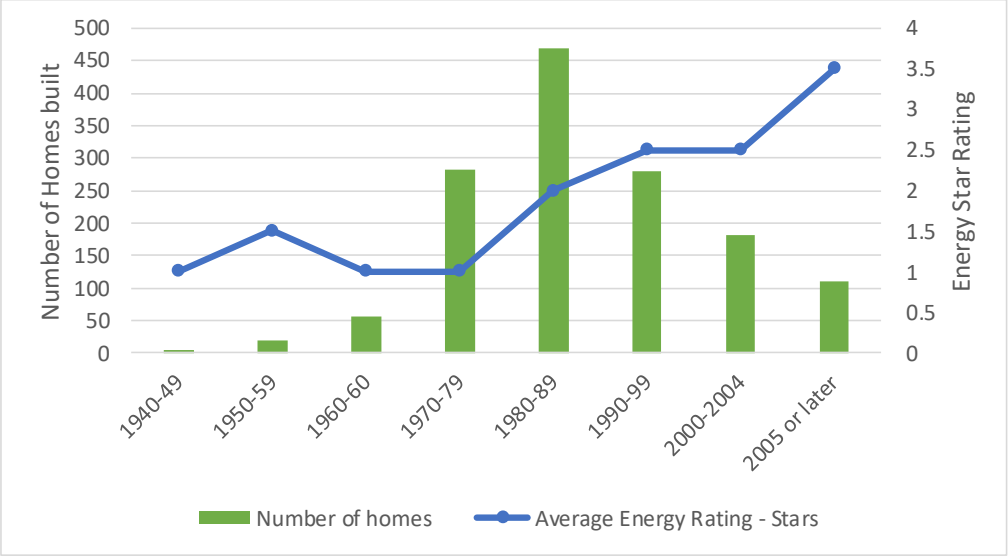
The Coastal Villages "People Propel™" program is another benefit created by the CVRF Board of Directors to meet the demand for safer, more fuel efficient and environmentally clean outboards and boats. By bulk-purchasing boats, motors and nets, CVRF is achieving economies of scale and bringing down prices for the region's residents. The vision and mission of CVRF is to "continuously focus on balancing growth in commercial fishing and sustainable development of CVRF communities, by providing the means for development of our communities by creating sensible, tangible, and long-term opportunities that generate hope for all people who want to fish and work" (Coastal Villages Region Fund, 2017).

2.4 HOUSING

Housing in the YK Delta region has not been thoroughly assessed. In 2014 the Alaska Housing Finance Corporation (AHFC), in collaboration with CCHRC, released an Alaska Housing Assessment, which revealed that compared to other parts of the state the YK Delta region had the least energy efficient homes. The report showed that homes in this region used 22% more energy per square foot to heat the average home than any other region in the state. The cost to supply energy to heat the homes was more than twice the cost compared to Anchorage, and almost three times higher than the national average (Wiltse, Madden, Valentine, & Stevens, 2014).

Alaska's home energy rating system is the state's standard by which a home's energy efficiency is measured. An energy rating with a higher number of "stars" means a more energy efficient building. The efficiency of YK Delta homes is improving: homes built in the 1940s generally received a one energy star rating, while homes built after 2000 received on average an energy star rating of nearly 3.5.

Figure 3: The number of homes of each energy star rating built per decade in the YK Delta region (Wiltse, Madden, Valentine, & Stevens, 2014).



However, housing in the region faces several other issues, including poor ventilation, overcrowding, lack of air-tightness, high cost and low overall quality of construction. Approximately 19 percent of households in the YK Delta Region are cost-burdened, spending 30 percent or more of total income on housing costs, including rent, water and sewer utilities, and energy. The average annual energy costs constitute approximately 13 percent of census median area income for occupied housing (Wiltse, Madden, Valentine, & Stevens, 2014). Costs for energy in Emmonak and Alakanuk are higher than the regional average.

Approximately 20% of the occupied housing units are overcrowded and another 31% are severely overcrowded. With over half of the occupied housing in the region overcrowded, Alakanuk is slightly better off than Emmonak, but still has approximately 36% of its occupied housing units in some form of overcrowded condition.

The Association of Village Council Presidents (AVCP) Regional Housing Authority (RHA) is a state-charted, regional housing authority formed to address housing needs in Southwest Alaska, including Nunam Iqua, Emmonak, and Alakanuk. They work with 51 tribal councils in the region that have named AVCP-RHA as the Tribal Designated Housing Entity and are funded with Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA) funds. AVCP-RHA was organized on October 17, 1974 and is located in Bethel (AVCP RHA, 2017).

The housing authority provides affordable housing services to program-eligible individuals and families. The largest program it offers is the "Mutual Help Homeownership Program." The agency also provides low rent housing as well as rental housing for elderly or handicapped persons. AVCP-RHA has constructed over 1,500 homes in 48 villages. Since 2000, Alakanuk has had 52 new housing units built, Emmonak has had six built (AK Department of Labor & Workforce Development, 2017).

The AVCP-RHA Tribal Operations Department works with tribal councils, future and current homebuyers and rental tenants, as well as individuals and families who are seeking affordable housing opportunities.

Photo 4: Boat landing in Emmonak.

When looking at solutions, increased collaboration within the sub-region would allow for a multi-community approach when completing energy-efficiency upgrades.

2.5 SANITATION

SEWER & WATER

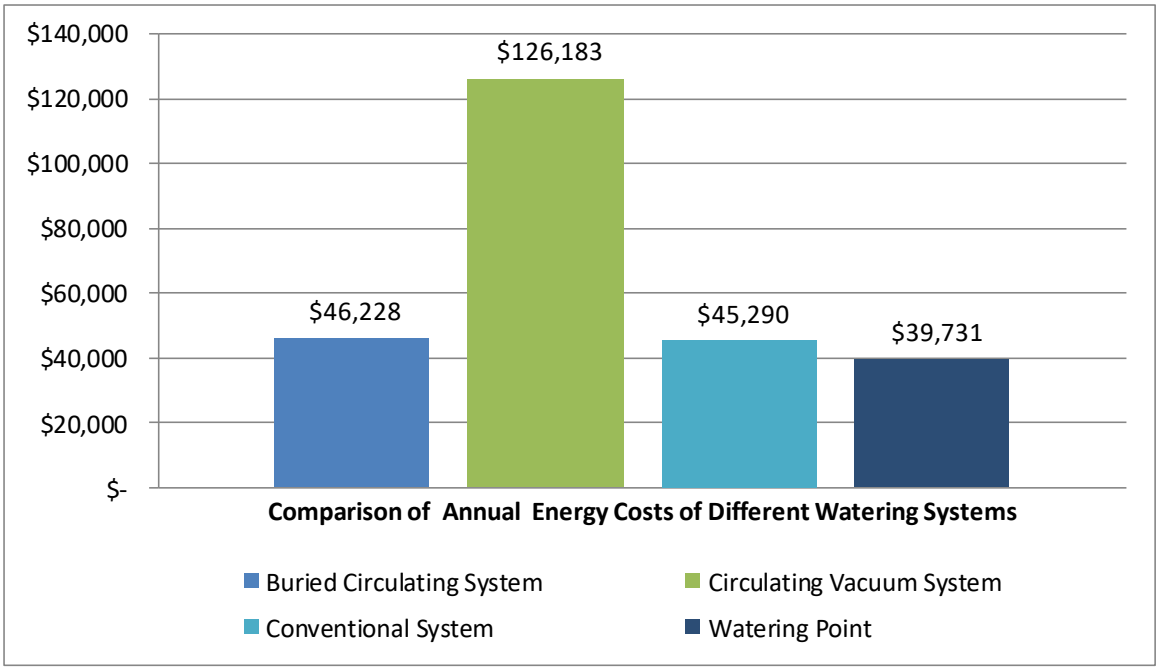
Compared to the rest of the state, the YK Delta Region has the most "unserved" communities in terms of water and sewer services. Unserved is defined as 55 percent or less of homes in the region are served by piped water/sewer or haul systems, with the remaining residents relying on "honey buckets," or the use of plastic buckets for toilets. With honey bucket systems, human waste can spill, exposing residents to raw sewage. Those exposed are more likely to contract diseases including hepatitis A, bronchitis, and impetigo. Observations indicate that water and sewer systems in this region are in worse shape than any other region in the state.

There are many reasons for the lack of conventional sewer and water systems in this region, including the lack of suitable soils and gravel, permafrost, drainage, climate and environmental factors, technical constraints, operation and maintenance challenges, and low per capita income.

One of the issues preventing the installation of the more desirable piped water and sewer systems in the YK Delta Region is finances, both in terms of construction and maintenance costs. Due to the isolation of the communities and lack of access, construction costs are extremely high, often making a project out of reach. The YK Delta Region also has one of the highest unemployment and poverty rates in the state. This limits the ability of the area's residents to pay the monthly fee required to maintain piped water and sewer systems. Energy costs are the second highest expense for water and sewer facilities in rural Alaska (Alaska Rural Utility Collaborative, 2016). Keeping energy costs down can increase the likelihood that residents can afford piped sanitation facilities.

There are several types of water and sewer systems including buried or unburied circulating systems, circulating vacuum system, conventional system and a watering point. Energy costs for each system vary, with the circulating vacuum system being the most expensive. ANTHC recently conducted energy audits on the water and sewer systems in 28 of the 56 communities in the YK Delta Region. Table 5 illustrates the annual costs for the water systems in the communities in the YK Delta Region audited by ANTHC.

Table 5: Average water system energy costs. Data from audits of 28 communities in YK Delta region courtesy of (ANTHC Rural Energy Initiative, 2017).



The Yukon Kuskokwim Health Corporation (YKHC) is raising funds to develop a "Dump the Bucket" campaign. They plan to test off-the-shelf systems for recycling gray water. They hope that by using water twice people will spend less money to deliver water to their homes (Eurich, 2015).

Water systems vary in the study area. In Alakanuk, water comes from the Alakanuk Slough and is treated, stored in a tank, and then delivered to the community. Emmonak's water is pumped from the Yukon River and treated. An aboveground circulating water system and vacuum sewage system serves much of the village. Nunam Iqua also takes its water from the Yukon River. The water is treated and distributed via above ground piping, as well as being available from a central watering point.

LANDFILLS

Alaska Department of Environmental Conservation (DEC) manages the solid waste permit process required by state law. Alakanuk's landfill is permitted and is managed by the City. It is about five acres in area and is located approximately 1,100 feet from Alakanuk Pass and 2,100 feet from the Yukon River. An effort was made to clean up the landfill site in 2014; however, the City does not have the functioning heavy equipment needed to maintain the landfill well. The burn unit at the landfill is not functional.

Emmonak closed their old landfill around 2013 when a new Northwest Landfill was permitted with berms and fencing around it. While there is a gate, it is generally not used allowing for open access to the landfill. The landfill does have an operator and a burn box.

Nunam Iqua's landfill is not permitted. It is located on the tundra and is only accessible in summer via boardwalk, which does not allow for access by heavy equipment to maintain the landfill. Trash is hauled by individuals and is not covered. No burn box is available. ANTHC performed a feasibility study for capping the current landfill and opening a new one (Antrobus & Boccia, 2014), but this has not yet been implemented.

2.6 TRANSPORATION

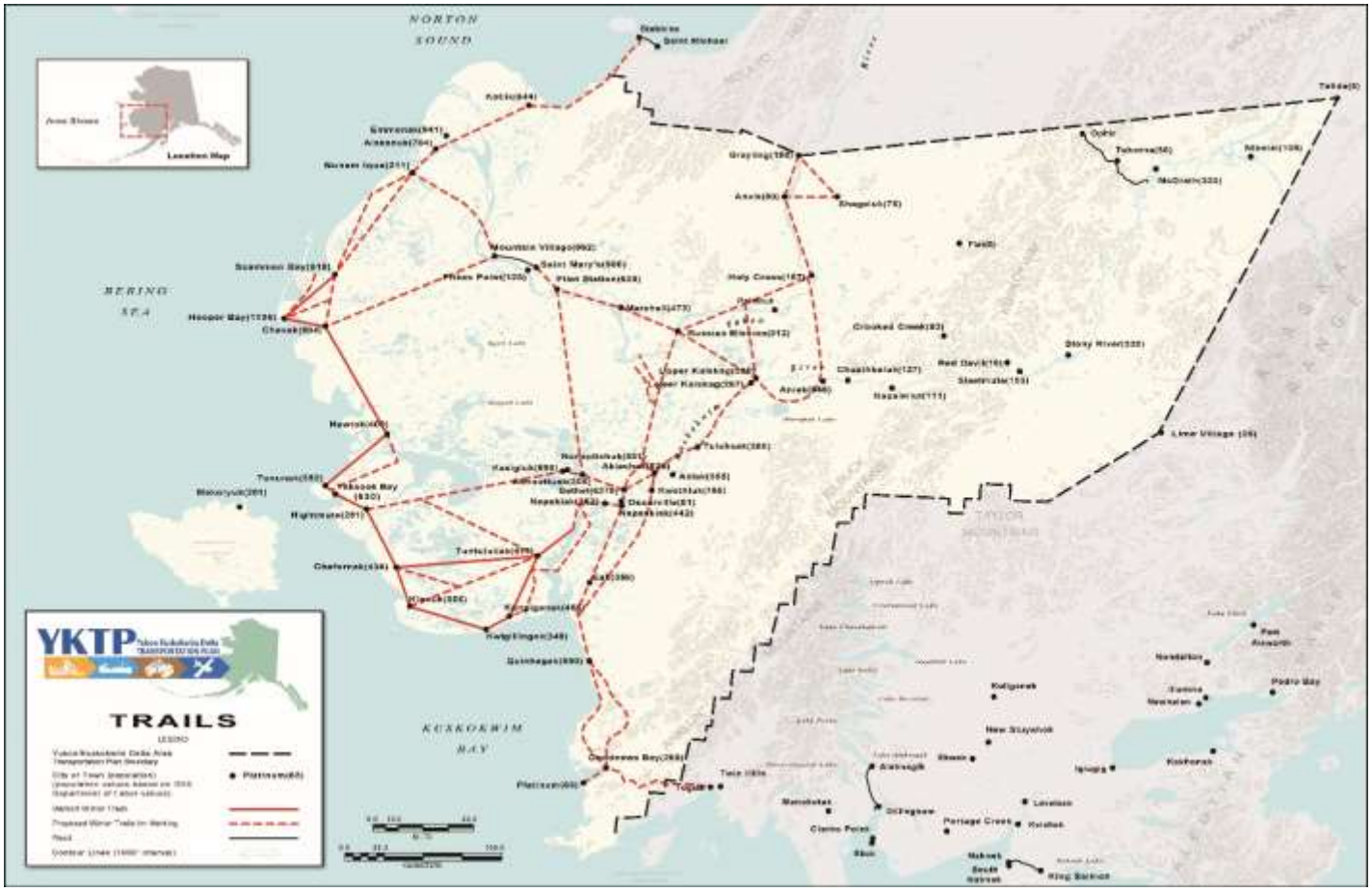
Lower Yukon residents rely on a system of airports, rivers, ports, barge landings, and trails for transportation to, from and within the region. Communities are not connected to the state's highway system. This lack of connection contributes to the high cost of fuel, services and goods. While air travel is the only year-round mode of transportation, a patchwork of surface transportation modes – varying depending on the time of year – supports the movement of passengers and cargo (including fuel delivery) within this region. Alaska Airlines provides passenger service and freight delivery between Anchorage and the hub community of Bethel. Grant Aviation provides air service to 15 villages; Ravn Alaska and Yute Air serve 26 villages; and Pen Air provides air service to 2 villages.

Photo 5: Airstrip in Alakanuk.

There are numerous marked winter trails throughout the region. The trail markings consist mostly of wooden tripods.

All three communities in the study area use primarily all-terrain vehicles (ATVs), boat or foot travel in the summer and snow machines in the winter months to travel throughout the area. Each community has local board-road systems, which allow residents to easily access housing and local businesses. Most communities are linked in the winter by the marked trails, as seen in the YK Transportation Plan map in Figure 4.

Figure 4: Trail map for the Yukon Kuskokwim Delta. Figure from (Alaska Department of Transportation & Public Facilities, 2017).



2.7 STAKEHOLDERS & CONTACTS

Table 6 and Table 7 provide contact information for the entities serving the Lower Yukon communities.

Table 6: Regional contacts.

Community Development Quota Organization (CDQ)	Yukon Delta Fisheries Development Association 2902 Arctic Boulevard Anchorage, AK 99503 Phone: (907) 644-0326 Website http://www.ydfda.org/
Health Corporation	Yukon Kuskokwim Health Corporation 900 Chief Eddie Hoffman Highway Bethel, AK 99559 Phone: (907) 543-6000 Website: http://www.ykhc.org
Electric Cooperative	Nuvista Light and Electric Cooperative, Inc. 1205 E. International Airport Road, Suite 202 Anchorage, AK 99518 Phone: (907) 562-3103 Website: http://www.nuvistacoop.org
	Alaska Village Electric Cooperative 4831 Eagle St. Anchorage AK 99503 Phone: (907) 561-1818 Website: http://www.avec.org
Native Corporation	Calista Corporation 301 Calista Court # A Anchorage, AK 99518-3000 Phone: (907) 279-5516 Website http://www.calistacorp.com
Native Association	Association of Village Council Presidents (AVCP) P.O. Box 219 Bethel, AK 99559 Phone: (907) 543-3596 Website: http://www.avcp.org
Regional Housing Authority	AVCP Regional Housing Authority P.O. Box 767 Bethel, AK 99559 Phone: (907) 543-3121 Website: http://www.avcphousing.org
School Districts	Lower Yukon School District 100 Airport Rd P.O. Box 32089 Mountain Village AK 99632-0089 Phone: (907) 591-2411 Website: http://www.loweryukon.org
Workforce Development	Yuut Elitnaurviat P.O. Box 869 Bethel, AK 99559 Phone: (907) 543-0999 Website: http://www.yuut.org

Table 7: Local contacts.

Alakanuk	**Village of Alakanuk:** commchief8450@yahoo.com Or: roney@avcp.org (907) 238-3419 President: Michael James Administrator: Raymond Oney IGAP Coordinator: Ignatius George **City of Alakanuk:** cityofauk@yahoo.com (907) 238-3313 Administrator: Alan Hanson (acting) Mayor: Edgar Andrews (acting) City Clerk: Mary Jane Stanislaus **Alakanuk Native Corporation:** nycbookkeeper@outlook.com (907) 238-3117 Vice Chair: Raymond Joseph Manager: Christopher James **Alakanuk Clinic**: (907) 238-3210 **Alakanuk School:** (907) 238-3399
Emmonak	**Emmonak Tribe:** emktribal@gmail.com (907) 949-1720 Vice Chair: Martha Kelly Tribal Administrator: Sharon Oktoyak IGAP Coordinator: John Lamont **City of Emmonak:** emkcity@gmail.com (907) 949-1227 City Manager: Martin B. Moore, Sr. Mayor: Herman Hootch City Clerk: Shannon Andrew **Emmonak Corporation:** emkcorp@yahoo.com (907) 949-1129 President/CEO: James Kameroff Board Secretary: Candace Kameroff **Emmonak Alaska State Trooper Post:** (907) 949-1300 **Pearl E. Johnson Sub-regional Clinic:** (907) 949-3500 **Yukon Delta Fisheries Development Association:** (907) 644-0326 **Emmonak School:** (907) 949-1248

Nunam Iqua	**Native Village of Nunam Iqua: nunamtribe@gmail.com** (907) 498-4184 President: Dominica Strongheart Administrator: Darlene Pete IGAP Coordinator: Elizabeth Adams **City of Nunam Iqua:** cityofnunam@gmail.com (907) 498-4226 Mayor: Edward Abraham, Jr. City Administrator: Esther Manumik City Clerk: Johanna Murphy **Swan Lake Corporation:** (907) 498-4227 President: Frank Camille **Nunam Iqua Clinic:** (907) 498-4228 **Sheldon Point School:** (907) 498-4112

2.8 COMMUNITY PROFILES

The following profiles show the individual community sector data available at the time of this report. Each profile gives a brief description of the culture and people, current infrastructure, economic factors and each sector as it contributes to this project. This snapshot in time allowed the team to do a cross-comparison and analysis for the potential for shared services.

Working with local, regional and state agencies, these profiles are the baseline for the regional analysis chapter that follows. The number of employees in each community in the sectors compared has been provided where possible to give an indication of the jobs, and by extension revenue, provided by that entity in each community, which could be lost in the event of regional consolidation.

COMMUNITY SUSTAINABILITY PROFILE: ALAKANUK

Location: Part of the Lower Yukon Subregion. Located at the east entrance of Alakanuk Pass, the major southern channel of the Yukon River, 15 mi from the Bering Sea. Part of the Yukon Delta National Wildlife Refuge. It lies 162 air miles northwest of Bethel. It is the longest village on the lower Yukon. Approximately 25 homes are threatened by erosion.

Language: Central Yup'ik

Historical Setting: Alakanuk is a Yup'ik word meaning "wrong way," aptly applied to a village on this maze of watercourses. It was originally settled by a Yup'ik shaman named Anguksuar and his family. A Catholic mission school was built near the village. A post office was established in 1946.

Climate: Alakanuk falls within the transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers. Heavy winds are frequent during the fall and winter.

Access: Air service is available year-round. Fishing boats, skiffs, snow machines, and ATVs are used by residents for local travel. The Yukon River is used as an ice road during freeze-up, from November through May. The current dock is area subject to erosion. Barges deliver goods during the summer months via the Yukon River.

Cultural Resources: Alakanuk is a Yup'ik Eskimo village active in commercial fishing and subsistence. The importation, sale and possession of alcohol is banned.

Local Contacts

Village Corporation:	Alakanuk Native Corporation	**Email:** auknative_corp148@yahoo.com	**Phone:** 907-238-3117
City:	City of Alakanuk	**Email:** cityofauk@yahoo.com	**Phone:** 907-238-3313
Tribal:	Village of Alakanuk	**Email:** commchief8450@yahoo.com	**Phone:** 907-238-3419

Demographics / Housing

Poverty Rate	22.4%	2000	2010	Percent of Residents Employed	74.59%
Total Population		652	677	Median Household Income	$33,750
Median Age of Total Population		21	27	Denali Commission Distressed Community	Yes
Average Household Size		5	5	Percentage of Native Alaskans	94.98%
Housing Units		186 total, 160 occupied, 3-4 vacant, 8 at risk from erosion, AVCP Regional Housing Authority			

Energy

Owner	Description	Notes	Economic Factors
AVEC	Electrical Power Plant owned and operated by AVEC, PCE subsidized	3 Diesel Generators. Heat recovery is utilized. Periodic tank farm flooding; Intertie with Emmonak completed in 2011; tieline planned.	1 operator, 1 alternate

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	
City	Ruby or Vitas	40,000 Heating Oil, 2,000 Gasoline	
		Would like to increase capacity	
Native Corp.	Yukon Fisheries Development Assn.	150,000 Heating Oil, 150,000 Gasoline	

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
City of Alakanuk	Surface source, circulating system	145 connections	Energy Audit completed	2-6 employees

Health

Owner/Operator	Description	Notes	Economic Factors
Tribe/YKHC	Health Clinic	No improvements scheduled.	4 employees

Education

Owner/Operator	Description	Number of Students	Economic Factors
LYSD	K-12 School and Head Start	215 (17 teachers)	28 employees

Transportation

		Notes	
Air Access	Gravel airport, fair condition	General aviation airport	
Boat / Barge Access	Dock at risk from erosion	Fuel, Goods, Materials	

Landfill

Owner/Operator	Description	Notes	
City of Alakanuk	Permitted, Class III	Improper burn, lack of management.	

COMMUNITY SUSTAINABILITY PROFILE: EMMONAK

Location: Part of the Lower Yukon Subregion. Emmonak is located at the mouth of the Yukon River, 10 miles from the Bering Sea, on the north bank of Kwiguk Pass. It lies 120 air miles northwest of Bethel and 490 air miles from Anchorage, in the Yukon Delta National Wildlife Refuge.

Historical Setting: The village is called "Imangaq" in Yup'ik. Villagers call themselves "Kuigpagmuit" or "people from the Yukon River." The original settlement was 1.4 miles south of its present location and was first reported by the U.S. Coast and Geodetic Survey in 1899. In the 1940s, commercial fishing became a major industry in the village, and the Northern Commercial Company built a cannery. In 1964, the cannery was washed away by floods. Due to increasing flooding and erosion, the village was relocated 1.4 miles north in 1964-65. The new location was named Emmonak, which means "blackfish."

Language: Central Yup'ik

Climate: Emmonak falls within the transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers. Freeze-up occurs during October; break-up occurs in June.

Access: Emmonak relies on air and water transportation. A state-owned gravel airstrip is available. There are no connecting roads, but winter trails to Kotlik, Alakanuk, and Nunam Iqua are used by snow machines. Skiffs and ATVs are used during the summer for local transportation.

Cultural Resources: Emmonak is a Yup'ik Eskimo village involved in commercial fishing, processing, and subsistence activities. Residents of Chuloonawick, a nearby fish camp, also live in Emmonak.

Local Contacts

Village Corporation:	Emmonak Corporation	**Email:**	emkcorp@yahoo.com	**Phone:**	907-949-1129
City:	City of Emmonak	**Email:**	emkcity@gmail.com	**Phone:**	907-949-1227
Tribal:	Emmonak Tribe	**Email:**	emktribal@gmail.com	**Phone:**	907-949-1720

Demographics / Housing

Poverty Rate	23.3%	2000	2010	Percent of Residents Employed	68.14%
Total Population		767	762	Median Household Income	$60,694
Median Age of Total Population		23	22	Denali Commission Distressed Community	No
Average Household Size		5	5	Percentage of Native Alaskans	96.33%
Housing Units		213 total, 185 occupied, 28 vacant, AVCP Regional Housing Authority			

Energy

Owner	Description	Notes	Economic Factors
AVEC	Electrical Power Plant owned and operated by AVEC, PCE subsidized	4 Diesel Generators. Heat recovery is utilized. Intertie with Alakanuk completed in 2011; tieline planned. Emmonak Wind & Transmission 800kW.	4-6 Employees

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	
City	North Star (final year of 3-year	60,000 Heating Oil, 10,000 Gasoline	
Native Corp.	contract)	150,000 Heating Oil, 200,000 Gasoline	

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
City of Emmonak	Surface source, circulating system	198 connections	Energy Audit completed	3 Employees

Health

Owner/Operator	Description	Notes	Economic Factors
Tribe/YKHC	Pearl E. Johnson Subregional Clinic	No improvements scheduled.	Estimated 15 employees
	Women's shelter	Provides regional service	

Education

Owner/Operator	Description	Number of Students	Economic Factors
LYSD	K-12 School and Head Start	215 (14 teachers)	26 Employees

Transportation

		Notes	
Air Access	Gravel airport, good condition	General aviation airport	
Boat / Barge Access	Dock with barge access	Fuel, Goods, Materials	

Landfill

Owner/Operator	Description	Notes	Economic Factors
City of Emmonak	Permitted, Class III	New berms, fencing, burn box. Have operator.	Operator

COMMUNITY SUSTAINABILITY PROFILE: NUNAM IQUA

Location: Part of the Lower Yukon Subregion. Nunam Iqua is on a south fork of the Yukon River, about 9 miles south of Alakanuk and 18 miles southwest of Emmonak on the Yukon-Kuskokwim Delta. It lies 500 miles northwest of Anchorage.

Historical Setting: Nunam Iqua was historically the location of summer fish camps, due to its location near the Black River. In Yup'ik, the name means "end of the tundra." A man called Sheldon owned and operated a fish saltery at the site in the late 30s and early 40s. The saltery was later operated by Northern Commercial Company. The village was first measured in 1950 by the U.S. Census, which recorded a population of 43 residents. The City of Sheldon Point was formed in 1974. In November 1999, residents voted to change the city name to the City of Nunam Iqua.

Language: Central Yup'ik

Climate: Nunam Iqua falls within the transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers. Heavy winds in the fall and winter often limit accessibility. The Bering Sea is ice-free from mid-June through October.

Access: Nunam Iqua has easy access by boat and barge. It has a state-owned and operated gravel airstrip. Float planes can land at Kwemeluk Pass. In the winter, snow machines serve as the primary mode of inter-village transportation.

Cultural Resources: Commercial fishing and subsistence activities are the means of support in this Yup'ik Eskimo village.

Local Contacts

Village Corporation:	Swan Lake Corporation	**Email:** swanlakenunam@gmail.com	**Phone:** 907-498-4227	
City:	City of Nunam Iqua	**Email:** cityofnunam@gmail.com	**Phone:** 907-498-4226	
Tribal:	Native Village of Nunam Iqua	**Email:** nunamtribe@gmail.com	**Phone:** 907-498-4184	

Demographics / Housing

Poverty Rate	18.2%	2000	2010	Percent of Residents Employed	
Total Population		191	210	Median Household Income	$49,000
Median Age of Total Population		18	22	Denali Commission Distressed Community	Yes
Average Household Size		5	5	Percentage of Native Alaskans	91.44%
Housing Units		45 total, 43 occupied, 1 unfinished BIA unit, 1 vacant AVCP unit, 4 vacant LYSD units			

Energy

Owner	Description	Notes	Economic Factors
City of Nunam Iqua	Nunam Iqua Electric Company owned and operated by City, PCE subsidized	4 Diesel Generators. Heat recovery is utilized. New power plant in August 2015. Wind assessment completed.	3 power plant operators 2017 budget: $324,131

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	Economic Factors
City	Varies depending on prices	169,000 Heating Oil, 36,000 Gasoline	Oversight by Utility Clerk,
NIEC	offered by 5 potential	12,000 Diesel	Administrator / 2017
LYSD	providers	40,000 Heating Oil, 3,000 Diesel	budget: $176,115

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
City of Nunam Iqua	Surface source, circulating system	36 homes	Energy Audit completed	4 plant ops /
	Central watering point			2017 budget :$232,710

Health

Owner/Operator	Description	Notes	Economic Factors
Tribe/YKHC	Health Clinic	No improvements scheduled.	3 Employees

Education

Owner/Operator	Description	Number of Students	Economic Factors
LYSD	PK-12 School	61 (5 teachers)	20 Employees

Transportation

		Notes	
Air Access	Gravel airport, fair condition	General aviation airport	
Boat / Barge Access	Dock with barge access	Fuel, Goods, Materials	

Landfill

Owner/Operator	Description	Notes Solid waste collection provided.	
Tribal IGAP Program	Nonpermitted, Class III	On tundra, open access, not maintained.	

This page left intentionally blank.

CHAPTER III

REGIONAL ANALYSIS

This page left intentionally blank.

3.1 HEALTH

OPTION: ESTABLISH A SUB-REGIONAL HEALTH BOARD

Currently, there are local clinics in Nunam Iqua and Alakanuk that provide basic first aid and general services. Emergency patients are flown to Bethel. There is a sub-regional hub clinic in Emmonak which serves the villages of Emmonak, Alakanuk, Kotlik, Nunam Iqua, Bill Moore's Slough, Chuloonawick, and Hamilton. There is also a women's shelter located in Emmonak, which provides services to approximately 500 women and children from the villages around the Lower Yukon River Delta. A sub-regional health board would be made up of representatives from each village (Nunam Iqua, Alakanuk, and Emmonak) and could identify health issues and potential solutions for the three communities.

Location: Regional
Term: Medium (3-7 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Central knowledge base to communicate best practices:** The health board could facilitate communication amongst the three villages, and also communication between the villages and YKHC. If one village identifies a successful health practice or program, it can be communicated to other parties; YKHC can use the health board as a starting point for health education in the communities.
- **Address current issues:** A health board could address health issues as they occur, and facilitate a timely solution by coordinating action among community members and health organizations. For instance, if a MRSA[2] outbreak occurred, the health board could educate community members about preventative practices while coordinating parties to install water and sewer equipment to facilitate a long-term solution.
- **Address alcoholism:** Alcoholism is a recurrent mental health issue in the region. The health board could prioritize addressing this issue by looking at the effect of current practices on alcoholism, and suggesting possible solutions.
- **Opportunity to pursue grants as a group:** A health board could write sub-regional language and compile sub-regional data to use in grant applications for funding to benefit health at the sub-regional level, rather than each village having to search for and apply for funding on its own.
- **Health and sanitation board:** A sub-regional health board could be combined with a sub-regional water control board to address problems and apply for grants across both sectors.
- **Expansion to remaining villages in region:** A sub-regional health board, if successful, could grow to encompass members from other villages served by the sub-regional clinic in Emmonak, such as Kotlik, Bill Moore's Slough, Chulooonawick, and Hamilton.

DISADVANTAGES

- **Cost of meetings:** The members of the health board would need to travel to a central location to meet. The villages would have to find funding for the cost of the travel and the meetings.
- **Requires authority to act and enforce:** The three villages would need to recognize the health board and agree to consider their recommendations. Further, the health board would need to communicate its function to other organizations in the region working on health, such as YKHC and ANTHC.

EVALUATION

The increased communication and support avenues for the health professionals, as well as the potential opportunities to pursue grants should make up for the financial costs. The extension of the board to members beyond the health care professionals will

[2] Methicillin-resistant Staphylococcus aureus, an antibiotic resistant bacteria

provide avenues to increase the awareness of existing health issues as they arise, and disseminate treatment information to a wider audience more quickly.

Recommendation: This option should be merged with the sub-regional water and sanitation board option. A deeper examination of this option is warranted.

OPTION: CENTRALIZED CLINIC

Currently, there are local clinics in Nunam Iqua and Alakanuk that provide basic first aid and general services. Emergency patients are flown to Bethel. There is a sub-regional hub clinic in Emmonak which serves the villages of Emmonak, Alakanuk, Kotlik, Nunam Iqua, Bill Moore's Slough, Chuloonawick, and Hamilton. There is also a women's shelter located in Emmonak, which provides services to approximately 500 women and children from the villages around the Lower Yukon River Delta. A centralized clinic, located in Emmonak, would contain consolidated services for the region, and absorb the local clinics in Nunam Iqua and Alakanuk.

Location: Regional
Term: Medium (3-7 years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Broad-range medical facility:** Consolidating personnel and services from all three clinics would allow for the one remaining clinic to offer a broader range of service with longer hours.
- **Reduce operating costs:** The closure of two local clinics in Nunam Iqua and Alakanuk would lower the region's cost of maintaining and operating the clinic buildings.

DISADVANTAGES

- **Lower access to immediate medical services:** The current local clinics offer basic medical needs in place. The centralized clinic would eliminate these services and create a greater human life risk.
- **Economic impact for Nunam Iqua and Alakanuk:** The closure of the two smaller local clinics would eliminate jobs in those communities. It would also impact housing and funding for medical services.
- **Increased travel expenses:** Residents in Nunam Iqua and Alakanuk would face greater travel expenses to obtain basic medical care. The cost of transporting patients from the region to and from the centralized clinic would have a negative economic impact.
- **Lack of housing in Emmonak:** The current housing stock of Emmonak would not be able to support additional residents, including clinic workers and people that may need to move to obtain regular medical care.
- **May change regional demographics:** If people move to Emmonak for work and better access to medical care, it would change the demographics of the region.

EVALUATION

The negative impacts from loss of services in two communities, increased time penalties on residents of two communities, and the potential loss of jobs do not appear to have any strong positive impact on the communities. This option would also require acceptance from the regional health organization, YKHC.

Recommendation: This option does not provide adequate benefits to the communities, and will remove needed services and funds from village economies and create a life risk to all residents in the other two communities. This option is not recommended.

OPTION: OPEN A SUB-REGIONAL ASSISTED LIVING FACILITY FOR SENIOR CITIZENS

Currently, those requiring assisted living must move out of their communities, whether to Bethel or a more distant location. Relatives from the sub-region must travel long distances to visit with these individuals or else move out of the communities also.

There is a women's shelter located in Emmonak, which provides services to approximately 500 women and children from the villages around the Lower Yukon River Delta. This option would create an assisted living facility for senior citizens in either Emmonak or Alakanuk that could accommodate elders from the three communities.

Location: Emmonak or Alakanuk
Term: Medium (3-7 years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Creates jobs:** A sub-regional assisted living facility would create jobs in the sub-region for the operations and maintenance of the facility along with the care of the residents.
- **Increased community funds:** Shift funds for supporting the elders in Bethel to supporting the elders locally, providing added economic stimulus to the sub-region.
- **Keeps elders in the community:** Currently, elders who need assisted living must go to Bethel or Anchorage. This option would keep elders near their families by allowing them to stay in the sub-region.
- **Decreased travel expenses:** Currently, families must travel to Bethel or Anchorage to see family members in assisted living facilities. This option would allow families to travel a smaller distance to see their family members in the assisted living facilities.
- **Possible funding from CDBG:** This type of project may be funded by the Community Development Block Grant offered through Housing and Urban Development (HUD).

DISADVANTAGES

- **Capital cost of building the facility:** The sub-region would need to locate funding to build the facility. Funding for community facilities is available (see Implementation Chapter) and monthly rents of residents may be able to cover the cost of loan financing, if it was used.
- **Cost of operating the facility:** The facility would need to sustain its operation and maintenance costs through monthly rents of residents. However, the monthly rents needed to sustain the facility may be too high for residents to pay them. A feasibility study would need to be done to analyze if the facility could be self-sustaining.
- **Lack of housing in Emmonak or Alakanuk:** The assisted living facility would require workforce. If people moved to the community for work, there may not be adequate housing available.
- **Authoritative body needed:** A facility like this will require a long-term oversight organization to ensure that the standards are being upheld and to seek funding as necessary. YKHC may be approached as a potential authoritative body.

EVALUATION

The potential financial gains for the local economy as well as the ability to preserve the cultural treasures that are the elders locally are all positive aspects of this option. The need for trained personnel to staff this facility, and the need to keep it up to standards will require funding and ongoing effort. Possibilities for the oversight organization could include either the sub-regional health board, or one of the tribal health consortiums.

Recommendation: This option is recommended for consideration. An examination of this option in the form of a financial feasibility study is warranted.

OPTION: CENTRALIZED SCHOOL

Currently, there are Lower Yukon School District schools in Nunam Iqua, Alakanuk, and Emmonak. The school in Nunam Iqua is for grades K-12, and has approximately 50 students. Schools in Emmonak and Alakanuk include both K-12 classes and a Head Start program. Emmonak and Alakanuk have roughly equal populations, and both of their schools have over 200 students. The school in Alakanuk has a new building; classes were first held there in August 2013. Alakanuk is the central village geographically, with Emmonak located to the North, and Nunam Iqua to the South. This option would consolidate the three schools into one large school, either in Alakanuk or Emmonak.

Location: Emmonak or Alakanuk
Term: Long (10+ years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Stronger inter-community ties:** All children would be educated together in a community school, which would bring the children from each village together. A large centralized school would also provide a location for the greater community to gather for events, dances, and meetings.
- **Lower utility costs:** Only having one school would mean fewer buildings to maintain, heat, operate, and insure.

DISADVANTAGES

- **Increased travel cost for teachers, staff, and students:** Teachers, staff, and students not living in the community with the school would have increased travel in order to attend or work at the school. This additional travel would increase transportation costs for those individuals, in addition to potentially deteriorating current transportation routes if they are not designed for increased travel.
- **Loss of employment:** While more jobs would be created in the community with the centralized school, jobs would be lost in the other two communities. Former teachers and staff at the closed schools may not be guaranteed employment at the central school, and may not be able to remain in their current location with no employment.
- **Loss of funds for school maintenance:** Communities without schools would lose the state funds that currently go to maintain the school buildings. If the community wanted to retain the building for another purpose, such as for community gatherings, it would be at their own expense.
- **Need for improved transportation infrastructure between villages:** Currently, there are no summer routes between villages. In the winter, there are marked snow machine trails. These trails may not be able to support the increased traffic that a community school would bring, and would require improvements.
- **Additional safety concerns:** Transporting students overland in winter would present additional safety issues, including freezing temperatures, breakdowns between villages, or difficulty for caregivers to transport students.
- **No available housing for new teachers and staff:** There is not sufficient housing in Emmonak or Alakanuk to accommodate the teachers, staff, and students that would be relocated to work at or attend a community school.
- **New energy demands in the community with the centralized school:** The larger community school would have additional heating and electrical demands that would need to be provided by the AVEC power equipment and the fuel storage facility.
- **May change regional demographics:** If people move to the village with the centralized school for work and better access to education, it would change the demographics of the region.

EVALUATION

The negative impacts from loss of services in two communities, increased time penalties on residents of two communities, and the potential loss of jobs for the three communities as a whole do not appear to have any strong positive impact on the communities

except for greater inter-community ties from attending school together. This option would also require acceptance from the regional education attendance area administration.

Recommendation: This option does not provide benefits to the communities, and will remove needed services and funds from village economies. This option is not recommended.

OPTION: PROFESSIONAL DEVELOPMENT BOARD

Currently, there is no maintained directory of workers in the sub-region. This option would create a professional development board that would maintain a list of skilled workers available for projects in the sub-region and help to coordinate continuing education and training for workers in the sub-region.

Location: Regional
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Ready contacts for services:** A maintained directory of skilled labor in the sub-region would provide people starting projects with a ready list of available workers.
- **Continuing development:** The board would provide an active body that can seek continuing education and professional development opportunities for the skilled labor pool.
- **Seek workers to fulfill needs for upcoming projects:** The board could identify areas of need in the local labor market and seek mechanisms to meet those labor gaps.

DISADVANTAGES

- **Funding for creation and ongoing operation:** The sub-region would need to fund the creation of the board, travel for meetings, and ongoing maintenance of the worker directory.

EVALUATION

During community meetings, representatives from Emmonak reported that AVCP is starting a workforce development program with the Tribe. Similarly, Alakanuk is starting a list of potential trained, capable workers to form a talent pool to staff local projects.

Recommendation: This option is recommended. Community efforts should be combined.

3.3 TRANSPORTATION

OPTION: PERSONAL LOCATOR BEACON (PLB) RENTAL

Currently, there are no established roads between these three villages. In the summer, residents can use skiffs to travel by waterway between the villages. In the winter, there are snow machine trails between the villages. This option would not alter the routes and modes of transportation between villages. However, it would establish PLB rental at community hubs in each village. When renting out a PLB, renters would be responsible for filing a travel plan and timeline specifying when and where they expect to return the PLB.

Location: Alakanuk, Emmonak, and Nunam Iqua
Term: Short (1 - 3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Decrease search and rescue time:** Providing a specific place and procedure for filing trip plans, as well as renting out PLBs, would help with emergency response in the region. Trip plans would guide responders to a general location if someone went missing on a trip, and the PLB could specify an exact location. This, in some situations will make the difference between the life and death of a traveler.
- **Reduce time and resources needed for emergency response:** Having a specified procedure for filing trip plans and renting (or checking out) PLBs could reduce the time and resources spent on emergency response in the region, by guiding responders to the location of the traveler quickly.
- **Regional health board collaboration:** The potential health board could help with this program, by coordinating stakeholders and searching for funds.

DISADVANTAGES

- **Capital and ongoing costs:** This type of program requires funding for set-up, including purchasing the PLBs, and arranging for who will be responsible for their rental and where they will be stored. It will also require annual operational funding, for PLB repair, someone's time for renting the PLBs and collecting trip plans, and space for keeping the trip plans.
- **Training cost:** In order to ensure the PLBs are used properly, community trainings should be conducted for potential renters. Also, emergency responders will need training on how to use the PLB to locate the distressed individual. Funding will be required to conduct the trainings.
- **PLB rentals will likely not reach most vulnerable travelers:** The most vulnerable travelers, those most likely to require search and rescue services, are individuals under the influence of alcohol and/or drugs who leave the community with no plan. These individuals will not take the time to rent a PLB and thus this program would not help them.

EVALUATION

The primary targets for this option seem to be the least likely to follow its procedures.

Recommendation: This option is not recommended due to a lack of means to enforce use by the population that most needs it.

OPTION: TRAIL MARKING

Currently, there are no established roads between these three villages. In the summer, residents can use skiffs to travel by waterway between the villages. In the winter, there are snow machine trails between the villages. This option would not alter the routes or modes of transportation between villages. However, it would mark both land and sea routes with directional staking and/or buoys in order to identify the route. This option is also suggested in the AVCP 2012-2017 Comprehensive Economic Development Strategy. Currently, RPKinney is completing regional trail mapping for the 8 miles of snow machine trails between Alakanuk and Emmonak.

Location: In-place
Term: Medium (3 - 7 years)
Permitting: None
Reference Links: 2012-2017 AVCP Comprehensive Economic Development Strategy

ADVANTAGES

- **Increase traveler safety:** Marking the routes with directional tools will help direct travelers to each village, especially in inclement weather where the trail may not be apparent.
- **Maintained route:** Staff marking the route each year can choose the most sustainable route, avoiding areas where the land needs time to recover from previous traffic, or encouraging a single path rather than many to protect the surrounding environment.
- **Necessary for other shared services:** A marked route would facilitate travel between villages, and increase the ability for other shared services to be implemented. These services could include a health board, consolidated health clinic and school, sanitation and housing projects, and bulk fuel purchases.

- **Stronger community ties:** A marked route would ensure an established path between villages, allowing for more regular travel.
- **Existing mapping:** A trail-marking crew could utilize the trail map being created by RPKinney to mark the trail between Emmonak and Alakanuk, which would decrease the initial cost of setting the route.

DISADVANTAGES

- **Capital and ongoing costs:** Funding will be required to purchase the route tripods, buoys, and beacons. In addition, personnel will be required to set up and take down the markers each year. It is expected that year-to-year there will be need for some of the markers to be repaired or replaced.
- **Increased usage:** Marking the route may lead to higher confidence for travelers, and result in a larger number of people traveling from village to village. The route may not be able to sustain the increased amount of traffic.

EVALUATION

This is a natural next step following the current ongoing mapping of the trails.

Recommendation: This option is recommended. Pursuit of funding for this option is a likely next step.

OPTION: SURFACED TRAIL BETWEEN COMMUNITIES

Currently, there are no established roads between these three villages. In the summer, residents can use skiffs to travel by waterway between the villages. In the winter, there are snow machine trails between the villages. This option would build upon a marked route by creating a surfaced trail, consisting of a material such as Geoblock, to encompass the distance between villages.

Location: In-place
Term: Medium (3-7 years)
Permitting: Required
Reference Links: Alaska DNR Revised Statute 2477 Rights-of-Way

ADVANTAGES

- **Stronger community ties:** A surfaced trail would facilitate smoother travel between villages, allowing for more regular travel.
- **Necessary for other shared services:** A surfaced trail would facilitate travel between villages, and increase the ability for other shared services to be implemented. These services include a health board, consolidated health clinic and school, sanitation and housing projects, and bulk fuel purchases.
- **Maintained route:** The surfaced trail could be implemented along the most sustainable route, and would require regular maintenance. This would decrease travel along other land areas, reducing environmental damage and also providing a safer route than traveling over an un-maintained trail.

DISADVANTAGES

- **Waterways:** The route between villages crosses large waterways (including the Yukon River between Alakanuk and Nunam Iqua). A bridge would be necessary for summer travel.
- **Capital funding:** Feasibility studies in other regions indicate that the initial permitting and construction costs can be several million dollars.
- **Maintenance costs:** The region would need to hire a maintenance crew or contractor to maintain the trail year-round. This would add an annual expense to the region.

EVALUATION

A number of the shared services options could either benefit from, or require this option. Since many of those options also have long lead times (due to permitting, feasibility studies, and/or surveying work), there is time for an examination of information on

the currently existing trail system. A traffic analysis of the trail systems for the frequency of use and amount of freight moved could also provide further information to inform a decision on this option.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted after the trail mapping and marking is done and should include a traffic analysis of the routes.

OPTION: SURFACED ROAD BETWEEN COMMUNITIES

Currently, there are no established roads between these three villages. In the summer, residents can use skiffs to travel by waterway between the villages. In the winter, there are snow machine trails between the villages. This option would build upon a surfaced trail by expanding it to a roadway that would cover the distances between villages. There is precedent for an ice road in the region: Alakanuk and Emmonak each used to maintain an ice road between the two villages in the winter.

Location: In-place
Term: Long (10+ years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Stronger community ties:** A road would facilitate smoother travel between villages, allowing for more regular travel.
- **Necessary for other shared services:** A road would facilitate travel between villages, and increase the ability for other shared services to be implemented. These services include a health board, consolidated health clinic and school, sanitation projects, and bulk fuel purchases.
- **Maintained route:** The road could be implemented along the most sustainable route, and would require regular maintenance. This would decrease travel along other land areas, reducing environmental damage and also providing a safer route than traveling over an un-maintained trail.

DISADVANTAGES

- **Waterways:** The route between villages crosses large waterways (including the Yukon River between Alakanuk and Nunam Iqua). A bridge would be necessary for summer travel.
- **Capital funding:** Feasibility studies in other regions indicate that the initial permitting and construction costs can be several million dollars.
- **Maintenance costs:** The region would need to hire a maintenance crew or contractor to maintain the trail year-round. This would add an annual expense to the region. Road maintenance could be a greater expense than surfaced trail maintenance.

EVALUATION

Roads, unlike trail systems, often require a permitting process. Other rural Alaska road projects have had a planned 5-year permitting process followed by a 2-year build period. Roads also require a higher maintenance cost than a trail system. Currently, the amount of freight and frequency of traffic between communities has not been quantified, so the strong justification for a road cannot yet be made.

Recommendation: This option does not provide benefits to the communities at this time. A deeper examination of the surfaced trail system option once completed could change that decision.

OPTION: INTER-COMMUNITY WATER TAXI SERVICE

Currently, there are no established roads between these three villages. In the summer, residents can use skiffs to travel by waterway between the villages. In the winter, there are snow machine trails between the villages. This option would establish a water taxi that would run on a regular schedule between Alakanuk, Emmonak, and Nunam Iqua.

Location: Alakanuk, Emmonak, and Nunam Iqua
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Stronger community ties:** A water taxi would facilitate smoother travel between villages, allowing for more regular travel.
- **Necessary for other shared services:** A water taxi would facilitate travel between villages, and increase the ability for other shared services to be implemented. These services include a health board, consolidated health clinic and school, sanitation projects, and bulk fuel purchases.
- **Maintained route:** The water taxi would be a regular maintained service. This would decrease travel along other land areas, and also provide a safer route than traveling over an un-maintained trail.

DISADVANTAGES

- **Seasonal operation:** A water taxi would not be able to run during freeze-up, break-up, and winter.
- **Capital funding:** There would be a cost associated with purchasing the boat for the taxi, as well as the costs to set up the program.
- **Maintenance costs:** The sub-region would need to hire a driver and maintain the boat, which would add an annual cost to the region if this was not covered by traveler fees. Conversely, this could be run as a private business.

EVALUATION

This would increase the opportunities for some shared services options. To establish its viability as a sub-regionally controlled business would require additional evaluation of the sub-regional market potential.

Recommendation: This option is not recommended at this time. Additional evaluation of community population movement would be a recommended next step.

3.4 SANITATION (WATER, SEWER, LANDFILL)

OPTION: INSTALL AND PROVIDE TRAINING IN THE USE OF BURN BOXES IN EACH COMMUNITY; TRAIN A PERSON TO FILL A SHARED POSITION TO CONDUCT PROPER BURNS IN ALL THREE COMMUNITIES

Currently, the three communities rely on landfills to dispose of waste. In Emmonak, the class III landfill is permitted and has berms, fencing, and a burn box. There is an existing landfill operator. In Alakanuk, the class III landfill is permitted, but there are limited funds for upkeep. There is a grader, but no dozer or excavator. There is a burn box but it is not functional. In Nunam Iqua, the class III landfill is not permitted. Problems include its location on the tundra, lack of infrastructure, and open burning. In this option, Alakanuk and Nunam Iqua would each implement a burn box to dispose of waste to decrease the volume of waste in each landfill. One trained individual, potentially the landfill operator in Emmonak, would travel to each community to conduct scheduled burns to dispose of collected waste.

Location: Alakanuk and Nunam Iqua
Term: Short (1-3 years)
Permitting: Required
Reference Links: Burning Garbage and Land Disposal in Rural Alaska

ADVANTAGES

- **Provides a controlled method of waste management:** Burn boxes would provide the communities with a method of disposing of waste, rather than storing it in a landfill.

- **Health benefits:** Current landfills face issues such as lack of cover, proximity to water sources, open burning, and a lack of fencing. These problems pose health risks to the community that could be lessened with the addition of a regulated burn box.
- **Potential to add jobs:** The burn box would add training and jobs in the area for the collection and disposal of waste, and maintenance and operation of the burn box. This would result in at least one shared position between the three communities. This position may be filled by Emmonak's existing landfill operator, or could be filled with another individual in a second, complementary position.

DISADVANTAGES

- **Financing to install, maintain, and operate:** The burn box would require funding for installation, maintenance, and operation. Further, communities would need to pay the individual responsible for the burns. Currently, none of the communities is collecting fees relating to waste disposal.
- **Locating land for burn box sites:** Nunam Iqua would need to identify an area to put the burn box. Ideally, the burn box would be located near a landfill, but since the landfill needs relocation, a new site will be needed for both.
- **Need for improved transportation infrastructure:** Currently, there is only a winter surface trail connecting the villages. The individual conducting the burns would need a reliable, maintained route between communities to conduct burns on schedule.

EVALUATION

Burn boxes come in many sizes, and burn boxes which closely meet the communities' needs can be acquired for Alakanuk and Nunam Iqua. Proper utilization of burn boxes can assist landfill management, and better waste management generally leads to improvements in health for surrounding people. If the position in Emmonak were shared by the other communities, then the costs for Emmonak could be reduced and the costs for establishing services at Alakanuk and Nunam Iqua could be done for less capital cost. The other communities would need funding to pay for the position and an overseeing body would need to exist.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted. A comparative analysis with the in-place service option to implement a burn box in each community with local operators could be considered.

OPTION: ESTABLISH A CENTRALIZED LANDFILL

Currently, the three communities rely on landfills to dispose of waste. In Emmonak, the class III landfill is permitted and has berms, fencing, and a burn box. There is an existing landfill operator. In Alakanuk, the class III landfill is permitted, but there are limited funds for upkeep. There is a grader, but no dozer or excavator. There is a burn box but it is not functional. In Nunam Iqua, the class III landfill is not permitted. Problems include its location on the tundra, lack of infrastructure, and open burning. In this option, the communities would establish one large, central landfill to replace the local landfills. Communities would collect waste and transport it to the central landfill for disposal.

Location: Alakanuk or Emmonak
Term: Medium (5-10 years)
Permitting: Required, landfills in Alaska are permitted by the Alaska Department of Environmental Conservation. Both Emmonak and Alakanuk have landfills that are currently permitted.
Reference Links: ADEC Solid Waste Program

ADVANTAGES

- **Provides a controlled method of waste management:** A central, permitted landfill would provide the communities with a method of disposing of waste.
- **Health benefits:** Current landfills face issues such as lack of cover, proximity to water sources, open burning, and a lack of fencing. These problems pose health risks to the community that could be lessened with the addition of a permitted, centralized landfill.

- **Potential to add jobs:** The centralized landfill would add training and jobs in the area for the collection and transport of waste, and maintenance of the landfill. This would result in at least one shared position between the three communities.
- **Less maintenance:** One centralized landfill would require less maintenance than three separate landfills.

DISADVANTAGES

- **Financing to establish, maintain, and operate:** The landfill would require funding for establishment, maintenance, and operation. Further, communities would need to pay the individual(s) responsible for waste collection and transport, and landfill maintenance. Currently none of the communities are collecting fees related to waste disposal.
- **Locating the landfill:** The communities would need to identify a landfill site that can be reached by transportation infrastructure and have the capacity to accept waste from all three communities.
- **Need for improved transportation infrastructure:** Currently, there is only a winter surface trail connecting the villages. The transportation of waste to the landfill will require a maintained route between the villages to move waste on a reliable schedule.

EVALUATION

A centralized landfill would by default achieve the need for both Alakanuk and Nunam Iqua to move their current landfills. A staffed and permitted landfill would have positive impacts on health and the environment in the immediate surroundings of the communities. This would create paid positions in the sub-region, and potentially increase awareness of health risks. Money needed to pay for the positions would need to be raised through fees or acquired through grants and an oversight body would need to be appointed. A centralized landfill would require a surfaced transportation system between the communities, as well as additional trash hauling infrastructure. The long lead time for surfaced transportation combined with the lead time on the centralized landfill suggest this is a project for future consideration after a surfaced transportation system is established, but not immediate action.

Recommendation: This option is not recommended at this time.

OPTION: ESTABLISH A SUB-REGIONAL WATER AND SANITATION CONTROL BOARD

Currently, all three communities have a piped water and sewer system for some homes. In Nunam Iqua, there is a water treatment plant, central watering point, and piped water system as well as a vacuum sewer system. In Emmonak, there is an aboveground circulating water system for treated water from the Yukon River, and a vacuum sewer system that serves most of the village. In Alakanuk, there is a water treatment facility, water tank, and piped water as well as a vacuum sewer system that serves 90% of the homes. However, Alakanuk's system has not worked since September 2016 when the water lines froze and the system failed. This option would establish a sub-regional water and sanitation control board. It would be made up of representatives from each village and could identify water and sewer issues and solutions for the three communities.

Location: Regional
Term: Medium (3-7 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Central knowledge base to communicate best practices:** The water and sanitation board could facilitate communication amongst the three villages, and also communication between villages and outside agencies. If one village identifies a successful practice or program, it can be communicated to other parties. Outside agencies from the state and federal government, or regional Tribal groups, can use the water and sanitation board as a point of contact for the three villages.
- **Opportunity to pursue grants as a group:** A board could write regional language and compile regional data to use in grant applications for funding to benefit water and sewer infrastructure at the sub-regional level, rather than each village having to search for and apply for funding on its own.
- **Health, water, and sanitation board:** A sub-regional water and sanitation board could be combined with a sub-regional health control board to address problems and apply for grants across both sectors.

- **Expansion to remaining villages in the region:** A sub-regional board, if successful, could grow to encompass members from other villages served by the sub-regional clinic in Emmonak, such as Kotlik, Bill Moore's Slough, Chuloonawick, and Hamilton.

DISADVANTAGES

- **Cost of meetings:** The members of the board would need to travel to a central location to meet. The villages would have to find funding for the cost of travel and the meetings.
- **Requires authority to act and enforce:** The three villages would need to recognize the board and agree to consider the recommendations and programs. Further, the board would need to communicate its function to other organizations in the region working on water and sanitation issues, such as YKHC and ANTHC.

EVALUATION

Given the strong ties between water quality and health, a joint entity that examined both health and water quality might be a better option. Many of the arguments for water quality control are health-related and could lead to conflicts when seeking funding opportunities. As a standalone entity a water quality control board would have a harder time drawing on health reasons in their justifications.

Recommendation: This option should be merged with the sub-regional health board option. A deeper examination of this option is warranted.

OPTION: SUB-REGIONAL HAZMAT TRAINING

Currently, the three communities rely on landfills to dispose of waste. In Emmonak, the class III landfill is permitted and has berms, fencing, and a burn box. There is an existing landfill operator. In Alakanuk, the class III landfill is permitted, but there are limited funds for upkeep. There is a grader, but no dozer or excavator. There is a burn box but it is not functional. In Nunam Iqua, the class III landfill is not permitted. Problems include its location on the tundra, lack of infrastructure, and open burning. In this option, the three communities would collaborate to offer sub-regional hazmat training for waste management workers from all three communities.

Location: Regional
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Increased knowledge base on waste management practices:** The training would provide local workers with increased knowledge and training on handling hazardous materials that they encounter in local landfills and burn boxes.
- **Opportunity to fund training as a group:** Training costs will be reduced if unified training can be held for the sub-region, rather than individual trainings for each community. Also, the cost of the training can be split among the three communities.
- **Water and sanitation board:** A sub-regional water and sanitation board could arrange for the training to occur and search for funding to conduct it.
- **Expansion to remaining villages in the region:** A sub-regional training course could grow to encompass members from other nearby villages, such as Kotlik, Bill Moore's Slough, Chuloonawick, and Hamilton.

DISADVANTAGES

- **Cost of training:** The three communities would need to fund the training, which would include recruiting an instructor, paying the instructor, and room and board for the instructor and students.

EVALUATION

Increasing the applied knowledge of the local workforce in the handling of hazardous materials has a number of positive potential health impacts in the communities. In an area with a number of disease vectors, reducing exposure risks can have large impacts. Funding for this option seems to be the major consideration to overcome.

Recommendation: This option should be considered if funding can be found. A deeper examination of this option is warranted.

OPTION: IMPLEMENTATION OF WATER DESALINATION OR ALTERNATIVE WATER OPTIONS

Currently, all three communities have a piped water and sewer system for some homes. In Nunam Iqua, there is a water treatment plant, central watering point, and piped water system as well as a vacuum sewer system. In Emmonak, there is an aboveground circulating water system for treated water from the Yukon River, and a vacuum sewer system that serves most of the village. In Alakanuk, there is a water treatment facility, water tank, and piped water as well as a vacuum sewer system that serves 90% of the homes. However, Alakanuk's system has not worked since September 2016 when the water lines froze and the system failed. Rising sea levels due to climate change have caused water to have a high saline level and reduced drinkability. This option would implement a method to reduce the salinity of the drinking water.

Location: Regional
Term: Medium (3-7 years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Improved quality of local drinking water:** Desalination methods or a viable alternative water generating source would reduce the salinity of the drinking water, improving the quality of the water.
- **Health, water, and sanitation board:** A sub-regional water and sanitation board could lead a feasibility study to evaluate different options for reducing salinity or acquire potable water.
- **Addressing issue now could reduce implementation costs:** Climate change is worsening so addressing the problem sooner rather than later could reduce total capital cost and avoid a crisis where water becomes undrinkable.

DISADVANTAGES

- **Cost of implementation:** A project to implement desalination of water in the three communities will require funding for initial set-up and continuing operation. Alternative potable water generation technologies would also require funding.
- **Need to identify best option:** The three villages would each need to decide on how they would implement a desalination or alternative potable water source program. Various options exist and one solution may not be appropriate for the entire sub-region.

EVALUATION

This option will require a preliminary evaluation of existing technologies and a comparison with water needs for the sub-region.

Recommendation: This option is recommended. The first step will be a pre-feasibility study to identify which desalination methods exist and are appropriate for the sub-region.

3.5 HOUSING

OPTION: PERFORM ENERGY AUDITS AND RETROFITS ON HOMES AS NEEDED

According to the 2014 Housing Assessment, the majority of homes in these three villages have not undergone energy retrofits. In Nunam Iqua, approximately half of the homes have not had an energy audit. The percentage of homes lacking an initial audit is higher in Alakanuk (66%) and Emmonak (87%). However, many homes still report problems. For instance, in Alakanuk, newer

modular homes are not well insulated and mold accrues due to lack of ventilation. In this option, the villages could hire and train a single audit and weatherization crew to perform the energy retrofits on low-performing homes.

Location: All
Term: Medium (3-7 years)
Permitting: None
Reference Links: 2014 Housing Assessment; AHFC Weatherization

ADVANTAGES

- **Creation of local jobs:** The weatherization crew can be made up of local individuals. If needed, the sub-region could ensure that the crew was properly trained for weatherization work. This increases the number of local jobs, as well as increasing the skills of people in the area. After retrofits are complete, the weatherization crew could utilize their experience to work on new construction projects.
- **Reduction of household energy costs:** Energy audits and retrofits reduce the heating and electricity use of homes, which also decreases end-user energy costs.
- **Increase in indoor comfort and safety of homes:** Energy audits identify envelope issues such as places where drafts exist, and also address safety issues such as back drafting and inadequate ventilation. Completing the retrofits makes homes warmer and safer.
- **Reduced health care costs for respiratory issues:** Energy retrofits that address ventilation will improve indoor air quality and improve breathing conditions for people suffering from respiratory illnesses.
- **Opportunity to level homes and buildings on piling foundations:** In Alakanuk, some buildings with piling foundations require re-leveling. The weatherization crew would be able to perform this job along with other retrofits.
- **Efficient wood stoves:** The weatherization crew could evaluate homes for the possible installation of a wood stove, and install them in homes that could use them. Efficient wood stoves would allow families to use local alder, driftwood, or gathered wood to heat their homes.
- **Community building retrofits:** The weatherization crew could perform energy audits and retrofits on community buildings such as tribal halls and washeterias. For instance, in Alakanuk, the washeteria needs upgraded energy efficient appliances.
- **Existing housing entities:** The Tribe in Emmonak is hiring a Housing Director to address issues with derelict houses and oversee construction of new homes. In Alakanuk, an energy planning committee has formed to focus on energy efficiency retrofits, such as lighting, weatherization, and boilers. One or both of these entities may be able to oversee a weatherization crew for the sub-region.

DISADVANTAGES

- **Need lead agency/individual to facilitate:** The communities would need to identify an agency or individual to run the audit and retrofit process. This agency/individual would hire and train the crew, organize the audits and retrofits, and interact with homeowners. Emmonak is hiring a housing director who may be able to take on these duties; however, additional people or different people may be required.
- **Cost of implementation:** Communities would need to identify funding for the training, audits, labor, materials, and travel. Some funding may be available through AHFC's weatherization program. However, this program has experienced reduced funding in recent years, so other funding would also be necessary. Existing programs identified in the Implementation Chapter in this report may also have funding potential.

EVALUATION

The housing in these communities is generally in need of weatherization. There are technical certifications and requirements for the work. If local skilled labor can meet the necessary qualifications, and funding can be acquired, then local crews can do this work. There are likely cost-efficiencies in seeking funding in collaboration with a regional housing authority and specifying in the grant that a certain amount of local training and labor must be included. There are two existing authorities in Alakanuk and Emmonak that can coordinate these activities.

Recommendation: The obvious need for weatherization in these communities requires that this be pursued in some fashion. Sufficient documentation of the issues would enhance pursuit of funding from multiple sources.

OPTION: ENERGY CONSERVATION TRAINING

Energy costs in the region are high in comparison to more urban areas of the state. Energy conservation training for community residents can empower them with small do-it-yourself home retrofits and behavioral changes that can reduce heating and electricity costs.

Location: All
Term: Short (1-3 years)
Permitting: None
Reference Links: 2014 Alaska Housing Assessment

ADVANTAGES

- **Creation of local jobs:** The communities can hire a local resident to receive training on energy conservation techniques. This person can then present this information locally at community gatherings, schools, or door-to-door.
- **Reduction of household energy costs:** Energy conservation techniques reduce the heating and electricity use of homes, which also decreases end-user energy costs.
- **Existing housing entities:** The Tribe in Emmonak is hiring a Housing Director to address issues with derelict houses and oversee construction of new homes. In Alakanuk, an energy planning committee has formed to focus on energy efficiency retrofits, such as lighting, weatherization, and boilers. One or both of these entities may be able to oversee the energy conservation training.

DISADVANTAGES

- **Need lead agency/individual to facilitate:** The communities would need to identify an agency or individual to hire and train someone in energy conservation, and then to arrange presentations. Emmonak is hiring a housing director who may be able to take on these duties; however, additional people or different people may be required.
- **Funding for training, travel, and presentations:** Communities would need to identify funding to train someone in energy conservation, and to present this information in each village.

EVALUATION

Education of community members on energy conservation behavior and the benefits to the communities are quick and easy. This can be incorporated into the curriculum for any of the K-12 classes for additional impact. Hiring and training weatherization crews may not be as feasible as seeking grant funding in collaboration with a regional housing authority for the express purpose of retrofitting the remaining homes up to standard. A grant could specify that local labor be used for the work crews with oversight, lead positions and equipment being supplied by the housing authorities.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

3.6 ENERGY AND BULK FUEL

OPTION: ADVANCED METERING SYSTEM FOR AVEC COMMUNITIES

Currently, AVEC provides electricity for Emmonak and Alakanuk. There are three wind generators located in Alakanuk, and Alakanuk and Emmonak are connected by an intertie. This option, which appeared in the 2012-2017 AVCP Comprehensive Economic Development Strategy, would install networked metering systems in homes located in Emmonak and Alakanuk. These systems have already been installed in other AVEC communities, and have been shown to reduce electric consumption by providing the home occupants with instantaneous information about their electric use. As an alternative, a TED metering system could be installed.

Location: Alakanuk and Emmonak
Term: Short (1-3 years)
Permitting: None
Reference Links: 2012-2017 AVCP Comprehensive Economic Development Strategy

ADVANTAGES

- **Reduced electric use:** The networked metering systems allow homeowners to see their electric consumption in real-time, and learn about how different appliances and behaviors affect consumption. They can then make adjustments to reduce usage and realize energy cost savings.

DISADVANTAGES

- **Cost:** The communities would need to address the cost of installation and training for homeowners to use the meters. AVCP Inc. or AVEC may be a resource to help with this initial funding.
- **Unlikely expansion to Nunam Iqua:** This program would likely not expand to Nunam Iqua because the City owns the local power plant. Energy conservation causes a loss of revenue. If overhead remains constant, electric prices would then increase.

EVALUATION

This option provides a mechanism that would allow residents to better manage their household costs. It has been shown to be successful in other AVEC communities.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: CONSOLIDATED BULK FUEL PURCHASING

Currently, each community has multiple bulk fuel storage facilities and fuel is hauled to individual home storage tanks. The communities purchase fuel individually. The Yukon Delta Fisheries Development Association sells fuel in the sub-region at cost. While the fishery is able to sell fuel at a lower cost to the communities, it cannot meet the demand for fuel in the region on its own. In this option, communities would order and purchase fuel together, allowing for the possibility of a lower price per gallon. The fuel cooperative would need to include LYSD and AVEC. Fuel would be stored in one tank farm and hauled to individual home storage tanks.

Location: All
Term: Long (10+ years)
Permitting: None for purchase, required for transport
Reference Links: N/A

ADVANTAGES

- **Lower fuel costs:** Residents have the potential for lower energy and transportation costs if the price of fuel per gallon can be reduced.
- **Less maintenance for central fuel storage:** The three communities would store fuel in one bulk tank farm. This would result in reduced maintenance and permitting.

DISADVANTAGES

- **Existing fuel supplier:** The primary competitor has infrastructure in place and sells fuel to residents at cost. While this supplier cannot meet the demand of the region on its own, it does cut into the market for lower priced fuel.
- **Funding to expand existing tank farm:** Funding would be required to expand a designated tank farm, likely the one in Emmonak, to be able to store more fuel.
- **Need infrastructure to haul fuel between communities:** The communities would need to acquire the infrastructure and transportation to accommodate fuel transport between communities.

- **Need maintained trail or road between communities:** Currently, there are only un-maintained winter surface trails connecting the communities. Fuel transport would require a maintained trail or road.
- **Varying credit histories:** Bulk purchasing can be challenging if parties have varying credit histories and methods of payment.
- **Varying transportation requirements:** Bulk purchasing can be challenging because the cost of fuel transport to each community is different. The purchasing entity would need to address if communities would pay the same price or be responsible for additional transportation costs.

EVALUATION

Fuel is currently being supplied at cost by an organization that intends to keep their operations going for the foreseeable future; however, this supplier cannot meet the entire demand of the sub-region. The additional costs of developing a parallel infrastructure for shipping and storing fuel may be financially viable if the three communities can purchase fuel in bulk together to meet the remaining fuel demands of the sub-region.

Recommendation: This option should be explored further. A market demand analysis would be helpful to inform preliminary feasibility work. A positive result on the preliminary feasibility could support funding for business plan development and the next steps.

OPTION: RESEARCH ALTERNATIVE ENERGY FOR THE SUB-REGION

Currently, AVEC provides electricity for Emmonak and Alakanuk. There are three wind generators located in Alakanuk, and Alakanuk and Emmonak are connected by an intertie. Nunam Iqua Electric provides electricity to Nunam Iqua using four diesel generators. A study by the Alaska Energy Authority in 2012 indicated Nunam Iqua will wait before committing to wind power. Alakanuk's energy vision identified a priority of researching alternative, renewable energy, such as solar panels, wind turbines, waste heat utilization, and hydropower. With this option, the communities could complete a feasibility study as an initial step towards identifying renewable possibilities for the region. Emmonak also indicated that they would like alternative energy generation in their community.

Location: All
Term: Medium (3-7 years)
Permitting: None
Reference: Nunam Iqua Wind Power Study (Nunam Iqua Advisory Planning Board, 2012)

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Lower energy costs:** Renewable energy has the potential to lower energy costs for community members.
- **Local circulation of money:** Local renewable energy projects mean more money stays within a community. Rather than spending money on fossil fuels imported from elsewhere, money goes towards renewable energy jobs within a community.
- **Local jobs:** Renewable energy systems must be maintained and operated by members of a community.

DISADVANTAGES

- **Funding to study and install:** Funding would be required to perform feasibility studies for renewable energy, and then for the initial installation.
- **Maintenance:** Some renewable energy infrastructure, such as wind turbines, requires specialized knowledge and training to maintain.

EVALUATION

This requires a positive decision from the current electric utilities and would represent a significant capital investment, as well as ongoing annual maintenance. While this option provides benefits to the residents and has community support, the final decision to pursue this option is not in the hands of the communities.

Recommendation: This option appears to provide some benefits to the communities. To pursue this option further, the communities should begin by performing a feasibility study to present to the utilities. This study should include an evaluation of the environmental and societal impacts, as well as an evaluation of the financial feasibility.

OPTION: USE PROPANE OR NATURAL GAS INSTEAD OF DIESEL FUEL FOR HEATING

Currently, diesel - and, for Alakanuk and Emmonak, wind - provides heat and electricity to the communities. This option would explore the possibility to bring propane or natural gas to the sub-region as an alternative for heating fuel and/or electricity. The propane would be transported from Fairbanks. The natural gas may come from a pipeline branch from a future larger pipeline in the state.

Location: All
Term: Long (10+ years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Lower energy costs:** Natural gas has the potential to lower energy costs for community members.
- **Planned pipelines that may allow for branching:** There are pipelines under consideration in the region that may allow for communities to add branches to in order to bring natural gas to their residents.

DISADVANTAGES

- **Funding to study and set up:** Funding would be required to perform a feasibility study, and if it indicated that the project would be worthwhile, to arrange for regular transport, distribution, storage, and sale of propane in the short term while waiting for the natural gas in the long term.
- **Conversion of appliances:** Heating and cooking appliances may require conversion to accommodate propane and natural gas as a fuel source rather than diesel fuel.

EVALUATION

To implement this option, the communities would need to identify a long-term supplier and ensure that the local market demand was sufficient. Then, a stable transportation infrastructure would need to be in-place to begin regular shipments. Finally, the cost of converting appliances is very high. The recent wood stove change out program conducted by Fairbanks North Star Borough can provide an example of the funding requirements for an appliance conversion.

Recommendation: This option in not recommended at this time. To pursue this option an evaluation of the financial feasibility would be required. As part of the evaluation the supply of a larger pipeline would need to be evaluated.

3.7 OPTIONS TO IMPROVE SERVICES-IN-PLACE

In many of the sectors, there are currently no feasible options to implement shared services. In these cases, the communities could first focus on improving services-in-place, with the long-term goal of re-evaluating shared services after local conditions have improved.

OPTION: SUB-REGIONAL PROJECT NEWSLETTER

Currently, the three communities in the sub-region are each identifying issues and implementing solutions in several sectors, including Health, Housing, Education, Sanitation, Transportation, and Energy. This option would provide the sub-region with a regular newsletter. The newsletter would provide information on results from studies, upcoming projects, and opportunities for collaboration.

Location: In-place
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Collaboration on similar projects and purchases:** The newsletter would serve to let each Tribe, City and Corporation find out about upcoming projects, purchases, or studies. If there was an opportunity for collaboration or bulk purchasing, the communities could find out in advance and act together on the opportunity.
- **Share success stories:** The newsletter could share success stories about ongoing projects in each community, such as new housing or reductions in energy costs. Communities and homeowners could utilize the techniques from those projects that apply to them to experience similar results.
- **Existing housing entities:** The Tribe in Emmonak is hiring a Housing Director to address issues with derelict houses and oversee construction of new homes. In Alakanuk, an energy planning committee has formed to focus on energy efficiency retrofits, such as lighting, weatherization, and boilers. One or both of these entities may be able to coordinate the newsletter section for housing.
- **Combination with existing newsletter:** This newsletter could be combined with one of the existing newsletters in the sub-region in order to save on costs and utilize an existing distribution network.

DISADVANTAGES

- **Need lead agency/individual to facilitate:** The communities would need to identify an agency or individual to publish the newsletter. One of the existing housing entities may be able to take on this task as many of the sectors are directly related to housing.
- **Funding for newsletter:** Communities would need to identify funding for the drafting and publication of a regular newsletter.

EVALUATION

This would be a low cost mechanism for enhancing sub-regional knowledge of issues and building community support for changes.

Recommendation: Pursuit of this option is recommended.

CATEGORY: HEALTH
OPTION: REHABILITATE SAUNA IN ALAKANUK

Currently, there is an existing sauna in Alakanuk, but it is in disrepair and cannot be used. This option would retrofit the building so that community members and visitors could use the sauna for a fee.

Location: Alakanuk
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the community and has community support.
- **Source of revenue:** A sauna in the community would bring in revenue to the city. The revenue could be used to employ an individual to keep the sauna clean and extra revenue could go to other services or to eventually expand the sauna.
- **Potential to add jobs:** The sauna has the potential to increase the number of jobs in the community, if the upkeep of the sauna is not added to the job duties of an existing employee.

- **Improves health:** The sauna would provide community members a place to bathe. Community members with no indoor plumbing due to lack of a water/sewer connection for their home or due to a malfunctioning water/sewer system could bathe at the sauna.

DISADVANTAGES

- **Cost of rehabilitation:** Alakanuk would need to locate funding to rehabilitate the sauna. However, funding for rehabilitation of community buildings is available from various agencies (see Implementation Chapter). If the rehabilitation is paid for via loan financing, a portion of the revenue from use of the sauna could be used for loan payments.

EVALUATION

This option has multiple advantages for the community. If funding opportunities can be identified, this project could be managed by the local clinic or sub-regional health board to ensure any necessary health standards for the facility are observed.

Recommendation: This option appears to provide benefits to the community and is recommended.

CATEGORY: TRANSPORTATION
OPTION: UPGRADE BOAT LANDINGS

Currently, each community has an airport with a gravel landing, and a dock for boat landings. In Emmonak, the 60-foot dock is in deep water and serves as the regional port for the Lower Yukon Delta. Emmonak and Alakanuk have dirt roads; Nunam Iqua is mainly a boardwalk community. This option would improve the boat landings in Alakanuk and Nunam Iqua. In Alakanuk, the dock needs to be moved to a new location with a stabilized bank. In Nunam Iqua, the barge landing needs to be upgraded with gravel surfacing and mooring points.

Location: Alakanuk and Nunam Iqua
Term: Short to Medium (1-5 years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Improved safety:** Upgrades to boat landings increase the safety for boat travelers and the on-shore population. For instance, improvements would mean a stabilized bank will not give way unexpectedly, moorings for boats so they do not drift away or require land storage, and better surfacing for water drainage.
- **Increased access:** Improved boat landings will allow more people to access and use them for water travel.
- **One crew:** If both villages plan to take up projects in the same season, the same crew and machines could be used in all locations. This could reduce capital costs by reducing transportation costs and using a crew familiar with the conditions in the region.

DISADVANTAGES

- **Capital cost:** Funding is necessary to improve the docks, including funding for materials, personnel, and shipping. Also, in Alakanuk, an appropriate site would need to be identified through a feasibility study.

EVALUATION

A dock is a necessary basic service for these communities. Moving the dock in Alakanuk is a necessary move due to bank stability issues with its current location. The improvements to Nunam Iqua's barge landing can also be characterized as necessary maintenance for continued use.

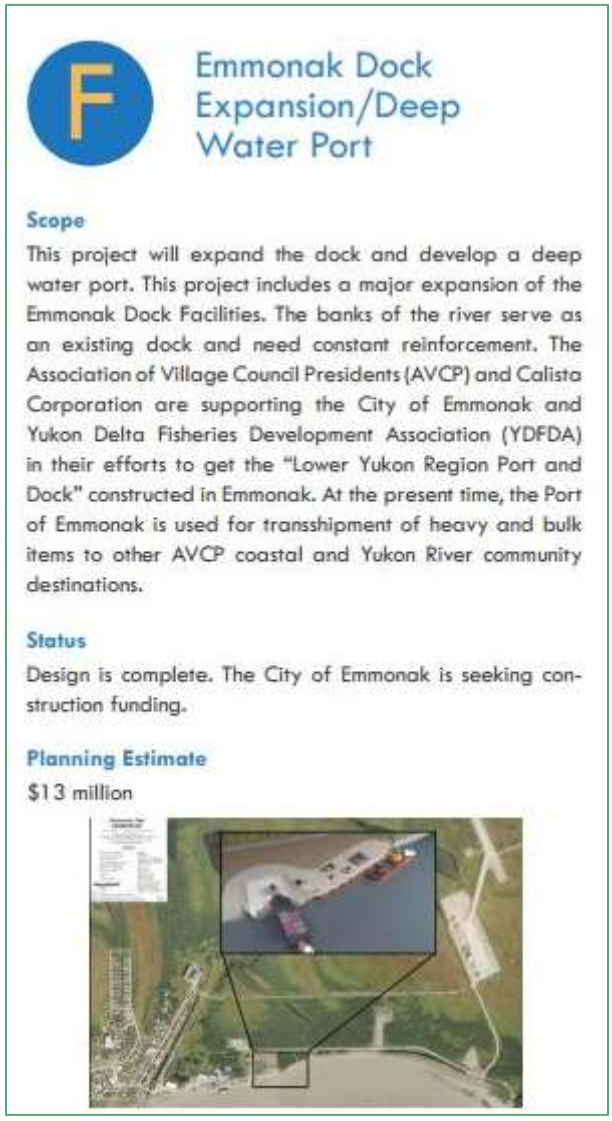
Recommendation: This option is recommended for Alakanuk and Nunam Iqua to preserve access to necessary basic services.

OPTION: CREATION OF DEEP WATER PORT IN THE SUB-REGION

Currently, each community has an airport with a gravel landing, and a dock for boat landings. In Emmonak, the 60-foot dock is in deep water and serves as the regional port for the Lower Yukon Delta. Emmonak and Alakanuk have dirt roads; Nunam Iqua is mainly a boardwalk community. This option would improve create a deep water port in the sub-region. The 2012-2017 AVCP Community Economic Development Strategy report as well as the Yukon-Kuskokwim Delta Transportation Plan both recommend converting the existing 60-foot deep port in Emmonak to a deep-water port for the Yukon River. Emmonak leaders indicated that there are existing feasibility studies for a dock/port to serve the sub-region. The water in Emmonak and Alakanuk is sufficiently deep to support a deep-water port; however, this project is already in place for Emmonak in the AVCP CEDS and State STIP.

Location: Emmonak
Term: Short to Medium (1-5 years)
Permitting: Required
Reference Links: 2012-2017 AVCP Comprehensive Economic Development Strategy, Yukon Kuskokwim Delta Transportation Plan

Figure 5: Description of the proposed dock expansion project in Emmonak. Figure from (Alaska Department of Transportation & Public Facilities, 2017).



ADVANTAGES

- **Increased access:** A deep-water port will also allow more ships to access the region, allowing for more goods and services to reach the sub-region.
- **One crew:** If the deep-water port is created in conjunction with the landing improvements, the same crew and machines could be used in all locations. This could reduce capital costs by reducing transportation costs and using a crew familiar with the conditions in the region.

DISADVANTAGES

- **Capital cost:** Funding is necessary to create and maintain a deep-water port.
- **Location:** The sub-region would need to decide where to locate the port, either in Emmonak or Alakanuk.

EVALUATION

Based on the Yukon Kuskokwim Delta Transportation Plan, the design of the deep water port is complete and the City of Emmonak is seeking funding for construction (see Figure 5). This option should proceed as outlined in the Transportation Plan.

Recommendation: It is recommended to move this option forward as described above.

OPTION: AIRPORT IMPROVEMENTS IN EACH COMMUNITY

Currently, each community has an airport with a gravel landing, and a dock for boat landings. In Emmonak, the dock is in deep water (60 feet) and serves as the regional port for the Lower Yukon Delta. Emmonak and Alakanuk have dirt roads; Nunam Iqua is mainly a boardwalk community. This option would improve the existing airports. Improvements would be tailored to each individual community but could include: lengthening the runways; adding runway lighting and GPS-based instrument landing systems; building airport shelters; upgrading snow removal equipment; and constructing warehouses near the airport for cargo.

Location: Emmonak, Alakanuk, Nunam Iqua

Term: Short to medium (1-5 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Would improve efficiency of transporting goods into and out of the region:** Upgrades that facilitate the landing of cargo planes in the region (such as longer runways and navigational aids) as well as the construction of cargo warehouses would improve the ability to transport cargo in and out of the region. This includes the transport of fish out of the region, which could facilitate moving the fish to market and increasing the income in the region.
- **Potential to add jobs:** Airport improvements would bring temporary construction jobs to the region. Also, long-term maintenance of buildings and snow removal would add part-time or full-time employment.
- **Improved safety:** Improvements such as runway lighting, GPS navigation equipment, and airport shelter would improve the safety of air travel in the region.
- **One crew:** If all three villages plan to take up projects in the same season, the same crew and machines could be used in all locations. This could reduce capital costs by reducing transportation costs and using a crew familiar with the conditions in the region.
- **Build on existing project in Nunam Iqua:** According to Carin Finch of Nunam Iqua (personal communication, March 8, 2017), there is already a planned airport improvement project there. This project could then build on that one to finish all needed improvements.

DISADVANTAGES

- **Capital cost:** The airport improvements would require funding for materials and construction.
- **Maintenance costs:** Some of the airport improvements would necessitate ongoing maintenance, such as cargo buildings, airport shelters, lighting, and snow removal. The maintenance of these improvements would need to be incorporated into an existing job or a new job. Additionally, maintenance equipment and parts would need to be purchased on an ongoing basis.

EVALUATION

Improvements that preserve the integral functions of the airport (lengthening the runways; adding runway lighting GPS-based instrument landing systems; acquiring and using snow removal equipment) will fall under DOT&PF and FAA jurisdictions and funding. Communities could increase the likelihood of action by finding funding for the necessary evaluation studies on environmental and economic impact from such improvements and maintenance activities.

In the case of the improvements that assist the local users of the airport (building airport shelters; constructing warehouses near the airport for cargo), the landowner where the new construction would be sited should be consulted as their approval is necessary. The next step would be a financial evaluation of the warehousing or warming shelter to determine what the necessary capital and ongoing heating and maintenance costs would be for the owner on record.

Recommendation: This option should be explored further with the knowledge of the affected parties.

OPTION: UPGRADE AND REHABILITATE COMMUNITY STREETS

Currently, Emmonak and Alakanuk have dirt roads; Nunam Iqua is mainly a boardwalk community. This option would improve the road and path infrastructure in each community. Improvements might include widening paths and streets; adding dust control measures; upgrading lighting; and creating new streets or paths where needed. These upgrades fall under the jurisdiction and funding of the Tribal Transportation Program.

Location: Emmonak, Alakanuk, Nunam Iqua
Term: Short to medium (1-5 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Improved safety:** Improving infrastructure for paths and streets would increase the transportation safety in each village. Dust control would improve air quality; wider paths and streets would allow for easier passing; and creating new paths and streets would provide residents with a designated route to travel.
- **Increased efficiency:** Maintained roads improve vehicle efficiency and decrease maintenance needs. Additionally, lighting upgrades can decrease electric usage.
- **One crew:** If all three villages plan to take up projects in the same season, the same crew and machines could be used in all locations. This could reduce capital costs by reducing transportation costs and using a crew familiar with the conditions in the region.

DISADVANTAGES

- **Capital cost:** Improvements to roads and paths require upfront funding for labor, materials, and machines that the region may not have in-place.

EVALUATION

A traffic analysis of the road network for the frequency of use and amount of freight moved could provide information to guide a decision on this option. Communities may be able to fund improvements through the BIA Tribal Transportation Program.

Recommendation: This option would provide minor benefits to the community. A deeper examination of this option, in conjunction with the Tribal Transportation Program, is warranted to evaluate the potential cost.

OPTION: ESTABLISH INTRA-COMMUNITY PUBLIC TRANSPORTATION

Currently Emmonak and Alakanuk have dirt roads; Nunam Iqua is mainly a boardwalk community. Residents walk, or use ATVs or snow machines for travel within and between communities. This option would add public transportation options in each community, such as transportation to and from school, transportation to and from the airport, and grocery delivery to families that need it.

Location: Emmonak, Alakanuk, Nunam Iqua
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Improved safety:** Providing a public transportation option has the potential to reduce the amount of traffic on the roads overall. It also gives pedestrians another option for transit in times when visibility is low, such as in inclement weather or during dark winter days.
- **Increased access:** Public transportation increases access for residents to essential services such as school, airport, clinic, and grocery store.
- **Additional jobs:** Job(s) would be added for driving and maintaining public transportation vehicles.
- **Potential to share portions of the service:** If public transportation is implemented in more than one village, they could share maintenance personnel and potentially a driver (for instance, if the driver did a route in different villages on different days).
- **Potential to operate seasonally:** If this service was not feasible year-round, it could be set up to operate seasonally, to take advantage of times of higher traffic, such as tourism season.
- **Potential to reach new subdivisions or building locations:** If buildings are moved further away due to erosion, or subdivisions for housing are planned further out of town, this service could increase access to these new areas.

DISADVANTAGES

- **Capital cost:** Funding would be necessary to set-up the program, purchase vehicles and equipment, and hire new personnel.

- **Ongoing cost:** Annual funding would be necessary for fuel, personnel, and maintenance. This would add an additional expense to the region that may or may not be offset by user fees.
- **Liability:** A party would need to assume liability for in-village transportation once projects were up and running.

EVALUATION

This would increase access to essential services for community members with mobility issues. To establish its viability as a business would require additional evaluation of the local market potential. Optionally the local village councils could consider funding it as a community service.

Recommendation: This option is not recommended at this time. Additional evaluation of community population movement would be a recommended next step. However, this option may become more viable if buildings in the communities have to move locations to more stable ground and further from essential services.

CATEGORY: HOUSING
OPTION: RELOCATE BUILDINGS

In Alakanuk, certain buildings are located within the tidal and high wind flood area. Additionally, the tribal building is in an area that is suffering from erosion. In this option, these buildings would be relocated to stable ground not in the flood area.

Location: Alakanuk
Term: Short (1-3 years)
Permitting: Possible, depending on new locations
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Improved safety:** Moving buildings out of erosion and flood zones increases the safety of residents and improves access to those buildings.
- **Additional jobs:** The village could hire local individuals to re-locate the buildings.
- **Potential to utilize weatherization crew:** If a weatherization crew is performing energy retrofits on buildings, they may also be able to receive training to be able to re-locate the buildings. This would increase their skills and prolong their work.

DISADVANTAGES

- **Funding:** Funding would be necessary to train people to re-locate the buildings, and to perform the relocation. Also, additional equipment may need to be purchased for the relocation effort.
- **New locations:** Suitable locations would need to be identified for each building that required a move.

EVALUATION

Rising sea levels make this option a requirement. Funding is likely the biggest first hurdle. Identification and allocation of land for future sites is also an early necessity.

Recommendation: It is recommended to start the process to implement this option.

OPTION: CONSTRUCT NEW AFFORDABLE HOUSING

Emmonak is currently planning a new subdivision and has secured funding for road construction. After the road is in place, this option would involve building new homes in the subdivision. The Tribe is hiring a Housing Director to oversee the process.

Location: Emmonak
Term: Short (1-3 years)
Permitting: Possible, depending on the locations of the new homes
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Improved housing conditions:** New homes will provide more housing options in the community, alleviating overcrowding in older homes.
- **Local jobs:** The Housing Director can hire local individuals for the construction of the new subdivision, road, houses, and services such as water and electricity.
- **Energy efficient housing:** The new houses can be designed to be energy efficient, and utilize energy efficient appliances for heating, ventilation, and other uses. This will ensure low energy costs for future residents.

DISADVANTAGES

- **Funding:** Funding will be necessary for the planning and construction of the new homes, as well as for installing services such as water and electricity.

EVALUATION

Management personnel are being hired. Roads and services are being planned. Housing is being planned.

Recommendation: This option is underway. It is recommended to seek funding now for the next steps.

CATEGORY: SANITATION
OPTION: IMPROVE LANDFILL MANAGEMENT AND PURSUE THE AK DEC PERMITTING PROCESS

Currently, the three communities rely on landfills to dispose of waste. In Emmonak, the class III landfill is permitted and has berms, fencing, and a burn box. There is an existing landfill operator. In Alakanuk, the class III landfill is permitted, but there are limited funds for upkeep. There is a grader, but no dozer or excavator. There is a burn box but it is not functional. In Nunam Iqua, the class III landfill is not permitted. Problems include its location on the tundra, lack of infrastructure, and open burning. In this option, Alakanuk would close its current landfill and open a new landfill in a different location. Nunam Iqua would pursue the ADEC permitting process with a new landfill location. Nunam Iqua could also implement a trash collection service, which is supported by the community.

Location: Alakanuk and Nunam Iqua
Term: Short to Medium (1-5 years)
Permitting: Required
Reference Links: ADEC Solid Waste Program, Nunam Iqua Preliminary Landfill Design Study (Antrobus & Boccia, 2014)

ADVANTAGES

- **Health benefits:** Current landfills face issues such as lack of cover, proximity to water sources, open burning, and a lack of fencing. These problems pose health risks to the community that could be lessened with a permitted landfill.
- **Potential to add jobs:** The permitted landfill would add training and job(s) in the area for the collection and transport of waste, and maintenance of the landfill. This would result in at least one partial position in each community.
- **Potential for new job to cover multiple duties:** Landfill management may not be a full-time position in each village, but it could be combined with duties for other services, such as the individual operating the burn box, transportation improvement jobs, or the weatherization crew.
- **Phases:** ANTHC's landfill report describes phases to close the old landfill and construct and open the new one. Operating projects with phases provides the opportunity to pursue funding over time and incrementally improve the waste disposal process.

DISADVANTAGES

- **Need for a new location:** In order to pursue the permit process, both communities will need to identify a new landfill location.
- **Funding to install, maintain, and operate:** Permitted landfills require capital funding to set up according to state standards, and ongoing maintenance. No community currently collects a fee related to waste disposal.

EVALUATION

The process of getting landfills through the permitting process has previously improved landfill quality and helped the health of nearby residents and the surrounding environment. Permitted landfills will require funding to maintain and operate.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: INSTALL AND PROVIDE TRAINING IN THE USE OF BURN BOXES IN EACH COMMUNITY; TRAIN A PERSON IN EACH COMMUNITY TO CONDUCT PROPER BURNS

Currently, the three communities rely on landfills to dispose of waste. In Emmonak, the class III landfill is permitted and has berms, fencing, and a burn box. There is an existing landfill operator. In Alakanuk, the class III landfill is permitted, but there are limited funds for upkeep. There is a grader, but no dozer or excavator. There is a burn box but it is not functional. In Nunam Iqua, the class III landfill is not permitted. Problems include its location on the tundra, lack of infrastructure, and open burning. In this option, Alakanuk and Nunam Iqua would install operational burn boxes and hire and train a person to conduct proper burns.

Location: Alakanuk and Nunam Iqua
Term: Short (1-3 years)
Permitting: Required
Reference Links: Burning Garbage and Land Disposal in Rural Alaska

ADVANTAGES

- **Provides a controlled method of waste management:** Burn boxes would provide the communities with a method of disposing of waste, rather than storing it in a landfill.
- **Health benefits:** Current landfills face issues such as lack of cover, proximity to water sources, open burning, and a lack of fencing. These problems pose health risks to the community that could be lessened with a regulated burn box.
- **Potential to add jobs:** The burn box will require maintenance and an individual to conduct the burns. This would add at least one job to the region.
- **Potential for new job to cover multiple duties:** Operation of the burn box may not be a full-time position in each village, but it could be combined with duties for other services, such as landfill maintenance, transportation improvement jobs, or the weatherization crew.

DISADVANTAGES

- **Locating land for the burn box site:** Each community would need to identify an area to put the burn box. Ideally, the burn box would be located near a landfill, but in cases where the landfill must be relocated, a new site will be needed for both.
- **Funding to install, maintain, and operate:** The burn box will require capital funding to set up according to state standards, ongoing maintenance, and a salary for the individual conducting the burns. No community currently collects a fee related to waste disposal.

EVALUATION

This option varies from the shared services option in that there is not a traveling shared staff position, but three in-place staff positions, one for each community. Burn boxes come in many sizes, and burn boxes which closely meet the communities' needs can be acquired. Proper utilization of burn boxes can assist landfill management, and better waste management generally leads to improvements in health for surrounding people. This would create paid positions, and potentially increase awareness of health risks.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted. A comparative analysis with the shared services option could be considered.

OPTION: REPAIR THE WATER SEWER SYSTEM IN ALAKANUK

In Alakanuk, there is a water treatment facility, water tank, and piped water as well as a vacuum sewer system that serves 90% of the homes. However, Alakanuk's system has not worked since September 2016 when the water lines froze and the system failed.

This option would repair and upgrade Alakanuk's system. This would include upgrading the existing circulating pump to 15 horsepower, replacing old components, and adding a waste heat system. The community could also add a remote monitoring system to prevent another freeze-up.

Location: Alakanuk
Term: Short (1-3 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Community support:** This has been requested by the communities and has community support.
- **Improved hygiene and health:** Indoor plumbing for homes allows residents to more easily establish habits that inhibit the spread of disease, such as hand washing, bathing, clothes washing, and cleaning. Repairs to the system will restore indoor plumbing to homes on the water/sewer system.
- **Reduced energy costs:** Adding a waste heat recovery component to the system would reduce the amount of heat required and the number of freeze-ups.
- **Less maintenance:** Upgrading the system to new, efficient equipment will reduce the amount of maintenance that they system requires.

DISADVANTAGES

- **Funding for implementation:** Alakanuk will need to locate funding to upgrade the water/sewer system.

EVALUATION

ANTHC is already in the process of fixing this system. Resident input on methods to improve the existing system should be shared with ANTHC personnel prior to their arrival on-site to increase the likelihood of adoption of the suggestions.

Recommendation: This option is recommended.

OPTION: UPGRADE COMMUNITY WATER AND SEWER SYSTEMS TO INCLUDE THE WHOLE VILLAGE

Currently, all three communities have a piped water and sewer system for some homes. In Nunam Iqua, there is a water treatment plant, central watering point, and piped water system as well as a vacuum sewer system. In Emmonak, there is an aboveground circulating water system for treated water from the Yukon River, and a vacuum sewer system that serves most of the village. In Alakanuk, there is a water treatment facility, water tank, and piped water as well as a vacuum sewer system that serves 90% of the homes. However, Alakanuk's system has not worked since September 2016 when the water lines froze and the system failed. This option would expand the water and sewer systems already in place to include all homes in each of the communities.

Location: In-place
Term: Medium (3-7 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Improved hygiene and health:** Indoor plumbing for homes allows residents to more easily establish habits that inhibit the spread of disease, such as hand washing, bathing, clothes washing, and cleaning.
- **Potential to add jobs:** The construction required to expand the existing systems to all homes in each community has the potential to add job(s) to the region. Also, one trained crew could work on systems in all three villages.
- **Shared training and equipment:** There is potential to share training and equipment costs if one crew is able to work on the systems in all three villages.

DISADVANTAGES

- **Funding for implementation:** Communities would need to fund the expansion of the current systems. These systems will also require maintenance. If this maintenance cannot be incorporated into the maintenance that already occurs, more funding will be needed to keep the systems up and running.

EVALUATION

This option requires a decision from the current water utility and represents a significant capital investment, as well as ongoing annual maintenance costs. While this option provides potential benefits to the residents, the final decision to pursue this option is not in the hands of the community.

Recommendation: To pursue this option an evaluation of environmental and societal impacts as well as an evaluation of the financial feasibility would be required and would need to be presented to the utility. Potential for "out-of-the-box" options, such as the Portable Alternative Sanitation System from ANTHC, should be explored.

CHAPTER IV

IMPLEMENTATION PLAN

This page left intentionally blank.

IMPLEMENTATION PLAN

4.1 SUMMARY OF RECOMMENDATIONS

Figure 6 and 7 provide an overview of potential development projects by sector and timeframe. They also shows how some projects are dependent on the development of others, for example, a surface trail between communities depends on first completing a traffic analysis for the trails.

Figure 6: Roadmap for potential recommended shared services.

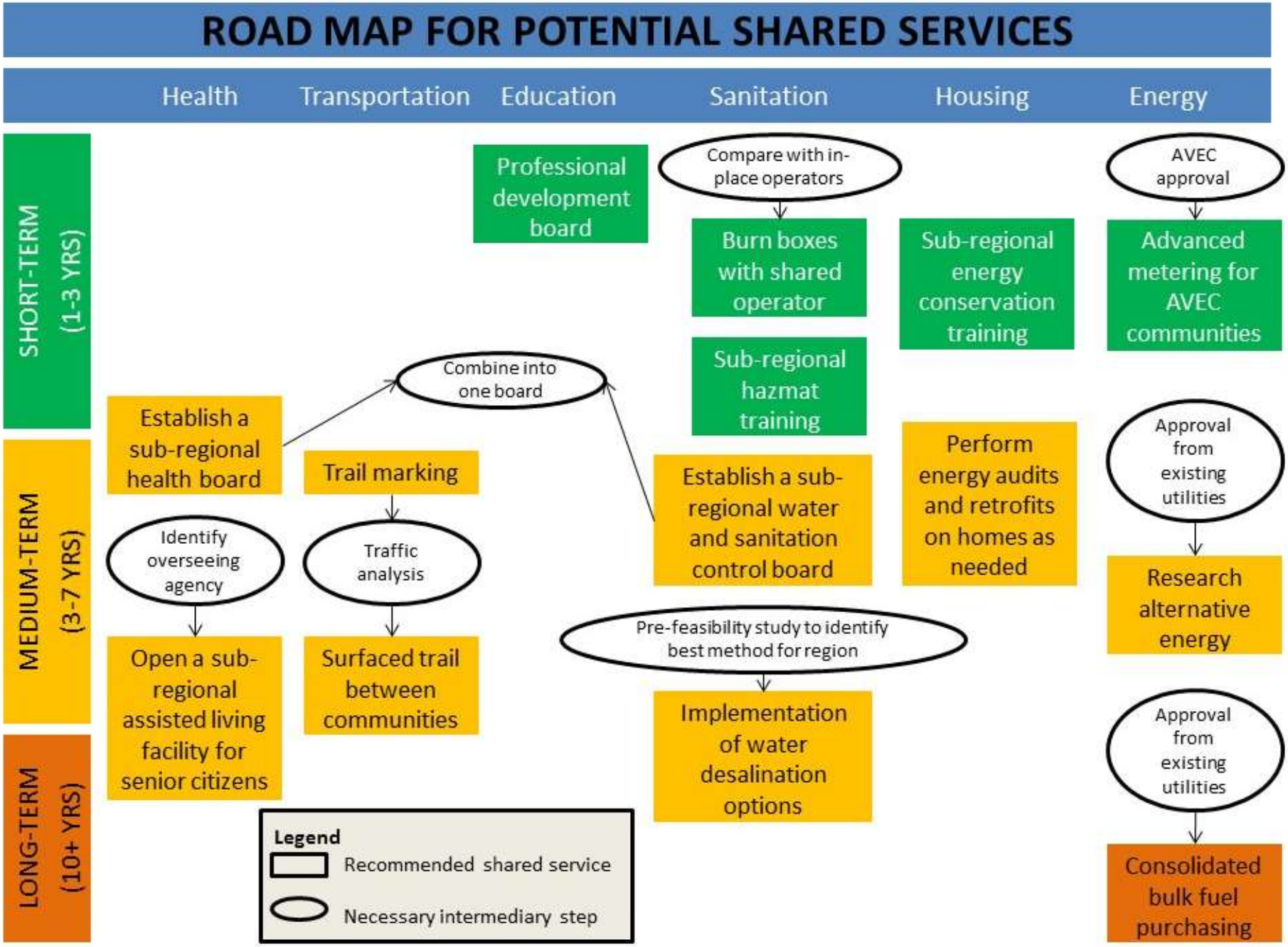
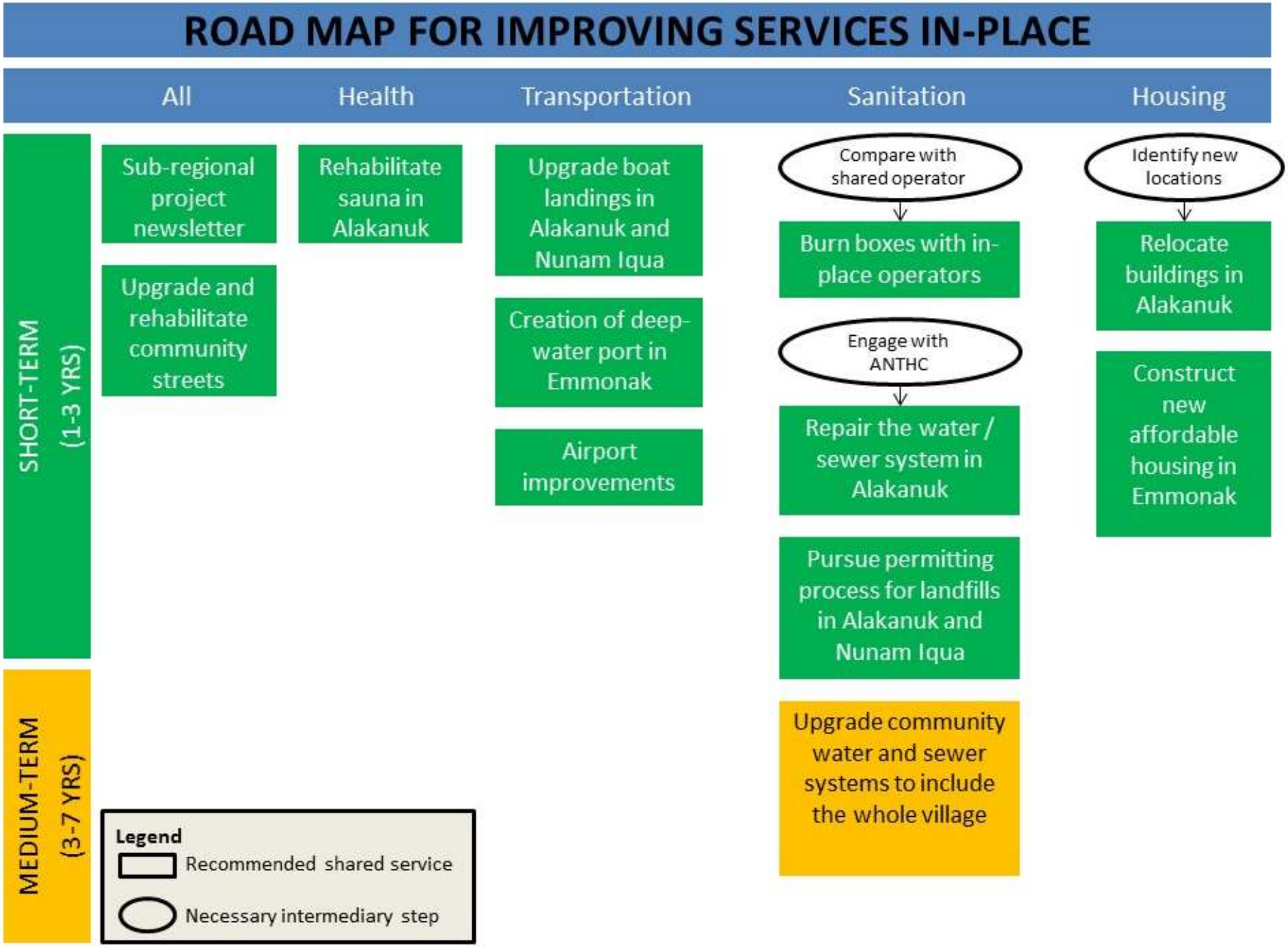


Figure 7: Road map for recommended improvements to services in place.



SHARED SERVICES OPTIONS BY SECTOR: RECOMMENDATIONS

The following table contains all the shared service options, organized by category and term for implementation. This table summarizes the shared services that the previous sections lay out in detail. Options in grey are not recommended at this time.

Sector	Option	Term	Permitting	Recommended
Health	Establish a sub-regional health board	3-7 years	No	Yes
Health	Centralized clinic	3-7 years	Yes	No
Health	Open a sub-regional assisted living facility for senior citizens	3-7 years	Yes	Yes
Education	Professional development board	1-3 years	No	Yes
Education	Centralized school	10+ years	No	No
Transportation	PLB rental	1-3 years	No	No
Transportation	Inter-community water taxi service	1-3 years	No	No
Transportation	Trail marking	3-7 years	No	Yes
Transportation	Surfaced trail between all communities	3-7 years	Yes	Yes
Transportation	Surfaced road between all communities	10+ years	Yes	No
Sanitation	Install and provide training in the use of burn boxes in each community; train a person to fill a shared position to conduct proper burns in all three communities	1-3 years	Yes	Yes / Compare with in-place service
Sanitation	Sub-regional hazmat training	1-3 years	No	Yes
Sanitation	Implementation of water desalination options	3-7 years	Yes	Yes
Sanitation	Establish a sub-regional water and sanitation control board	3-7 years	No	Yes
Sanitation	Establish a centralized landfill	5-10 years	Yes	No
Housing	Energy conservation training	1-3 years	No	Yes
Housing	Perform energy audits and retrofits on homes as needed	3-7 years	No	Yes
Energy and bulk fuel	Advanced metering for AVEC communities	1-3 years	No	Yes
Energy and bulk fuel	Research alternative energy for the sub-region	3-7 years	No	Yes
Energy and bulk fuel	Consolidated bulk fuel purchasing	10+ years	Yes	Yes
Energy and bulk fuel	Use natural gas instead of diesel fuel for heating	10+ years	No	No

IN PLACE OPTIONS BY SECTOR: RECOMMENDATIONS

The following table contains all the options for improving services in place, organized by category and term for implementation. This table summarizes the services that the previous sections lay out in detail. Options in grey are not recommended at this time.

Sector	Option	Term	Permitting	Recommended
N/A	Sub-regional project newsletter	1-3 years	No	Yes
Health	Rehabilitate sauna in Alakanuk	1-3 years	No	Yes
Transportation	Establish intra-community public transportation	1-3 years	No	No
Transportation	Upgrade boat landings	1-5 years	Yes	Yes
Transportation	Creation of deep-water port in the sub-region	1-5 years	Yes	Yes
Transportation	Airport improvements in each community	1-5 years	No	Yes
Transportation	Upgrade and rehabilitate community streets	1-5 years	No	Yes
Housing	Relocate buildings	1-3 years	Possible	Yes
Housing	Construct new affordable housing	1-3 years	Possible	Yes
Sanitation	Repair the water sewer system in Alakanuk	1-3 years	No	Yes
Sanitation	Install and provide training in the use of burn boxes in each community; train a person in each community to conduct proper burns	1-3 years	Yes	Yes / Compare with in-place service
Sanitation	Improve landfill management and pursue the AK DEC permitting process	1-5 years	Yes	Yes
Sanitation	Upgrade community water and sewer systems to include the whole village	3-7 years	No	Yes

OTHER OPTIONS REQUIREMENTS

The following recommended options would require additional approval by entities not part of the communities:

- Sub-regional assisted living facility — Approval and inspections from: health organization, overseeing agency, or funding agency
- Surfaced trail between communities — Permit and approval from: AK DOT&PF
- Burn boxes in each community — Permit from: AK DEC
- Water desalination options — Approval from: AK DEC
- Advanced metering for AVEC communities — Approval from: AVEC
- Consolidated bulk fuel purchasing — Approval from: Existing utilities
- Research alternative energy for the sub-region — Approval from: Existing utilities
- Creation of a deep water port — Approval from: AK DOT&PF
- Repair and upgrade existing water/sewer systems — Approval from: Existing utilities
- Improved landfill management — Approval from: AK DEC
- Airport improvements — Approval from: AK DOT&PF and FAA

The following recommended options require surfaced trails or roads between all the communities:

- Burn boxes in each community with a shared operator
- Consolidated bulk fuel purchasing

4.2 FUNDING OPPORTUNITIES

It is important to consider how a project will be financed from the initial planning stages. The first step is to identify potential funding sources, and how they might impact project design. Also, considering financing early on in project planning allows communities to build resources and track milestones that might be required by the funding agency. Some general questions to consider are below. Many funders may require this information, and having it prepared can save time and strengthen applications.

1. How will a project be self-sustaining? Funders are reluctant to provide capital costs for projects that require ongoing costs that cannot be met through the project itself. For instance, if communities are considering applying for funding to cover the capital cost of a road, where will money for maintenance costs of the road come from in 5 years? In 10 years? For energy projects that will result in energy savings, can the community successfully convert those savings into cash to use for other purposes such as loan repayments, operations & maintenance, personnel, training, or future projects?
2. What other projects has the applicant previously implemented successfully? Information on prior successful projects demonstrates to funders that applicants have the skills necessary to plan and implement another project. It also demonstrates the ability of the applicant to keep financial and other records.
3. Is the project in line with existing community plans and priorities? If a community has plans and priorities that have been adopted or approved by the Tribal and Village Councils, the project should advance those plans or priorities. Including the resolution with the plan/priority with the application demonstrates that the project already has the support of the community government.
4. Does the community support the project? Has the applicant taken the time to vet the project with stakeholders in the community? Community participation can make or break a project's success. Demonstrating community support – through project partners, letters of support, community surveys – shows funders that a project has momentum behind it. Further, it demonstrates the ability of the applicant to share information, communicate with stakeholders, and address concerns. Finally, input from the community can strengthen applications by pointing out solutions to potential problems.
5. How strong is the project plan? Invest in training for business and project planning to improve the quality of applications. Applications should provide details on a project's financials, timeline, financial management, and personnel management practices. Taking the time to plan the project and including the details in an application again demonstrates investment in the project.
6. Is the project standard? While highly unique projects are still possible, funders often prefer when projects employ standard, proven techniques and technologies that are currently working in similar locations and conditions. This also can help reduce maintenance requirements for the project, and allow problems to be fixed by a number of skilled individuals from the industry.
7. What are the project risks? Every project has risks; strong applications will identify risks, indicating the project team is prepared to encounter challenges and has considered potential solutions. Identifying risks indicates that an applicant has a strong understanding of the project.

The table below contains grant and loan funding sources listed alphabetically by funding agency and with their individual titles. Funding opportunities are grouped in categories to show their area of assistance. It does not include potential funding from third party commercial lenders, but readers should contact these organizations as well. Community banks and credit unions have loan programs for projects and some funds may even be designated for environmental projects. These organizations can be preferable to federal and state funding sources because being local, they are invested in the community, know the local challenges and opportunities, and have staff that can provide advice in a face-to-face meeting.

Program	Funding Agency	Description	Comments
Energy cost assistance			
Power Cost Equalization (PCE)	Alaska Energy Authority (AEA)	Economic assistance for customers in rural areas of Alaska where the kilowatt-hour charge for electricity can be three to five times higher than in urban areas. PCE pays a portion of the energy sold by participating utilities.	AEA determines eligibility of community facilities and residential customers and authorizes payment to the electric utility. Commercial customers are not eligible for PCE credit. Participating utilities are required to reduce each eligible customer's bill by the amount that the State pays for PCE.
Heating Assistance Program (HAP)	Department of Health and Social Services	Fuel assistance for low-income families.	
Small business/organization			
TREND Alaska	Alaska Small Business Development Center	TREND helps companies find grants, loans, and investment sources.	TREND also provides assistance with developing inventions, finding partners, and marketing.
Tier I Grant Program	Rasmuson Foundation	Grants for capital projects, technology updates, capacity building, program expansion and creative works.	
Rural Business Development Grants	United States Department of Agriculture (USDA) Rural Development	This grant is a competitive opportunity for funding for projects that benefit small, emerging businesses in rural areas.	Funding can be used for a wide variety of applications, including training and technical assistance, land development, transportation improvement, feasibility studies, strategic planning, and more.
Energy projects			
Bulk Fuel Upgrades Program	Alaska Energy Authority	The bulk fuel upgrades program provides funding for the design, engineering, planning, and construction of code-compliant bulk fuel tank farms in rural communities.	This program is supported by the Denali Commission.
Power Project Loan Fund	Alaska Energy Authority	This fund provides loans to local utilities, governments, or power producers to develop and upgrade power facilities. Projects can include add heat recovery, fuel storage, and energy conservation.	Interest rates can be as low as zero.
Sustainable Energy Transmission and Supply Development Fund (SETS)	Alaska Industrial Development and Export Authority	SETS provides funding for energy transmission, generation, conservation, storage, and distribution projects through three mechanisms: direct loans, loan participation programs, and guarantees.	Eligible borrowers for SETS programs are cooperatives and businesses in Alaska.

Program	Funding Agency	Description	Comments
Tribal Energy Development Capacity Grant Program	Bureau of Indian Affairs (BIA)	This program provides funding for tribes to assess, develop, or obtain the capacity to develop energy resources.	
Energy Program	Denali Commission	The energy program at the Denali Commission funds energy infrastructure design, installation, and improvement in rural Alaska, including bulk fuel storage systems, power generation, transmission and distribution systems, and other projects.	
Alternative Energy Conservation Loan Fund	State of Alaska Department of Commerce, Community, and Economic Development	This fund provides loans for purchasing, constructing, and installing alternative energy systems or energy conservation improvements on commercial buildings.	
Electric Infrastructure Loan and Loan Guarantee Program	United States Department of Agriculture (USDA) Rural Development	This program provides insured loans and loan guarantees to finance the construction of electric distribution, transmission, and generation facilities in rural areas.	Funded projects can include demand side management and energy conservation programs, and renewable energy systems.
High Energy Cost Grants	United States Department of Agriculture (USDA) Rural Development	These grants help energy providers serving rural areas to lower energy costs for individuals in the area with extremely high household energy costs. Grants fund construction and improvement of facilities and implementation of energy conservation initiatives.	Energy costs must exceed 275% of the national average.
Rural Energy for America Program (REAP)	United States Department of Agriculture (USDA) Rural Development	This program provides both loans and grants to agricultural producers and rural small businesses for renewable energy systems and energy efficiency improvements.	Loans are available throughout the year; grants have an annual specific deadline for applications. The program also includes a component to fund up to 75% of energy audit costs.
USDA EE and Conservation Loan Fund	United States Department of Agriculture (USDA) Rural Development	This is an ongoing program that provides loans to electric utilities for energy improvement projects.	
START Program	United States Department of Energy	The START program provides technical assistance in strategic energy planning to help tribes move clean energy and energy efficiency projects to implementation.	

Program	Funding Agency	Description	Comments
Tribal Energy Program	United States Department of Energy	This program promotes tribal energy sufficiency and fosters economic development and employment on tribal lands through the use of renewable energy and energy efficiency. The program encompasses three different opportunities: competitive funding for energy projects, technical assistance from DOE labs, and education and training.	
Housing			
AAHA Training and Technical Assistance Program	Association of Alaska Housing Authorities	Indian Housing Block recipients are eligible for individualized on-site and remote technical assistance to build their own capacity and improve their housing programs. Grants are delivered in collaboration with Alaska HUD ONAP and regional housing authorities.	
Affordable Housing Enhanced Loan Program	Alaska Housing Finance Corporation (AHFC)	This program, a partnership between AHFC and another agency such as a housing authority, helps to provide safe, affordable housing to low- and moderate-income Alaskan borrowers. For instance, the program might help make loans more feasible for residents.	
Energy Efficiency Interest Rate Reduction Program	Alaska Housing Finance Corporation (AHFC)	Homebuyers who purchase a home with an AHFC loan can qualify for an interest rate reduction if they make energy improvements to the home. Existing energy efficient homes also can qualify for rate reductions.	The home needs to have an existing energy audit at the time of the loan. The interest rate reduction depends on if the home has access to natural gas.
Rural Owner-Occupied and Non-Owner-Occupied Loan	Alaska Housing Finance Corporation (AHFC)	This program offers loan funding for rural housing through eligible lenders. The interest rate and terms are often more attractive than other loan programs in order to support residents in rural areas.	
Second Mortgage Programs	Alaska Housing Finance Corporation (AHFC)	AHFC offers second mortgages to finance home improvements and/or maximize energy conservation.	Energy efficiency interest rate reductions can be used with a second mortgage.
Supplemental Housing Development Grant Program	Alaska Housing Finance Corporation (AHFC)	This program promotes energy efficiency in rural housing by funding projects that build energy efficient homes or rehabilitate existing units.	
Teacher, Health Professional, and Public Safety Housing Program	Alaska Housing Finance Corporation (AHFC)	This program funds rental housing for essential rural Alaska workers. The goal is to improve housing conditions in small communities and reduce turnover of rural professionals.	

Program	Funding Agency	Description	Comments
Housing Improvement Program (HIP)	Bureau of Indian Affairs (BIA)	This program is a funding mechanism for tribes to repair existing housing and provide new housing.	
Affordable Housing Program – Competitive Program	Federal Home Loan Banks (FHLBanks)	This program is a private source of funding for the purchase, construction, or rehabilitation of owner-occupied or rental residences for low- to moderate-income households.	This program is administered in Alaska by FHLB Des Moines.
Affordable Housing Program – Down Payment Assistance	Federal Home Loan Banks (FHLBanks)	This program helps member banks provide down payment and closing cost assistance to eligible local homeowners, so that more families can become homeowners.	This program is administered in Alaska by FHLB Des Moines.
Indian Community Development Block Grant Program	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This program provides grants to Alaska Native Villages for housing rehabilitation, land acquisition to support new housing construction, and under limited circumstances, new housing construction.	Grants can also be used to build community facilities and infrastructure, and for economic development.
Indian Housing Block Grant	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This program provides grants for housing activities through the regional housing authority.	
Section 184 Indian Home Loan Guarantee Program	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This loan program provides loan guarantees to lenders for housing-related loans to Alaska Native individuals and communities.	
Title VI Loan Guarantee	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This program provides financing guarantees to Indian tribes for private market loans to develop affordable housing.	
Home Ownership Services	NeighborWorks Alaska	NeighborWorks offers several programs to help potential homeowners finance a house, such as technical assistance in setting up a loan pool, USDA loan packaging, and housing counseling.	
Mutual Self-Help Housing Technical Assistance Grants	United States Department of Agriculture (USDA) Rural Development	This program provides grants to organizations to conduct local self-help housing construction projects. Homebuyers dedicate at least 30 hours per week for at least 1 year and perform the majority of tasks in building the home. The cost savings then becomes the homebuyer's "sweat equity" which acts as a down payment on the home.	In Alaska, approved USDA partners for this program are RurAL CAP and the Alaska Community Development Corporation.

Program	Funding Agency	Description	Comments
Rural Housing Site Development Loans	United States Department of Agriculture (USDA) Rural Development	This program offers two loans, Section 523 and Section 524 loans, to purchase and develop housing sites for low- and moderate-income families.	
Single Family Housing Direct Loan (Section 502 Direct Loan Program)	United States Department of Agriculture (USDA) Rural Development	These loans, for rural low-income residents, are a funding opportunity for safe and sanitary housing.	
Single Family Housing Guaranteed Loan	United States Department of Agriculture (USDA) Rural Development	This program provides lenders with a 90% loan guarantee for home loans to low- and moderate-income households in rural areas.	
Single Family Repair Loans and Grants (Section 504 Home Repair Program)	United States Department of Agriculture (USDA) Rural Development	This program provides loans to very-low-income families to repair, improve, or modernize their existing homes.	
VA Home Loans	U.S. Department of Veterans Affairs (VA)	This program provides a loan guarantee benefit for servicemembers, veterans, and eligible surviving spouses to help with building, repairing, retaining, or adapting homes for their families.	
Government/Community			
Energy Efficiency Revolving Loan Fund for Public Facilities	Alaska Housing Finance Corporation (AHFC)	Loans provide funding for energy efficiency improvements to buildings owned by regional education facilities, the University of Alaska, the state, or local municipalities.	Borrowers must obtain an Investment Grade Audit before applying for the loan to implement the audit's recommendations.
Smart Growth Implementation Assistance Program	Environmental Protection Agency (EPA)	This program provides technical assistance in policy analysis and public participatory processes. The assistance aims to foster economic growth, protect environmental resources, enhance public health, and plan for development.	This is not a grant, but technical assistance through a contractor team visit and activity facilitation.
Community Facilities Direct Loan and Grant Program	United States Department of Agriculture (USDA) Rural Development	This program provides funding to Tribes, nonprofits, and public bodies to purchase and/or improve rural community facilities such as health clinics, town halls, streets, community centers, and libraries.	
Economic Impact Initiative Grants	United States Department of Agriculture (USDA) Rural Development	The program provides funds to develop essential community facilities (such as for health care, public safety, and public service) in rural communities in severe economic depression.	

Program	Funding Agency	Description	Comments
Social and Economic Development Strategies (SEDS)	U.S. Department of Health and Human Services Administration for Native Americans (ANA)	The SEDS program provides financial assistance to tribes via grants that support local community development projects.	
Training and Technical Assistance	U.S. Department of Health and Human Services Administration for Native Americans (ANA)	Free trainings help applicants develop skills in project planning, and applying for federal grants.	
EDA Planning Program and Local Technical Assistance Program	U.S. Economic Development Administration (EDA)	This grant assists recipients in creating regional economic development plans to build capacity and guide the prosperity and resiliency of an area.	Current funding opportunity is open until fiscal year 2019.
Transportation			
Tribal Transportation Program	Bureau of Indian Affairs (BIA)	This program provides funding for community service projects such as construction or repair of roads, bridges, docks, and trails.	
Airport Improvement Program	Federal Aviation Administration (FAA)	These grants fund the planning and development of public-use airports.	
Indian Community Development Block Grant Program	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This program provides grants to Alaska Native Villages for construction of infrastructure such as roads.	Grants can also be used for housing improvements and economic development.
Public Transportation on Indian Reservations Program Tribal Transit Program	U.S. Department of Transportation	This program provides funding to tribes for public transit projects that meet the needs of growing rural tribal communities.	
Transportation Investment Generating Economic Return (TIGER)	U.S. Department of Transportation	These grants improve access to reliable, safe, and affordable transportation for disconnected communities. Eligible projects include highway, bridge, public transportation, and port projects.	
Sanitation (water, sewer, landfill)			
Indian Community Development Block Grant Program	Housing and Urban Development (HUD) Administered by Alaska ONAP.	This program provides grants to Alaska Native Villages for construction of infrastructure such as water and sewer facilities.	Grants can also be used for housing improvements and for economic development.
Rural Alaska Village Grants	United States Department of Agriculture (USDA) Rural Development	This program funds the planning, development, and construction of water and wastewater systems to improve health and sanitation in rural Alaska.	The Alaska Native Tribal Health Consortium (ANTHC) can apply for this grant on behalf of villages.

Program	Funding Agency	Description	Comments
Rural Utilities Service	United States Department of Agriculture (USDA) Rural Development	This program provides grants and loans for infrastructure in rural communities, including the development of reliable water and wastewater systems. Eligible organizations include nonprofits, public bodies, Indian Tribes, and cooperatives.	Funding can also be used for increasing access to broadband and telecommunications and improvements to rural electric infrastructure.
Solid Waste Management Grants	United States Department of Agriculture (USDA) Rural Development	These grants funds projects that provide technical assistance or training to improve the planning and management of landfills.	
Water and Waste Disposal Loans and Grants	United States Department of Agriculture (USDA) Rural Development	This program provides funding to improve access to clean water and waste disposal systems in rural areas.	
Water and Waste Disposal Loan Guarantees	United States Department of Agriculture (USDA) Rural Development	This program helps private lenders provide affordable loans to finance projects to improve access to clean water and waste disposal systems in rural areas.	
Public Works Program	U.S. Economic Development Administration (EDA)	This program provides funding to help communities build infrastructure such as water and sewer system improvements, industrial parks, skill-training facilities, and redevelopment of brownfields.	
Alaska Native Village Grant	U.S. Environmental Protection Agency (EPA)	The goal of this program is to assist Alaska rural communities with construction of new or improved systems for drinking water and wastewater.	
Safe Drinking Water Act Tribal Set-Aside Program	U.S. Environmental Protection Agency (EPA)	This program helps tribes plan, design, and construct new or improved drinking water infrastructure.	

WORKS CITED

Abraham, J. (2011). *A promising tool for subsurface permafrost mapping - an application of airborne geophysics from the Yukon River Basin, Alaska (Fact Sheet 2011-3133).* Alaska: U.S. Geological Survey.

AK Department of Labor & Workforce Development. (2017). *Alaska New Housing Units, 2009-2016*. Retrieved May 2017, from AK Department of Labor & Workforce Development Research and Analysis: http://live.laborstats.alaska.gov/housing/newh.cfm

Alaska Department of Fish and Game. (2012). *Subsistence in Alaska: A Year 2012 Update.* Anchorage, AK: Alaska Department of Fish and Game.

Alaska Department of Transportation & Public Facilities. (2017). *Yukon Kuskokwim Delta Transportation Plan.* Anchorage, AK: Alaska Department of Transportation & Public Facilities.

Alaska Rural Utility Collaborative. (2016). *2016 ARUC Report on Activities.* Anchorage, AK: Alaska Native Tribal Health Consortium. Retrieved from https://anthc.org/what-we-do/tribal-utility-support/alaska-rural-utility-collaborative-aruc/

American Community Survey. (2016). *American Community Survey: Data Tables & Tools*. Retrieved November 22, 2016, from United States Census Bureau: https://www.census.gov/acs/www/data/data-tables-and-tools/index.php

ANTHC Rural Energy Initiative. (2017). *Rural Energy Reports & Audits*. Retrieved from Alaska Native Tribal Health Consortium: https://anthc.org/what-we-do/rural-energy/audits/

Antrobus, D., & Boccia, D. (2014). *Nunam Iqua Preliminary Landfill Design Study.* Anchorage, AK: Alaska Native Tribal Health Consortium.

AVCP RHA. (2017). *About AVCP RHA*. Retrieved from Association of Village Council Presidents Regional Housing Authority: http://www.avcphousing.org/about

Coastal Villages Region Fund. (2017). *About Us*. Retrieved from CVRF People Propel: http://www.coastalvillages.org/about-us

Eurich, J. (2015, April 21). *Tribal health organization turns to crowd sourcing for water and sewer project*. Retrieved from KNBA: http://knba.org/post/42115-legislators-do-not-reach-agreement-budgets

National Geographic Society. (2015, December). *Permafrost*. Retrieved from National Geographic Society Education: http://education.nationalgeographic.org/encyclopedia/permafrost/

Nunam Iqua Advisory Planning Board. (2012). *Nunam Iqua Wind Power Study.* Anchorage, AK: Alaska Energy Authority.

U.S. Census Bureau. (2010). *2010 Census Data*. Retrieved from United States Census 2010: https://www.census.gov/2010census/data/

United States Fish & Wildlife Service. (2014, November 3). *Yukon Delta: About the refuge*. Retrieved 2017, from Yukon Delta: National Wildlife Refuge | Alaska: https://www.fws.gov/refuge/Yukon_Delta/about.html

Wiltse, N., Madden, D., Valentine, B., & Stevens, V. (2014). *2013 Alaska Housing Assessment.* Anchorage, AK: Alaska Housing Finance Corporation & Cold Climate Housing Research Center.